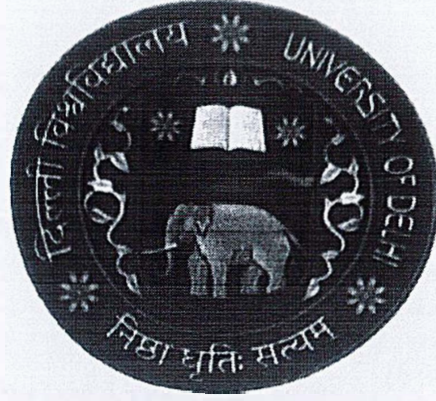




**FACULTY OF AYURVEDIC & UNAN MEDICINE
UNIVERSITY OF DELHI**

**Curriculum/syllabus for the Postgraduate
Programme MS -Tashreehul Badan (Anatomy)**

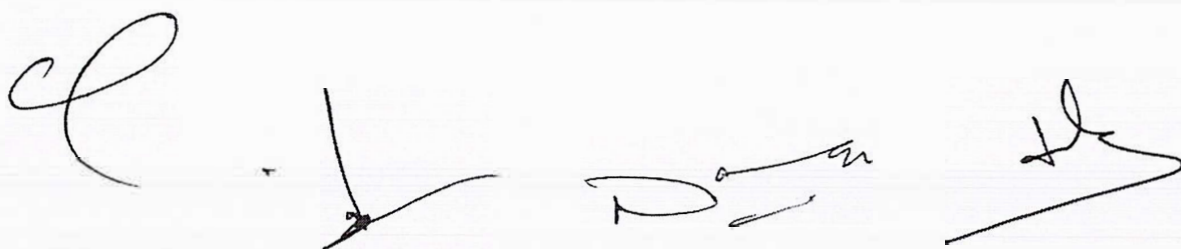
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**Competency-Based Dynamic Curriculum for MD/ MS UNANI
(PRESCRIBED BY NCISM)**

Semester I Course - Biostatistics

(SUBJECT CODE : UNIPG-BS)

(Applicable from 2024-25 batch, from the academic year 2024-25 onwards until further
notification by NCISM)



**BOARD OF UNANI, SIDDHA AND SOWA RIGPA
NATIONAL COMMISSION FOR INDIAN SYSTEM OF MEDICINE
NEW DELHI-110026**

PREFACE

Statistics plays a pivotal role in postgraduate studies, especially within Unani, where it is essential for conducting research, validating traditional knowledge, and advancing clinical applications. In Unani, the integration of statistical analysis allows scholars to analyze clinical data, ensure the standardization of formulations, and evaluate the efficacy of treatments. Additionally, the interpretation of literary research data from classical texts like Samhitas and manuscripts is critical for bridging ancient wisdom with modern scientific approaches.

This course introduces a comprehensive approach to biostatistics, emphasizing both theoretical understanding and practical application. Students will explore the use of statistics in clinical trials, formulation standardization, and data analysis from textual sources. Practical learning sessions focus on real-world applications, while experiential components guide students through analyzing classical Unani texts to derive meaningful insights using statistical methods.

Through this curriculum, students will gain valuable skills in statistical analysis and research methodology, empowering them to conduct robust, evidence-based research in Unani. The course is designed to enhance critical thinking, enabling scholars to contribute effectively to the field with a deepened understanding of both traditional knowledge and contemporary scientific practices.

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NCISM

Competency/Outcome-Based Dynamic Curriculum for MD/ MS UNANI

Subject Code : UNIPG-BS

Summary & Credit Framework

Module Number & Name	Credits	Notional Learning Hours	Maximum Marks of assessment of modules (Formative assessment)	Module Marks for Summative Assessment (University Examination)
1. Fundamentals of Statistics	1	30	25	10
2. Probability, Probability Distributions, Sampling Techniques, and Sample Size Determinations	2	60	50	25
3. Tests of significance and parametric statistical tests	2	60	50	25
4. Non-parametric statistical tests	1	30	25	15
5. Disease frequency; Demography and Vital statistics	1	30	25	15
6. Correlation and Regression Analysis	1	30	25	10
	8	240	200	100

Credit frame work

UNIPG-BS has 6 modules of 8 credits which includes 240 Notional Learning Hours. One Credit will be having 30 Hours of learner participation and teaching, practical and experiential learning will in the ratio of 1:2:3 i.e. One credit will have 5 hours of teaching, 10 hours of practical training and 13 hours of experiential learning and 2 hours of modular assessment for 25 marks.

Course Code and Name of Course

Course code	Name of Course
UNIPG-BS	Semester I Course - Biostatistics

Table 1 : Course learning outcomes and mapped Program learning outcomes

CO No	A1 Course learning Outcomes (CO) UNIPG-BS At the end of the course UNIPG-BS, the students should be able to-	B1 Course learning Outcomes mapped with program learning outcomes.
CO1	Demonstrate application of principles of Descriptive and Inferential Statistics in research.	PO4,PO7
CO2	Demonstrate use of appropriate statistical tests in research.	PO4,PO7
CO3	Analyze and present research data using suitable statistical methods, tools, and software.	PO4,PO5
CO4	Evaluate and interpret statistical data from research papers and publications.	PO4,PO8

Table 2 : Course contents (Modules- Credits and Marks)

2A Module Number	2B Module & units	2C Number of Credits	2D Notional Learning hours				2E Marks
			Theory	Practical Training	Experiential Learning including modular assessment	Total	
1	M-1 Fundamentals of Statistics This module provides an introduction to the fundamentals of statistics and its significance in the biomedical field. It emphasizes the importance of understanding how data is collected, classified, and analyzed, offering essential tools for interpreting research findings. By exploring various statistical methods, this module equips learners with the skills to describe and summarize data accurately, ensuring meaningful insights are drawn from research. It also addresses the correct and incorrect applications of statistics, highlighting the potential for misuse and how to avoid it. This knowledge is crucial for anyone involved in medical research or data-driven decision-making in healthcare. • M1U1 Fundamentals of Statistics 1. Definition of Statistics: Fundamentals of Statistics and its applications to the biomedical field (Biostatistics), Use and misuse of Statistics. 2. Data – Definition, Types, Classification and presentation 3. Variables- Definition, Types 4. Descriptive Statistics - Measures of Central tendency – Mean, Median, Mode, Percentile 5. Measures of Dispersion- Range, Quartile deviation, Mean deviation, and Standard deviation and Co-efficient of variation	1	5	10	15	(30)	10

2	M-2 Probability, Probability Distributions, Sampling Techniques, and Sample Size Determinations This module introduces the concept of probability, covering its definitions, types, and fundamental laws. It explores key probability distributions, including normal, binomial, and Poisson distributions, along with their properties and applications. The module also discusses important concepts such as standard error, point estimates, and confidence intervals in the context of interpreting research results. Additionally, it focuses on sampling techniques, both probability and non-probability-based, and the principles of determining appropriate sample sizes for different types of studies, including descriptive, analytical, and randomized controlled trials (RCTs). • M2U1 Probability and Probability Distributions Probability - Definitions, types, and laws of probability. Probability Distributions - 1. Normal distribution: Concept and Properties. 2. Different ways to test the assumption of normality. 3. Binomial Distribution, Poisson Distribution. 4. Definitions and explanation of Sampling distribution, Standard Error, Point Estimate, and Confidence interval • M2U2 Sampling techniques and Sample size Determinations 1. Population and sample parameters 2. Sampling techniques (probability & non-probability based) and Sample size Determinations: 3. Sampling designs and prerequisites for sample size computation. 4. Computation of sample size for Descriptive studies, Analytical Studies, and RCTs.	2	10	20	30	(60)	25

3	M-3 Tests of significance and parametric statistical tests This module covers the essential concepts of hypothesis testing, including the formulation of null and alternate hypotheses, and the understanding of Type I and Type II errors. It delves into tests of significance, the level of significance, power of the test, and the interpretation of the p-value, distinguishing between statistical and clinical significance. Additionally, it introduces parametric tests such as the Z test, Student's t-test (paired and unpaired), F-test, and Analysis of Variance (ANOVA), including repeated measures ANOVA, which are crucial for analyzing and interpreting data in research studies. • M3U1 Testing of hypothesis 1. Understand and apply the concept of null and alternate hypotheses 2. Define of Type I and type II errors, 3. Evaluate Test of significance, level of significance, power of the test 4. Calculate 'P' value and its interpretation, statistical significance, and clinical significance • M3U2 Parametric tests 1. 'Z' test 2. Student's 't' test: paired or dependent 3. Student's 't' test: unpaired or independent 4. 'F' test 5. Analysis of variance (ANOVA) test with post hoc Analysis 6. Repeated measures ANOVA with post hoc Analysis	2	10	20	30	(60)	25

4	M-4 Non-parametric statistical tests This module introduces non-parametric methods, focusing on their definition and fundamental principles. Non-parametric tests, such as the Chi-square test, Fisher's exact test, McNemar's test, Wilcoxon test, Mann-Whitney U test, Kruskal-Wallis, and Friedman test (with relevant post hoc tests like Dunn), are discussed for their application when data do not meet parametric assumptions. The module also highlights the key differences between parametric and non-parametric tests, helping learners understand when to use each approach based on the nature of the data and study design. • M4U1 Non-parametric methods 1. Definition and fundamentals of non-parametric methods; Concept and application of Chi-square test and Fisher's exact test. 2. Mann-Whitney U test: Concept and application 3. McNemar's test and Wilcoxon Signed rank test- Concept and application 4. Kruskal-Wallis test with relevant post hoc tests: Concept and application 5. Friedman test with relevant post hoc tests: Concept and application; parametric vs non-parametric test.	1	5	10	15	(30)	15
5	M-5 Disease frequency; Demography and Vital statistics This module focuses on the measures of disease frequency, covering key concepts such as incidence, prevalence, odds ratio, relative risk, and risk difference, along with their confidence intervals. It explains the computation and interpretation of rates, ratios, and proportions in health data. The module also introduces demography, highlighting its importance and applications, particularly in fertility measures. Additionally, it covers vital statistics, including the significance and calculation of birth, mortality,	1	5	10	15	(30)	15

	morbidity rates, and hospital-related statistics, essential for understanding population health and healthcare management. • M5U1 Measures 1. Measures of disease Frequency: Incidence and prevalence. 2. Odds ratio, Relative Risk and Risk difference, and their confidence intervals 3. Definition and computation of the measures Rate, Ratio, and Proportion 4. Demography and its importance and applications. Fertility measures 5. Vital statistics and its importance and applications. Birth rate, Mortality rates, Morbidity rates, and Hospital-related statistics.						
6	M-6 Correlation and Regression Analysis This module introduces the concepts of correlation and regression analysis, focusing on their properties, computation, and applications. It covers simple linear correlation, including Karl Pearson's correlation coefficient and Spearman's rank correlation. The module also explores linear and multiple regression analysis for predicting relationships between variables, along with logistic regression analysis used for binary outcomes. Additionally, it includes survival analysis, which is crucial for studying time-to-event data, commonly used in biomedical and clinical research. • M6U1 Correlation and Regression Analysis 1. Concept, properties, computation, and applications of correlation. Understanding of the scatter diagram 2. Simple linear correlation, Karl Pearson's correlation coefficient, Spearman's rank correlation.	1	5	10	15	(30)	10

	3. Linear and multiple regression analysis of their application and interpretation. 4. Logistic regression analysis: Concept and application. 5. Survival Analysis. Concept and application.						
		8	40	80	120	240	100

Table 3 : Modules - Learning objectives

3A Sr.No	3B Course Outcome	3C Learning Objective (At the end of the (lecture/practical/experiential) learning session, the students should be able to)	3D Notional learning Hours	3E Lecture/ Practical Training/ Experiential Learning	3F Domain/ Sub Domain	3G Level (Does/Sh ows how/ Knows h ow/Kno w)	3H Teaching Learning Methods
Module 1 : Fundamentals of Statistics							
Module Learning Objectives (At the end of the module, the students should be able to) 1. Explain the fundamentals of Statistics and its application to the biomedical field (Biostatistics). Use and misuse of Statistics. 2. Define various types of data and variables. 3. Identify the data type apply, and interpret descriptive statistics to summarize the characteristics of a data set.							
Unit 1 Fundamentals of Statistics 1. Definition of Statistics: Fundamentals of Statistics and its applications to the biomedical field (Biostatistics), Use and misuse of Statistics. 2. Data – Definition, Types, Classification and presentation 3. Variables- Definition, Types 4. Descriptive Statistics - Measures of Central tendency – Mean, Median, Mode, Percentile 5. Measures of Dispersion- Range, Quartile deviation, Mean deviation, and Standard deviation and Co-efficient of variation References: 1,2,3,4,5,6,7,8,9,10,11,12							
3A	3B	3C	3D	3E	3F	3G	3H

1	CO1,CO2,CO3	Define Statistics and Describe the concepts of Biostatistics. Use and misuse of Statistics	1	Lecture	CK	Know	L&PPT
2	CO1,CO2,CO3	Explain the data, variables, and their types	1	Lecture	CK	Knows-how	L&PPT
3	CO1,CO2,CO3	Appraise to enter, clean, group, and code for given data sets in Excel and other statistical software.	2	Practical Training 1.1	PSY-MEC	Shows-how	EDU,L&GD
4	CO1,CO2,CO3	Explain different methods of Presentation of data	1	Lecture	CE	Knows-how	L&GD
5	CO1,CO2,CO3	Construct the tables (tabulate) with one or more factors of classification manually /Statistical tool/software (Frequency distributions)	2	Practical Training 1.2	PSY-MEC	Does	PBL
6	CO1,CO2,CO3	Collect, enter, clean, and manually tabulate data collected/ statistical tool/ software.	3	Experiential-Learning 1.1	PSY-SET	Shows-how	PSM
7	CO1,CO2,CO3	Represent the quantitative and qualitative data Diagrammatically and graphically(Cumulative frequency distributions and their Graphical representation, Histogram, Frequency Polygon, Frequency Curve, Ogives, Population Pyramid, and Box Plot)	2	Practical Training 1.3	PSY-GUD	Shows-how	PBL
8	CO1,CO2,CO3	Data collection, enter,cleaning, tabulation, and graphically/ diagrammatically present the data collected manually/ statistical tool/ software	3	Experiential-Learning 1.2	PSY-SET	Shows-how	PBL
9	CO1,CO2,CO3	Explain the Measures of Central Tendency Mean(arithmetic, geometric,harmonic) , Median, Mode and Proportion.	1	Lecture	CAP	Knows-how	L&PPT
10	CO1,CO2,CO3	Calculate and Demonstrate measures of Central tendency using different sets of data (5 each)	2	Practical Training 1.4	PSY-SET	Shows-how	PSM
11	CO1,CO2,CO3	Collect, enter, clean, and compute measures of central tendency manually/ statistical tool/ software	2	Experiential-Learning 1.3	PSY-SET	Shows-how	PAL
12	CO1,CO2,CO3	Explain the measures of Dispersion- Range, Quartile deviation, Mean	1	Lecture	CK	Knows-	L&PPT

		deviation, and Standard deviation and Co-efficient of variation.				how	
13	CO1,CO2,CO3	Calculate and Demonstrate measures of Dispersion using different sets of data	2	Practical Training 1.5	PSY-SET	Shows-how	D
14	CO1,CO2,CO3	Collect,enter,clean data with computing measures of dispersion with manually/statistical tool/ software	2	Experiential-Learning 1.4	PSY-SET	Shows-how	C_L,D,DIS,PT,PrBL
15	CO1,CO2,CO3	Collect, enter, clean, present, and compute descriptive data analysis for one quantitative and qualitative variable manually/tool/software.	3	Experiential-Learning 1.5	PSY-GUD	Does	PAL

Practical Training Activity

Practical No	Name	Activity details
Practical Training 1.1	Data handling	• Demonstration by the teacher ◦ Data entry, cleaning, grouping, and coding of given data sets in Excel. • Hands-on training ◦ Divide students into three groups ◦ The students should be provided sample datasets (one specific to domain/subject* and one demographic)to each group for data entry, cleaning, grouping, and coding of the given data set in Excel. ◦ Encourage students to discuss their approaches within their groups. ◦ Invite each group to narrate and show the procedure they followed with their dataset in Excel. ◦ A discussion on the different methods used for text and numeric data, the challenges encountered, and the insights gained from the data • The teacher shall summarize the key concepts covered in the practical.
Practical Training 1.2	Graphically representinon of	

	qualitative data	• Demonstration by the teacher ◦ Tabulation of given data set using Excel/Statistical Software/tools • Hands-on training ◦ Divide students into small groups ◦ The students should be provided Sample datasets(specific to domain/subject*) or can use previous data sets for hands-on practice. ◦ Instruct each group to tabulate their assigned dataset. ◦ Instruct the presentation of only qualitative data graphically and diagrammatically. ◦ Encourage students to use excel/statistical tools/software for presentation. ◦ Encourage students to discuss their approaches within their groups. • The teacher shall summarize the key concepts covered in the practical.
Practical Training 1.3	Diagrammatic and graphical representation of quantitative and qualitative data	• Demonstration by the teacher ◦ Tabulation of given data set manually and using Statistical Software/tools • Hands-on training ◦ Divide students into small groups ◦ The students should be provided with sample datasets(one specific to domain/subject* and one demographic)or case studies for hands-on practice. ◦ Instruct each group to tabulate their assigned dataset. ◦ Instruct to present only quantitative data graphically. ◦ Encourage students to use statistical tools/software for presentation. ◦ Encourage students to discuss their approaches within their groups. • The teacher shall summarize the key concepts covered in the practical.
Practical Training 1.4	Calculation of measures of Central Tendency (3 Sets of Data)	• Demonstration by the teacher

		◦ Calculate the mean, median, and mode manually using Statistical Software/tools. • Hands-on training ◦ Divide students into small groups. ◦ The students should be provided Sample datasets (specific to domain/subject*) or can use previous data sets for hands-on practice. ◦ Instruct each group to calculate the mean, median, and mode for their assigned dataset. ◦ Encourage students to use statistical software for calculation and verification. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to present their results. ◦ Facilitate a discussion on the differences between mean, median, and mode in various datasets and their merits and demerits. • The teacher shall summarize the key concepts covered in the practical.
Practical Training 1.5	Calculation of measures of Dispersion (3 Sets of Data)	• Demonstration by the teacher ◦ Calculating the measures of Dispersion manually and using Statistical Software/tools. • Hands-on training ◦ Divide students into small groups ◦ The students should be provided Sample datasets (specific to domain/subject*) or can use previous data sets for hands-on practice. ◦ Instruct each group to calculate the range, variance, standard deviation, etc., for their assigned dataset. ◦ Encourage students to use statistical software for calculation and verification. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to present their results. ◦ Facilitate a discussion on the differences between range, variance, and standard deviation in various datasets. • The teacher shall summarize the key concepts covered in the practical.

Experiential learning Activity		
Experiential learning No	Name	Activity details
Experiential-Learning 1.1	Data collection, entry, and cleaning collected data	Data Collection-Students should collect data specific to their domain/ subject from sources such as clinics/ inpatient departments (IPD)/ laboratories/animal houses/ Central Research Facility/Drug testing laboratories/pharmacies or surveys, or data from existing datasets. Whichever is feasible, <i>Students may be given 2-3 days.</i> Data Entry: Once the data is collected, students should enter it into statistical software/ Tools
Experiential-Learning 1.2	Presentation of the data .	Data Entry and Cleaning: Cleaning the Data entered into statistical software/ Tools. Data tabulation: They should create frequency distributions to visualize the data distribution. Data presentation and interpretation: They should present the tabulated data graphically/ diagrammatically and also interpret it.
Experiential-Learning 1.3	Measures of central tendency manually/ statistical tool/ software	Data Collection-Domain specific data collected in Experiential learning 1.1 taken Data Cleaning: Cleaning the data sets in statistical software/ Tools Central Tendency: Students should calculate measures of central tendency (mean, median, mode) Interpreting Descriptive Statistics: After calculating and visualizing measures of central tendency, students should interpret the results to draw meaningful conclusions about the dataset. They should identify patterns, trends, and relationships within the data.
Experiential-Learning 1.4	Measures of dispersion	Data Collection-- Domain-specific data collected in Experiential learning 1.1 taken Data Entry and Cleaning: Once the data is collected, students should enter it into statistical software/ Tools Measures of Dispersion: Students should calculate measures of dispersion (range, variance, standard deviation) Interpreting Descriptive Statistics: After calculating and visualizing Measures of Dispersion, students should interpret the results to draw meaningful conclusions about the dataset. They should identify patterns, trends, and relationships within the data.
Experiential-Learning 1.5	Descriptive data analysis	Data Collection-- Domain-specific data collected in Experiential learning 1.1 taken Data Entry and Cleaning: Once the data is collected, students should enter it into statistical software/ Tools Data Exploration: They should create frequency distributions and histograms to visualize the data distribution. Central Tendency and Dispersion: Students should calculate measures of central tendency (mean, median, mode) and measures of dispersion (range, variance, standard deviation) Interpreting Descriptive Statistics: After calculating and visualizing descriptive statistics, students should interpret the results to draw meaningful conclusions about the dataset. They should identify patterns, trends, and relationships within the data.

Modular Assessment	
Assessment method	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 25 marks per credit. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. A.1.Practical structured Viva Prepare a 10 viva questions including all the topics of module 1. – 20 Marks 2.Answer key- Prepare the key points that need to be covered and marks to be allocated to different sections. Example - Question:What is mean? Answer Key:*Definition(1M): The mean is a measure of central tendency, also known as the arithmetic average of a dataset. *Formula(1M): $\text{Mean} = \frac{\text{Sum of all values}}{\text{Number of values}}$ 3.Score all students as per answer key. B.Practical Record Book – 5 Marks Or Any practical in converted form can be taken for assessment. Or Any of the experiential as portfolio/ refelections / presentations can be taken as assessment.	2

Module 2 : Probability, Probability Distributions, Sampling Techniques, and Sample Size Determinations

Module Learning Objectives

(At the end of the module, the students should be able to)

1. Define and explain the Concept and laws of probability
2. Explain different probability distributions, standard error, point estimate, and confidence interval.
3. Explain and relate the various types of Sampling techniques.
4. Compute sample size for Descriptive studies, Analytical studies, and RCTs.

Unit 1 Probability and Probability Distributions Probability -

Definitions, types, and laws of probability.

Probability Distributions -

- 1. Normal distribution: Concept and Properties.**
- 2. Different ways to test the assumption of normality.**
- 3. Binomial Distribution, Poisson Distribution.**
- 4. Definitions and explanation of Sampling distribution, Standard Error, Point Estimate, and Confidence interval**

References: 13,14,21,22,23,24

3A	3B	3C	3D	3E	3F	3G	3H
1	CO1,CO2,CO4	Explain Sample Spaces and Events associated with a random experiment. Define probability and discuss the laws of probability.	1	Lecture	CK	Know	L&PPT
2	CO1,CO2,CO4	Generate questions on probability, experimental probability, Mutually	2	Experiential-	PSY-ADT	Shows-	BS,DIS,I

		Exclusive, and Exhaustive Events in probability.		Learning 2.1		how	BL,PT,PER,PSM
3	CO1,CO2,CO4	Define and discuss the properties of normal distribution and explain standard normal distribution.	1	Lecture	CAP	Knows-how	DIS,L&PPT
4	CO1,CO2,CO4	Explain ways to test the assumption of normality (based on measures of central tendency, histogram, Shapiro-Wilk test)	1	Lecture	CK	Know	L&PPT
5	CO1,CO2,CO4	Test and appraise the assumption of normality of given data sets using Excel and other software.	2	Practical Training 2.1	PSY-SET	Shows-how	D,PAL
6	CO1,CO2,CO4	Interpret results in Excel and other software for testing the normality of given data sets.	2	Practical Training 2.2	PSY-GUD	Shows-how	D
7	CO1,CO2,CO4	Discuss assumptions, properties, and the application of binomial and poison distribution	1	Lecture	CK	Know	L&PPT
8	CO1,CO2,CO4	Compute the mean and variance of normal, binomial, and poison distribution (given the probability distribution function).	2	Practical Training 2.3	PSY-ADT	Shows-how	BL,D
9	CO1,CO2,CO4	Identify and justify normal, binomial, and poison distribution using a secondary dataset /Published data	2	Experiential-Learning 2.2	PSY-ADT	Shows-how	BL,D,DIS,PAL,PER,PBL
10	CO1,CO2,CO4	Collect and present of different real-life events in Respective subject domains where they can apply normal, binomial, and poison concepts.	2	Experiential-Learning 2.3	PSY-ADT	Shows-how	BL,D
11	CO1,CO2,CO4	Define and explain Sampling distribution, Standard Error, Point Estimate, and confidence Interval	1	Lecture	CK	Know	L&PPT
12	CO1,CO2,CO4	Compute and interpret Standard Error, Point Estimate, and confidence interval for the mean.	2	Practical Training 2.4	PSY-ADT	Shows-how	D,DIS,PT,PER,PrBL
13	CO1,CO2,CO4	Compute and interpret Standard Error, Point Estimate, and confidence interval for proportion.	2	Practical Training 2.5	PSY-SET	Shows-how	BL,D,IBL,PER

14	CO1,CO2,CO4	Identify and interpret the point estimate and confidence interval in the given research papers/data sets.	2	Experiential-Learning 2.4	PSY-SET	Shows-how	BL,D
15	CO1,CO2,CO4	Identify and interpret the point estimate and confidence interval for collected data sets.	2	Experiential-Learning 2.5	PSY-SET	Shows-how	D,PT,PER

Unit 2 Sampling techniques and Sample size Determinations

1. Population and sample parameters

2. Sampling techniques (probability & non-probability based) and Sample size Determinations:

3. Sampling designs and prerequisites for sample size computation.

4. Computation of sample size for Descriptive studies, Analytical Studies, and RCTs.

References: 15,16,17,18,19,20

3A	3B	3C	3D	3E	3F	3G	3H
1	CO1,CO2,CO4	Explain the population, sample, parameter, and statistic.	1	Lecture	CK	Know	L&PPT
2	CO1,CO2,CO4	Describe different Sampling techniques (Probability based) (simple, stratified, systematic, cluster)	1	Lecture	CK	Know	L&PPT
3	CO1,CO2,CO4	Describe different Sampling techniques (non-probability based) (snow ball, convenience, quota)	1	Lecture	CK	Know	L&GD
4	CO1,CO2,CO4	Demonstrate Sampling techniques (probability)	2	Practical Training 2.6	PSY-SET	Shows-how	D,IBL
5	CO1,CO2,CO4	Demonstrate Sampling techniques (non-probability)	2	Practical Training 2.7	PSY-SET	Shows-how	D,PL,PT, PER
6	CO1,CO2,CO4	Concept and understanding of sample size and study design (Descriptive, Analytical, and all study Designs)	2	Lecture	CK	Know	L&PPT

7	CO1,CO2,CO4	Determine and Compute sample size for Descriptive study Designs manually, using Excel and other available software/tools.)	2	Practical Training 2.8	PSY-SET	Shows-how	D,DIS,PER,PrBL
8	CO1,CO2,CO4	Determine and compute sample size for analytical studies (manually, using Excel and other available software/tools).	2	Practical Training 2.9	PSY-SET	Shows-how	D,DIS,PT,PER,PBL
9	CO1,CO2,CO4	Determine and compute sample size for RCT study designs (manually, using Excel and other available software/tools).	2	Practical Training 2.10	PSY-SET	Shows-how	D,IBL,PBL
10	CO1,CO2,CO4	Recognize sampling designs and critique sample sizes in research papers. Also, give the recommendations if they contradict.	2	Experiential-Learning 2.6	PSY-SET	Shows-how	BL,BS,IBL,PAL,PER,SDL,TBL
11	CO1,CO2,CO4	Calculate sample size for an observational study, use appropriate sampling techniques, and collect the data.	3	Experiential-Learning 2.7	PSY-SET	Shows-how	D,IBL,PAL,PER,PBL
12	CO1,CO2,CO4	Calculate sample size for analytical study using appropriate sampling technique and collect the data.	3	Experiential-Learning 2.8	PSY-SET	Shows-how	D,PAL,PBL,TBL
13	CO1,CO2,CO4	Calculate sample size for RCT study using appropriate sampling technique and collect the data.	2	Experiential-Learning 2.9	PSY-SET	Shows-how	BL,D,DIS,PT,PER,PrBL,SDL
14	CO1,CO2,CO4	Build and justify different scenarios using appropriate Study design, sampling techniques, and sample size formula.	2	Experiential-Learning 2.10	PSY-SET	Shows-how	BS,PrBL,TBL
15	CO1,CO2,CO4	Plan and produce a simulated model for different probability Sampling techniques.	2	Experiential-Learning 2.11	PSY-SET	Shows-how	BS,D-M,RP
16	CO1,CO2,CO4	Plan and produce a simulated model for different non-probability sampling techniques.	2	Experiential-Learning 2.12	PSY-SET	Shows-how	D,IBL,PT,PER

Practical Training Activity		
Practical No	Name	Activity details
Practical Training 2.1	Normal Data	• Demonstration by the teacher ◦ Test normality using statistical tools/ software. • Hands-on training/ presentation ◦ Divide students into small groups ◦ The students should be provided with Sample datasets (2 each) for hands-on practice. ◦ Instruct each group to test the normality using measures of central tendency, Histogram, and Shapiro-Wilk test. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to present their results. • Conclusion and summarization ◦ The teacher shall summarize the key concepts covered in the practical session and give inputs for further improvisation.
Practical Training 2.2	Interpretation of Normal Data.	• Demonstration by the teacher Interpretation of results after testing the normality using Excel and other software. • Hands-on training and Interpretation ◦ Each group is provided with the data set (1 each) for hands-on practice. ◦ Instruct the groups to test the normality of the given data set. ◦ Advocate for each group to discuss the different ways of interpreting results, the challenges encountered, and the insights gained. ◦ Then, students should be provided with only an output sheet/histogram/ result sheet from software/tool after testing

		for normality (2 each) to interpret the result as hands-on practice. • conclusion and summarization ◦ The teacher shall summarize the key concepts covered in the practical session and also give inputs for further improvisation.
Practical Training 2.3	Calculate the mean and variance of normal, binomial, and poison distribution.	• Demonstration by the teacher ◦ Calculation of means and variance of normal, binomial, and poison distribution for given data sets (manually/ Statistical Software/tools) • Hands-on training/ peer discussion ◦ Divide students into small groups ◦ Given the probability distribution function, the students should be provided with Sample datasets, ◦ Instruct the group to identify the type of probability distribution ◦ Direct each group to manually calculate the mean and variance of normal, binomial, and poison distribution for their assigned dataset. ◦ Encourage students to use statistical software for calculation and verification. ◦ Instigate brainstorming within the groups to discuss their approaches and findings. • conclusion and summarization ◦ The teacher shall summarize the key concepts covered in the practical session and also give inputs for further improvisation.
Practical Training 2.4	Standard Error and confidence interval	• Demonstration by the teacher ◦ Calculation of Standard Error, Point Estimate, and confidence interval for mean manually and using Statistical Software/tools • Hands-on training/ presentation ◦ Divide students into small groups

		◦ The students should be provided with Sample datasets for hands-on practice. ◦ Instruct each group to calculate the standard error, Point Estimate, and confidence interval for the mean for their assigned dataset. ◦ Encourage students to use statistical software for calculation and verification. ◦ Invite each group to present their results. • Conclusion and summarization ◦ The teacher shall summarize the key concepts covered in the practical session and also give inputs for further improvisation.
Practical Training 2.5	Standard Error and confidence interval Estimation.	• Demonstration by the teacher ◦ Calculation of Standard Error, Point Estimate, and confidence interval for mean manually and using Statistical Software/tools • Hands-on training/ Presentation ◦ Divide students into small groups ◦ The students should be provided with Sample datasets for hands-on practice. ◦ Instruct each group to calculate the Standard Error, Point Estimate, and confidence interval for proportions for their assigned dataset. ◦ Encourage students to use statistical software for calculation and verification. ◦ Invite each group to present their results. • Conclusion and summarization ◦ The teacher shall summarize the key concepts covered in the practical session and also give inputs for further improvisation.
Practical Training 2.6	Perform of probability sampling	• Demonstration by the teacher

		Probability sampling using real-world examples • Hands-on training / Peer learning/ Demonstration ◦ Divide students into small groups. ◦ Instruct each group to demonstrate data Collection using probability sampling techniques. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to demonstrate the probability sampling method. • Conclusion and summarization ◦ The teacher shall summarize the key concepts covered in the practical session and also give inputs for further improvisation.
Practical Training 2.7	Non-probability sampling	• Demonstration by the teacher Non-probability sampling using real-world examples • Hands-on training/ Peer learning/ Demonstration ◦ Divide students into small groups. ◦ Instruct each group to demonstrate data Collection using non-probability sampling techniques. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to demonstrate the non-probability sampling method. • Conclusion and summarization ◦ The teacher shall summarize the key concepts covered in the practical session and also give inputs for further improvisation.
Practical	Sample size for	

Training 2.8	Descriptive study Designs.	• Compute sample size for Descriptive study Designs (manually, Excel, and other available software/tools.)(5 for each case scenario) • Demonstration by the teacher ◦ Train to identify different study designs and decide the sample size calculation method to be used. ◦ Compute sample size for Descriptive study Designs (manually, Excel, and other available software/tools) • Hands-on training (problem-based learning) ◦ Divide students into small groups ◦ The students should be provided with a Sample case scenario (5 each) with all information needed for sample size calculation for hands-on practice. ◦ Encourage students to identify the study design and calculate the sample size. Thereby, they will discuss the approaches and findings within their groups. ◦ Invite each group to present and justify their results. • Conclusion and summarization ◦ The teacher shall summarize the key concepts covered in the practical session and also give inputs for further improvisation.
Practical Training 2.9	Sample size for analytical studies.	• Determine and compute sample size for analytical studies (manually, using Excel and other available software/tools). • Demonstration by the teacher ◦ Train to identify different study designs and decide the sample size calculation method to be used. ◦ Compute sample size for analytical study Designs (manually, Excel, and other available software/tools) • Hands-on training (problem-based learning) ◦ The students should be provided with a Sample case scenario (5 each) with all information needed for sample size calculation for hands-on practice. ◦ Encourage students to identify the study design and calculate the sample size. Thereby, they will discuss the approaches and findings within their groups. ◦ Invite each group to present and justify their results. • Conclusion and summarization ◦ The teacher shall summarize the key concepts covered in the practical session and also give inputs for further

		improvisation.
Practical Training 2.10	Sample size for experimental study Design.	• Determine and Compute sample size for experimental (manually, Excel, and other available software/tools.) • Demonstration by the teacher ◦ Train to identify different study designs and train to calculate the sample size calculation for different study designs. ◦ Compute sample size for experimental study Designs (manually, Excel, and other available software/tools) • Problem-based learning ◦ The students should be provided with a Sample case scenario (5 each) with all information needed for sample size calculation for hands-on practice. ◦ Encourage students to identify the study design and calculate the sample size. Thereby, they will discuss the approaches and findings within their groups. ◦ Invite each group to present and justify their results. • Conclusion and summarization ◦ The teacher shall summarize the key concepts covered in the practical session and also give inputs for further improvisation.
Experiential learning Activity		
Experiential learning No	Name	Activity details
Experiential-Learning 2.1	Probability and experimental probability.	◦ Students will be divided into groups. ◦ Each group will discuss and pose an enquiry (2 each) ◦ Access to study resources (e-learning) will be provided so that students can find relevant resources.

		◦ Each group is asked to make a meaningful explanation using prior and new knowledge and share the findings. ◦ The group that proposed the enquiry is asked to evaluate/critic the group that is sharing the findings. The teacher will evaluate the group findings, summarize the key concepts, and give input for further improvisation.
Experiential-Learning 2.2	Normal, binomial, and poison distribution.	Identify and justify normal, binomial, and poison distribution from collected secondary dataset /Published data. Data Collection- Students should collect published/ secondary data from different sources. Data Entry and Cleaning: Once the data is collected, students should enter it into statistical software/ Tools Data Exploration: They should create histograms to visualize the data distribution and use statistical software/tools to test the distribution. Interpreting Descriptive Statistics: Students should interpret the results to draw meaningful conclusions about the dataset after visualizing descriptive statistics and calculating test statistics. They should identify and justify the distribution. The teacher should summarize and conclude the session.
Experiential-Learning 2.3	Normal, binomial, and poison Distribution.	Data Collection- Instructed to collect real-life events related to their subject domain where they can apply concepts of normal, binomial, and poison. Data Exploration /Reflective Observation: Students then carry out peer discussion on the collected data with the subject experts and seniors pgs. Finally, review the experience attained. Interpreting /abstract conceptualization: Students should conclude the learning achieved through experience. The teacher should summarize and conclude the session.
Experiential-Learning 2.4	Confidence interval estimation.	Data Collection- Students should collect 5 domain-specific research papers from databases (Google Scholar/PubMed/Cochrane/ Dissertation, etc. Data Exploration: Students should identify point estimates and confidence intervals in the domain-specific research paper. Interpreting: After identifying, students should interpret the point estimate and confidence interval to draw meaningful conclusions about the research paper. The teacher should summarize and conclude the session.
Experiential-Learning 2.5	Confidence interval - Identify and interpret	Identify and interpret the point estimate and confidence interval for collected data sets. Data Collection- Students should collect data from different sources or through surveys. Data Entry and Cleaning: Once the data is collected, students should enter it into statistical software/ Tools Data Exploration: They should calculate point estimates and confidence intervals from the collected data set. Interpreting: After calculating and visualizing, students should interpret the point estimate and confidence interval to draw

		meaningful conclusions about the dataset. The teacher should summarize and conclude the session.
Experiential-Learning 2.6	Sample size and Sampling designs.	Data Collection- Students should collect 5 research papers from databases (Google Scholar/PubMed/Cochrane/ dissertation, etc. Data Exploration: Students should Recognize the sampling designs and sample size studied in the research paper. Interpreting: Students should critique the sampling design sample sizes in research papers after identifying them. Also, give the recommendation if it contradicts. The teacher should summarize and conclude the session.
Experiential-Learning 2.7	Sample size for an observational study.	Active experimentation: The student is instructed to Step one: Select a topic for observational study Step two: Do a literature search for sampling variability, margin of error, confidence interval, and sample mean/proportion/ coefficient. Step three: calculate the sample size Step four: choose the appropriate sampling technique Step five: collect the data. Step six: submit a report. The teacher shall study the submitted report and give feedback.
Experiential-Learning 2.8	Sample size for analytical study.	Active experimentation: The student is instructed to Step one: Select a topic for analytical study Step two: Do the literature search for sampling variability, margin of error, confidence interval, and sample mean/proportion/ coefficient. Step three: calculate the sample size Step four: choose the appropriate sampling technique Step five: collect the data. Step six: submit a report. The teacher shall study the submitted report and give feedback.
Experiential-Learning 2.9	Calculate sample size for RCT.	Active experimentation: The student is instructed to Step one: Select a topic for RCT study Step two: Do the literature search for sampling variability, margin of error, confidence interval, and sample mean/proportion/ coefficient.

		Step three: calculate the sample size Step four: choose the appropriate sampling technique Step five: collect the data. Step six: submit a report. The teacher shall study the submitted report and give feedback.
Experiential-Learning 2.10	Study design, sampling techniques, and sample size formula.	Active experimentation: The student is instructed to Step one: Plan scenarios (5 each) Step two: Specify the study design Step three: specify the sampling technique to be used Step four: specify the sample size formula that has to be used. Step five: compile and submit a report The teacher shall study the submitted report and give feedback.
Experiential-Learning 2.11	Probability sampling techniques.	Self-directed learning (role play/simulated worlds/ video) Step one: Form a group of 5 members each Step two: plan and create simulated learning (role play/simulated worlds) for probability sampling. Step three: exhibit the created simulated learning
Experiential-Learning 2.12	Non-probability sampling techniques.	Self-directed learning (role play/simulated worlds/ video) Step one: Form a group of 5 members each Step two: plan and create simulated learning (role play/simulated worlds) for probability sampling. Step three: exhibit the created simulated learning
Modular Assessment		
Assessment method		Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 25 marks per credit. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Working Portfolio on Experiential learning components of the module. 5 marks for each step. Student instructions 1. Submit a draft of your experiential learning.		4

2.Receive feedback you're mentor on methodology. 3.Revise the report based on the feedback. 4.Include reflections on what you learned after each experiential learning. 5. Show drafts of experiential learning with notes on what was challenging and how you overcame the obstacles. and (25 Marks) Any practical in converted form can be taken for assessment. Or Any of the experiential as portfolio/ refelections / presentations can be taken as assessment.	

Module 3 : Tests of significance and parametric statistical tests

Module Learning Objectives

(At the end of the module, the students should be able to)

- 1. Know the fundamentals of hypothesis testing and tests of significance**
- 2. Identify and apply appropriate parametric tests and interpret the findings**

Unit 1 Testing of hypothesis

- 1. Understand and apply the concept of null and alternate hypotheses**
- 2. Define of Type I and type II errors,**
- 3. Evaluate Test of significance, level of significance, power of the test**
- 4. Calculate 'P' value and its interpretation, statistical significance, and clinical significance**

References: 25,26,27,28,29

3A	3B	3C	3D	3E	3F	3G	3H
1	CO1,CO2,CO4	Understand and explain the concept of null and alternate hypotheses (Examples)	1	Lecture	CK	Know	BL
2	CO1,CO2,CO3,CO4	Construct the null and alternate hypothesis	2	Practical Training 3.1	PSY-SET	Shows-how	BL
3	CO1,CO2,CO3,CO4	Define and explanation of Type I and Type II errors	1	Lecture	CC	Shows-how	L&PPT
4	CO1,CO2,CO3	Demonstrate type I & type II errors from the data collected from secondary	2	Practical	PSY-	Shows-	BL,D,PB

	,CO4	sources,		Training 3.2	GUD	how	L
5	CO1,CO2,CO3 ,CO4	Understand and describe Tests of significance (steps involved), level of significance, and power. Explain one-tail and two-tail tests.	1	Lecture	CAP	Knows-how	L&PPT
6	CO1,CO2,CO3 ,CO4	Distinguish tests of significance for different scenarios (one sample, two samples, independent, dependent, parametric, non-parametric) Differentiate one-tail and two-tail tests.	2	Practical Training 3.3	PSY-SET	Shows-how	BL,D,GB L
7	CO1,CO2,CO3 ,CO4	Collect data from primary/secondary sources like articles or theses, identify data as one sample/two sample/ independent/ dependent/ one-time point/repeated, and suggest appropriate parametric/non-parametric test	3	Experiential-Learning 3.1	PSY-SET	Does	BL,D,PT, PER,PBL
8	CO1,CO2,CO3 ,CO4	Outline the importance of the 'p' value and its interpretation. Distinguish the statistical significance and clinical significance	1	Lecture	CAP	Knows-how	L&PPT
9	CO1,CO2,CO3 ,CO4	Examine the data and evaluate the significance and power. Critic the significance (statistical vs. clinical) in the given scenario.	2	Practical Training 3.4	PSY-SET	Shows-how	D,PL,PT, TBL
10	CO1,CO2,CO3 ,CO4	Collect data from secondary sources like articles or theses. Identify the tests of significance to be applied. Critic and interpret on level of significance, power, type I & type II errors, and p-value.	3	Experiential-Learning 3.2	PSY-GUD	Does	BL

Unit 2 Parametric tests

1. 'Z' test
2. Student's 't' test: paired or dependent
3. Student's 't' test: unpaired or independent
4. 'F' test
5. Analysis of variance (ANOVA) test with post hoc Analysis
6. Repeated measures ANOVA with post hoc Analysis

References: 30,31,32,33,34

3A	3B	3C	3D	3E	3F	3G	3H
1	CO1,CO2,CO3,CO4	Explain the 'Z' test, its application, and interpretation.	1	Lecture	CC	Knows-how	L&PPT
2	CO1,CO2,CO3,CO4	Calculate the 'Z' test using different statistical tools/software for a data set	2	Practical Training 3.5	PSY-SET	Shows-how	BL
3	CO1,CO2,CO3,CO4	Collect quantitative data from primary/secondary sources for a larger sample (n>30) with single/two groups. Utilizing data, do a Z test. Analyze the data with statistical tools and interpret the findings in terms of statistical and clinical significance.	3	Experiential-Learning 3.3	PSY-GUD	Does	BL
4	CO1,CO2,CO3,CO4	Explain the dependent 't' test, its application, and interpretation	1	Lecture	CAP	Knows-how	L&PPT
5	CO1,CO2,CO3,CO4	Demonstrate the 'dependent 't' test using different statistical tools/software for a data set	2	Practical Training 3.6	PSY-SET	Shows-how	BL
6	CO1,CO2,CO3,CO4	Collect quantitative data from primary/secondary sources for a sample with one group and two-time points. Utilizing data, do a dependent t-test. Analyze the data with statistical tools, Interpret the findings in terms of statistical and clinical significance.	3	Experiential-Learning 3.4	PSY-GUD	Does	BL
7	CO1,CO2,CO3,CO4	Explain the independent 't' test, its application, and interpretation	1	Lecture	CAP	Knows-how	L&PPT
8	CO1,CO2,CO3,CO4	Demonstrate the independent 't' test using different statistical tools/software for a data set	2	Practical Training 3.7	PSY-SET	Shows-how	BL
9	CO1,CO2,CO3,CO4	Collect quantitative data from primary/secondary sources for a sample with two groups and one-time points. Utilizing data, do an independent t-test. Analyze the data with statistical tools, Interpret the findings in terms of statistical and clinical significance.	3	Experiential-Learning 3.5	PSY-GUD	Shows-how	BL

10	CO1,CO2,CO3,CO4	Explain the 'F' test, its application and interpretation	1	Lecture	CAP	Knows-how	L&PPT
11	CO1,CO2,CO3,CO4	Demonstrate the 'F' test using different statistical tools/software for a data set	2	Practical Training 3.8	PSY-SET	Shows-how	BL,D,PER,PBL
12	CO1,CO2,CO3,CO4	Collect quantitative data from primary/secondary sources for a sample with more than two groups. Utilizing data, do an F test. Analyze the data with statistical tools, Interpret the findings in terms of statistical and clinical significance.	3	Experiential-Learning 3.6	PSY-SET	Shows-how	BL,BS,D,DSN,IBL,PER,PBL
13	CO1,CO2,CO3,CO4	Explain the 'ANOVA' test along with post hoc analyses, its application, and interpretation	1	Lecture	CAP	Knows-how	L&PPT
14	CO1,CO2,CO3,CO4	Demonstrate the 'ANOVA' test with analysis using different statistical tools/software for a data set	2	Practical Training 3.9	PSY-SET	Shows-how	BL,BS,D,DIS,IBL,PL
15	CO1,CO2,CO3,CO4	Collect quantitative data from primary/secondary sources for a sample with more than two groups and one-time points. Utilizing data, do ANOVA. Analyze the data with statistical tools, Interpret the findings in terms of statistical and clinical significance.	3	Experiential-Learning 3.7	PSY-GUD	Shows-how	D,DIS,PT,PER,PBL
16	CO1,CO2,CO3,CO4	Explain the 'repeated measures ANOVA' test along with post hoc analyses, its application, and interpretation	1	Lecture	CAP	Knows-how	L&PPT
17	CO1,CO2,CO3,CO4	Demonstrate the 'repeated measures ANOVA' test with Analysis using different statistical/software for data set tools	2	Practical Training 3.10	PSY-GUD	Shows-how	BL,D,DIS,PER,PBL,TBL
18	CO1,CO2,CO3,CO4	Collect quantitative data from primary/secondary sources for a sample with more than two groups and more than two-time points. Utilizing data, do repeated measures ANOVA. Analyze the data with statistical tools, Interpret the findings in terms of statistical and clinical significance.	3	Experiential-Learning 3.8	PSY-GUD	Does	D,PAL,PER,PBL,TBL

19	CO1,CO2,CO3,CO4	Collect quantitative data from primary/secondary sources for a sample with more than two groups and more than two-time points. Utilizing data, plan all parametric tests and assign levels of significance. Analyze the data with statistical tools, selecting the appropriate test. Interpret the findings in terms of statistical and clinical significance.	2	Experiential-Learning 3.9	PSY-GUD	Shows-how	D,DIS,IBL,PT,PER

Practical Training Activity

Practical No	Name	Activity details
Practical Training 3.1	Null and alternate hypothesis.	• Demonstration by the teacher ◦ Construction of null and alternate hypotheses in different research conditions, such as superiority/inferiority design and clinical, experimental studies, etc. ◦ Examples 1-2 for each condition: clinical, experimental studies - clinical, experimental, analytical studies –conditions: Test group T ?C Control group, T not less than C, T not more than C • Hands-on training ◦ Divide students into small groups and allot one research area for each group. ◦ Instruct each group to prepare possible research questions and research hypotheses. ◦ Students discuss and construct possible hypotheses. ◦ Invite each group to present their hypothesis. ◦ Discussion on the different classification techniques used, the challenges encountered, and the insights gained. • The teacher shall summarize the key concepts covered in the practical.
Practical Training 3.2	Type I & type II errors	• Demonstration by the teacher ◦ Datasets collected from research articles or theses demonstrate type I & II errors. ◦ Explain possible solutions to overcome them • Hands-on training

		◦ Divide students into small groups and allot one research data for each group. ◦ Facilitate the students by providing sample datasets or case studies for hands-on practice. ◦ Encourage students to discuss their findings & opinions within their groups. ◦ Invite each group to present their findings on type I & II errors. • Promote a discussion on the insights gained from the data • The teacher shall summarize the key concepts covered in the practical
Practical Training 3.3	Tests of significance	• Demonstration by the teacher ◦ Datasets collected from research articles or theses show how to identify different types of parametric/nonparametric tests to be applied for different conditions of data and differences in one/two-tail tests. • Hands-on training ◦ Divide students into small groups. ◦ The students should be provided Sample datasets or case studies for hands-on practice. ◦ Instruct each group to identify appropriate parametric or nonparametric tests for the assigned dataset. ◦ Encourage students to find similar conditions of data from the internet or any thesis. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to present their results. ◦ Facilitate a discussion on identifying appropriate parametric or nonparametric tests and one/two-tail tests for various datasets. • The teacher shall summarize the key concepts covered in the practical.
Practical Training 3.4	Data significance and power.	• Demonstration by the teacher ◦ Calculating the ‘significance and power’ manually and using Statistical Software/tools. • Hands-on training

		◦ Divide students into small groups ◦ The students should be provided Sample datasets or case studies for hands-on practice. ◦ Instruct each group to calculate the significance and power of their assigned dataset. ◦ Encourage students to use statistical software for calculation and verification. ◦ Encourage students to discuss their approaches, findings, and interpretations within their groups. ◦ Invite each group to present their results and interpretation. ◦ Brainstorm on statistical and clinical significance in various datasets. • The teacher shall summarize the key concepts covered in the practical.
Practical Training 3.5	'Z' test Calculation using statistical tools/software.	• Demonstration by the teacher ◦ Demonstrate Z test manually and using Statistical Software/tools, for example, a data set of continuous data of a larger sample ($n > 30$) • Hands-on training ◦ Divide students into small groups ◦ The students should be provided Sample datasets or case studies for hands-on practice. ◦ Instruct each group to calculate the Z variate and p-value for their assigned dataset. ◦ Encourage students to use statistical software for calculation and verification. ◦ Encourage students to discuss their approaches, findings, and interpretations within their groups. ◦ Invite each group to present their results and interpretation. • Facilitate a discussion on the differences in Z variate for various datasets. • The teacher shall summarize the key concepts covered in the practical.
Practical Training 3.6	Dependent 't' test.	• Demonstration by the teacher ◦ Calculating the 't' value and p-value for a single group, two-time point data set having continuous data of smaller sample ($n < 30$), manually and using Statistical Software/tools

		• Hands-on training ◦ Divide students into small groups ◦ The students should be provided Sample datasets or case studies for hands-on practice. ◦ Instruct each group to calculate the 't' value and p value for their assigned dataset. ◦ Encourage students to calculate the t value manually/using Excel and statistical tables for 't.' ◦ Encourage students to use statistical software for calculation and verification. ◦ Encourage students to discuss their approaches, findings, and interpretations within their groups. ◦ Invite each group to present their results and interpretation. • Facilitate a discussion on the differences in t value –p value for various datasets. • The teacher shall summarize the key concepts covered in the practical.
Practical Training 3.7	Independent 't' test	• Demonstration by the teacher ◦ Calculating the 't' value and p-value for two groups, a one-time point data set having continuous data of smaller sample ($n < 30$), manually and using Statistical Software/tools • Hands-on training ◦ Divide students into small groups ◦ The students should be provided Sample datasets or case studies for hands-on practice. ◦ Instruct each group to calculate the 't' value and p value for their assigned dataset. ◦ Encourage students to calculate manually/using Excel and statistical tables for 't'. ◦ Encourage students to use statistical software for calculation and verification. ◦ Encourage students to discuss their approaches, findings, and interpretations within their groups. ◦ Invite each group to present their results and interpretation. • Facilitate a discussion on the differences in t value –p value for various datasets. • The teacher shall summarize the key concepts covered in the practical.
Practical Training 3.8	'F' test Calculation.	

		• Demonstration by the teacher ◦ Calculating the 'F' value and p-value and applying appropriate tests for Two groups, a one-time point data set having continuous data of smaller sample ($n < 30$), manually and using Statistical Software/tools • Hands-on training ◦ Divide students into small groups ◦ The students should be provided Sample datasets or case studies for hands-on practice. ◦ Instruct each group to calculate the F and p values and apply analysis to their assigned dataset. ◦ Encourage students to calculate manually/using Excel and statistical tables for 't.' ◦ Encourage students to use statistical software for calculation and verification. ◦ Encourage students to discuss their approaches, findings, and interpretations within their groups. ◦ Invite each group to present their results and interpretation. • Facilitate a discussion on the differences in F value –p value and posthoc analyses for various datasets. • The teacher shall summarize the key concepts covered in the practical.
Practical Training 3.9	'ANOVA' test Analysis	• Demonstration by the teacher ◦ Calculating the 'F' value and p-value and applying appropriate tests for Three or more groups, a one-time point data set having continuous data of smaller sample ($n < 30$), manually and using Statistical Software/tools • Hands-on training ◦ Divide students into small groups ◦ The students should be provided Sample datasets or case studies for hands-on practice. ◦ Instruct each group to calculate the 'F' value and p-value and apply analysis to their assigned dataset. ◦ Encourage students to calculate manually/using Excel and statistical tables for 'f'. ◦ Encourage students to use statistical software for calculation and verification. ◦ Encourage students to discuss their approaches, findings, and interpretations within their groups. ◦ Invite each group to present their results and interpretation. • Facilitate a discussion on the differences in F value –p value and post hoc analyses for various datasets. • The teacher shall summarize the key concepts covered in the practical.

Practical Training 3.10	Annova test - Repeated	• Demonstration by the teacher ◦ Calculating the 'F' value and p-value and applying appropriate tests for one group, more than two-time points data set having continuous data, manually and using Statistical Software/tools • Hands-on training ◦ Divide students into small groups ◦ The students should be provided Sample datasets or case studies for hands-on practice. ◦ Instruct each group to calculate the 'F' and p values and apply analysis to their assigned dataset. ◦ Encourage students to calculate manually/using Excel and statistical tables for 'f'. ◦ Encourage students to use statistical software for calculation and verification. ◦ Encourage students to discuss their approaches, findings, and interpretations within their groups. ◦ Invite each group to present their results and interpretation. • Facilitate a discussion on the differences in F value –p value and post hoc analyses for various datasets. • The teacher shall summarize the key concepts covered in the practical.
Experiential learning Activity		
Experiential learning No	Name	Activity details
Experiential-Learning 3.1	Parametric/non-parametric test	Teacher activity: Divide students into multiple groups. Allot or mentor each group to select different types of data sets for the assignment. Guide them in using the statistical tools/software Student activity as Groups: Collection of data from primary/secondary sources: Data Collection- Students should collect data from different sources, such as articles or theses, by conducting interviews, clinical posting, or by gathering from existing datasets.

		Data Entry and Cleaning: Once the data is collected, students should enter it into Excel/statistical software/Tools Classify data as: independent/dependent Categorical or continuous data (Nominal/Ordinal/Scale) one sample/two samples/more than two samples one-time point /repeated measures Do appropriate descriptive statistics Find whether sampling is random or not. Find whether the distribution is Normal or not. Find the appropriate Statistical Test: parametric/non-parametric Which type of parametric /nonparametric Discuss the findings with your group members. Each group will present the findings and discussion by all students and faculty concerned to conclude. The teacher shall summarize the key concepts covered.
Experiential-Learning 3.2	level of significance, power, type I & type II errors, and p-value.	Teacher activity: Divide students into multiple groups. Allot or mentor each group to select different types of data sets for the assignment. Guide them in using the statistical tools/software. Student activity as Groups: Collection of data from secondary sources : Students should collect data from different sources, such as articles or theses, or by gathering data from existing datasets. Data Entry and Cleaning: Once the data is collected, students should enter it into Excel/statistical software/ Tools Analyze the data as follows: independent/dependent Categorical or continuous data (Nominal/Ordinal/Scale) one sample/two samples/more than two samples one-time point /repeated measures Do appropriate descriptive statistics Find whether sampling is random or not.

		Find whether the distribution is Normal or not. Identify the tests of significance to be applied. Decide the level of significance and p-value Calculate the power Discuss the possible type I & type II errors Critic and interpret the data set selected on the following level of significance power type I & type II errors p-value Discuss the findings with your group members. Each group will present the findings and discussion by all students and faculty concerned to conclude. The teacher shall summarize the key concepts covered.
Experiential-Learning 3.3	Z test	Teacher activity: Divide students into multiple groups. Allot or mentor each group to select different types of data sets for the assignment. Guide them in using the statistical tools/software Student activity as Groups: Data Collection- Students should collect data from different sources or through surveys. This can involve conducting interviews, gathering data from existing datasets, or collecting from a ward/class. Take care that the sample number is more than 30, has a continuous type, and follows random sampling. Collect data from two samples and two-time points. Data Entry and Cleaning: Once the data is collected, students should enter it into a datasheet/excel and statistical software/ Tools Data Exploration: Do appropriate descriptive statistics. (Mean, Median, range, variance, Standard deviation, Standard Error, etc.) Find whether the distribution is Normal or not. If following normal distribution, proceed with the Z test. Make Null and alternate hypotheses. (Superiority/inferiority or equal between groups). Do a test of significance, i.e., the ‘Z test’ for this data. Fix the level of significance at 0.05 or 0.01. Z Test: Perform the Z test an the prepared data sheet using statistical software/excel/manually. Use appropriate methods like one-tail (left or right) or two-tail tests. Interpretation: After calculating and visualizing descriptive and inferential statistics, students should interpret the results to draw meaningful conclusions about the dataset. Find whether the Null hypothesis proved or not.

		Find the possibilities errors. Discuss the Z variate, zone of acceptance and rejection. Analyze the data with statistical tools, selecting the appropriate test. Interpret the findings in terms of statistical and clinical significance. The teacher shall summarize the key concepts covered.
Experiential-Learning 3.4	Paired/dependent t-test’.	Teacher activity: Divide students into multiple groups. Allot or mentor each group to select different types of datasets for the assignment. Guide them in using the statistical tools/software Student activity as Groups: Data Collection- Students should collect data from different sources or through surveys. This can involve conducting interviews, gathering data from existing datasets, or collecting from a ward/class. Take care that the sample number is less than 30, has a continuous type, and follows random sampling. Collect data from one sample and two-time points. Data Entry and Cleaning: Once the data is collected, students should enter it into a datasheet/excel and statistical software/ Tools Data Exploration: Do appropriate descriptive statistics. (Mean, Median, range, variance, Standard deviation, Standard Error, etc.) Find whether the distribution is Normal or not. If following normal distribution, proceed to the paired/dependent t-test. Make Null and alternate hypotheses. (Superiority/inferiority or equal). Do a test of significance, i.e., ‘paired/dependent t-test’ for this data. Fix the level of significance at 0.05 or 0.01. ‘Paired/dependent t-test’: Perform the test an the prepared data sheet using statistical software/excel/manually. Use appropriate methods like one-tail (left or right) or two-tail tests. Interpretation: After calculating and visualizing descriptive and inferential statistics, students should interpret the results to draw meaningful conclusions about the dataset. Find whether the Null hypothesis proved or not. Find the possibilities errors. Analyze the data with statistical tools, selecting the appropriate test. Interpret the findings in terms of statistical and clinical significance. The teacher shall summarize the key concepts covered.
Experiential-Learning 3.5	Unpaired/independent t-test.	Teacher activity: Divide students into multiple groups. Allot or mentor each group to select different types of datasets for the assignment. Guide them in using the statistical tools/software

		Student activity as Groups: Data Collection- Students should collect data from different sources or through surveys. This can involve conducting interviews, gathering data from existing datasets, or collecting from a ward/class. Take care that the sample number is less than 30, has a continuous type, and follows random sampling. Collect data from two samples and one or two time points. Data Entry and Cleaning: Once the data is collected, students should enter it into a datasheet/excel and statistical software/ Tools Data Exploration: Do appropriate descriptive statistics. (Mean, Median, range, variance, Standard deviation, Standard Error, etc.) Find whether the distribution is Normal or not. If following normal distribution, proceed to ‘unpaired/independent t-test’. Make Null and alternate hypotheses. (Superiority/inferiority or equal). Do a test of significance, i.e., unpaired/independent t-test for this data. Fix the level of significance at 0.05 or 0.01. ‘Unpaired/independent t-test’: Perform the test on the prepared data sheet using statistical software/excel/manually. Use appropriate methods like one-tail (left or right) or two-tail tests. Interpretation: After calculating and visualizing descriptive and inferential statistics, students should interpret the results to draw meaningful conclusions about the dataset. Find whether the Null hypothesis proved or not. Find the possibilities errors. Analyze the data with statistical tools, selecting the appropriate test. Interpret the findings in terms of statistical and clinical significance. The teacher shall summarize the key concepts covered.
Experiential-Learning 3.6	F test.	Teacher activity: Divide students into multiple groups. Allot or mentor each group to select different types of datasets for the assignment. Guide them in using the statistical tools/software Student activity as Groups: Data Collection- Students should collect data from different sources or through surveys. This can involve conducting interviews or, gathering data from existing datasets, or collecting from a ward/class. Take care that the sample number is more than 30, has a continuous type, and follows random sampling. Collect data from more than two samples. Data Entry and Cleaning: Once the data is collected, students should enter it into a datasheet/excel and statistical software/ Tools Data Exploration: Do appropriate descriptive statistics. (Mean, Median, range, variance, Standard deviation, Standard Error, etc.) Find whether the distribution is Normal or not. If following normal distribution, proceed to the ‘F test’. Make Null and alternate hypotheses. (Superiority/inferiority or equal). Do a test of significance, i.e., ‘F test’ for this data. Fix the

		level of significance at 0.05 or 0.01. ‘F test’: Perform the test on the prepared data sheet using statistical software/excel/manually. Interpretation: After calculating and visualizing descriptive and inferential statistics, students should interpret the results to draw meaningful conclusions about the dataset. Find whether the Null hypothesis proved or not. Find the possibilities errors. Analyze the data with statistical tools, selecting the appropriate test. Interpret the findings in terms of statistical and clinical significance. The teacher shall summarize the key concepts covered.
Experiential-Learning 3.7	ANOVA. test	Teacher activity: Divide students into multiple groups. Allot or mentor each group to select different types of data sets for the assignment. Guide them in using the statistical tools/software Student activity as Groups: Data Collection- Students should collect data from different sources or through surveys. This can involve conducting interviews or, gathering data from existing datasets or collecting from a ward/class. Take care that the sample number is more than 30 with continuous type and follow random sampling. Collect data from more than two samples at one-time point. Data Entry and Cleaning: Once the data is collected, students should enter it into a datasheet/excel and statistical software/ Tools Data Exploration: Do appropriate descriptive statistics. (Mean, Median, range, variance, Standard deviation, Standard Error, etc.) Find whether the distribution is Normal or not. If following normal distribution, proceed to ‘ANOVA’. Make Null and alternate hypotheses. (Superiority/inferiority or equal). Do a test of significance, i.e., ‘ANOVA’, for this data. Fix the level of significance at 0.05 or 0.01. ‘ANOVA: Perform the test on the prepared data sheet using statistical software/excel/manually. Interpretation: After calculating and visualizing descriptive and inferential statistics, students should interpret the results to draw meaningful conclusions about the dataset. Find whether the Null hypothesis proved or not. Find the possibilities errors. Analyze the data with statistical tools, selecting the appropriate test. Interpret the findings in terms of statistical and clinical significance. The teacher shall summarize the key concepts covered.
Experiential-Learning 3.8	ANOVA	Teacher activity: Divide students into multiple groups.

		Allot or mentor each group to select different types of data sets for the assignment. Guide them in using the statistical tools/software Student activity as Groups: Data Collection- Students should collect data from different sources or through surveys. This can involve conducting interviews, gathering data from existing datasets, or collecting from a ward/class. Take care that the sample number is more than 30 with continuous type and follow random sampling. Collect data at more than two-time points. Data Entry and Cleaning: Once the data is collected, students should enter it into a datasheet/excel and statistical software/ Tools Data Exploration: Do appropriate descriptive statistics. (Mean, Median, range, variance, Standard deviation, Standard Error, etc.) Find whether the distribution is Normal or not. If following normal distribution, proceed to ‘repeated measures ANOVA.’ Make Null and alternate hypotheses. (Superiority/inferiority or equal). Do a test of significance, i.e., ‘repeated measures ANOVA’ for this data. Fix the level of significance at 0.05 or 0.01. ‘Repeated measures ANOVA’: Perform the test on the prepared data sheet using statistical software/excel/manually. Interpretation: After calculating and visualizing descriptive and inferential statistics, students should interpret the results to draw meaningful conclusions about the dataset. Find whether the Null hypothesis proved or not. Find the possibilities errors. Analyze the data with statistical tools, selecting the appropriate test. Interpret the findings in terms of statistical and clinical significance. The teacher shall summarize the key concepts covered.
Experiential-Learning 3.9	Parametric test	Teacher activity: Divide students into multiple groups. Allot or mentor each group to select different types of data sets for the assignment. Guide them in using the statistical tools/software Student activity as Groups: Data Collection- Students should collect data from different sources or through surveys. This can involve conducting interviews or, gathering data from existing datasets or collecting from a ward/class. Take care that the sample number is more than 30, has a continuous type, and follows random sampling. Collect data from more than two samples and at more than two-time points. Data Entry and Cleaning: Once the data is collected, students should enter it into a datasheet/excel and statistical software/ Tools Data Exploration: Do appropriate descriptive statistics. (Mean, Median, range, variance, Standard deviation, Standard Error, etc.) Find whether the distribution is Normal or not. If following normal distribution, proceed with an appropriate statistical test.

Make Null and alternate hypotheses. (Superiority/inferiority or equal). Do a test of significance, i.e., a 'parametric test' for this data. Fix the level of significance at 0.05 or 0.01.

Parametric Test: Perform the appropriate parametric test on the prepared data sheet using statistical software/excel/manually.

Interpretation: After calculating and visualizing descriptive and inferential statistics, students should interpret the results to draw meaningful conclusions about the dataset. Find whether the Null hypothesis proved or not.

Find the possible errors.

Analyze the data with statistical tools, selecting the appropriate test.

Interpret the findings in terms of statistical and clinical significance.

The teacher shall summarize the key concepts covered.

Modular Assessment

Assessment method

Hour

Instructions - Conduct a structured Modular assessment. Assessment will be for 25 marks per credit. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C.

4

• Problem based assessment (15 Marks)

1. Provide a Scenario one each on *hypothesis formulation, *steps in testing of hypothesis *parametric tests and
2. Based on the information student shall formulate a hypothesis/steps in testing of hypothesis/ parametric test to be applied.
- 3.

Example: **Scenario:** It has been observed that individuals who drink coffee before going to bed often take longer to fall asleep compared to those who do not consume coffee before bedtime. **Frame the null hypothesis and alternate hypothesis for the research domain.**

Null Hypothesis (H?):

Drinking coffee before going to bed has no effect on the time it takes to fall asleep.

Alternative Hypothesis (H?):

Drinking coffee before going to bed increases the time it takes to fall asleep.

B. Performance assessment (10): 1. Provide students one Sampled data.

2. Ask them to perform manually the test statistics.

and (25 marks)

Any practical in converted form can be taken for assessment.

Or

Any of the experiential as portfolio/ refelections / presentations can be taken as assessment.

Module 4 : Non-parametric statistical tests

Module Learning Objectives

(At the end of the module, the students should be able to)

1. Know the fundamentals of non-parametric statistical tests
2. Identify and apply appropriate non-parametric tests

Unit 1 Non-parametric methods

1. Definition and fundamentals of non-parametric methods; Concept and application of Chi-square test and Fisher's exact test.
2. Mann-Whitney U test: Concept and application
3. McNemar's test and Wilcoxon Signed rank test- Concept and application
4. Kruskal–Wallis test with relevant post hoc tests: Concept and application
5. Friedman test with relevant post hoc tests: Concept and application; parametric vs non-parametric test.

References: 35,36,37,38,39,40,41,42,43,44

3A	3B	3C	3D	3E	3F	3G	3H
1	CO1,CO2,CO3 ,CO4	Explain non-parametric methods, their application, and interpretation Explain the Concept and application of the Chi-square test, Fisher's exact test.	1	Lecture	CK	Know	L&PPT
2	CO1,CO2,CO3 ,CO4	Calculate the Chi-square test and Fisher's exact test using statistical tools/software.	2	Practical Training 4.1	PSY-SET	Shows- how	BL
3	CO1,CO2,CO3 ,CO4	Collect the relevant data sets and apply the Chi-square test, Fisher's exact test	3	Experiential- Learning 4.1	PSY-SET	Does	BL

4	CO1,CO2,CO3,CO4	Explain the Mann-Whitney U test, and its application, and interpretation	1	Lecture	CAN	Knows-how	L&PPT
5	CO1,CO2,CO3,CO4	Calculate the Mann-Whitney U test using statistical tools/software.	2	Practical Training 4.2	PSY-SET	Shows-how	BL
6	CO1,CO2,CO3,CO4	Collect the relevant data sets and apply the Mann-Whitney U test.	3	Experiential-Learning 4.2	PSY-SET	Does	BL
7	CO1,CO2,CO3,CO4	Explain and apply McNemar's test and Wilcoxon's Signed rank test	1	Lecture	CAP	Knows-how	L&PPT
8	CO1,CO2,CO3,CO4	Calculate McNemar's test, and Wilcoxon Signed rank test using statistical tools/software.	2	Practical Training 4.3	PSY-SET	Shows-how	BL
9	CO1,CO2,CO3,CO4	Collect the relevant data sets and apply McNemar's test and Wilcoxon Signed rank test.	3	Experiential-Learning 4.3	PSY-SET	Shows-how	BL
10	CO1,CO2,CO3,CO4	Explain and apply the Kruskal–Wallis test with relevant post hoc tests.	1	Lecture	CAP	Knows-how	L&PPT
11	CO1,CO2,CO3,CO4	Calculate the Kruskal–Wallis test with relevant tests using statistical tools/software.	2	Practical Training 4.4	PSY-SET	Shows-how	BL
12	CO1,CO2,CO3,CO4	Collect the relevant data sets and apply the Kruskal–Wallis test with relevant post hoc test	2	Experiential-Learning 4.4	PSY-SET	Does	BL
13	CO1,CO2,CO3,CO4	Explain and apply the Friedman test with relevant post hoc tests. Parametric vs Non parametric test.	1	Lecture	CAP	Knows-how	BL
14	CO1,CO2,CO3,CO4	Calculate the Friedman test with relevant post hoc tests using statistical tools/software.	2	Practical Training 4.5	PSY-SET	Shows-how	BL
15	CO1,CO2,CO3,CO4	Collect the data sets, identify and apply relevant nonparametric tests(Chi-square test, Mann-Whitney U test, McNemar's test, Wilcoxon Signed rank, Kruskal–Wallis test, Friedman test with relevant tests)	2	Experiential-Learning 4.5	PSY-SET	Does	BL

Practical Training Activity		
Practical No	Name	Activity details
Practical Training 4.1	Chi-square test and Fisher's exact test (2 Sets of Data for each)	• Demonstration by the teacher ◦ The collection of relevant data, data entry in statistical software, use of the appropriate application (Chi-square test and Fisher's exact test), viewing the outcome, analyzing it, and reporting the outcome. • Hands-on training ◦ Divide students into small groups (3-5 in number) ◦ The students should be provided with sample datasets for hands-on practice. ◦ Instruct each group to collect data and enter it in statistical software, use the appropriate application (Chi-square test and Fisher's exact test), view the outcome, and analyze and report it. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to present their classification results. ◦ A discussion on the techniques used, the challenges encountered, and the insights gained from the data • The teacher shall discuss, summarise, and conclude the session.
Practical Training 4.2	Mann-Whitney U test (2 Sets of Data)	• Demonstration by the teacher ◦ Collection of relevant data, data entry in statistical software, use of the appropriate application (Mann-Whitney U test), viewing the outcome, analyzing and reporting the outcome. • Hands-on training ◦ Divide students into small groups (3-5 in number) ◦ The students should be provided with sample datasets for hands-on practice. ◦ Instruct each group to collect data and enter it in statistical software, use the appropriate application (Mann-Whitney U test), view the outcome, and analyze and report the outcome. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to present their classification results.

		◦ A discussion on the techniques used, the challenges encountered, and the insights gained from the data • The teacher shall discuss, summarise, and conclude the session.
Practical Training 4.3	McNemar's test and Wilcoxon Signed rank test (2 Sets of Data for each)	• Demonstration by the teacher ◦ Collection of relevant data, data entry in statistical software, use of the appropriate application (McNemar's test and Wilcoxon Signed rank test), viewing the outcome, analyzing it, and reporting the outcome. • Hands-on training ◦ Divide students into small groups (3-5 in number) ◦ The students should be provided with sample datasets for hands-on practice. ◦ Instruct each group to collect data and enter it in statistical software, use the appropriate application (McNemar's test and Wilcoxon Signed rank test), view the outcome, and analyze and report it. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to present their classification results. ◦ A discussion on the techniques used, the challenges encountered, and the insights gained from the data • The teacher shall discuss, summarise, and conclude the session.
Practical Training 4.4	Kruskal Wallis test (2 Sets of Data)	• Demonstration by the teacher ◦ Collection of relevant data, data entry in statistical software, use of the appropriate application, viewing the outcome, analyzing and reporting the outcome. • Hands-on training ◦ Divide students into small groups (3-5 in number) ◦ The students should be provided with sample datasets for hands-on practice. ◦ Instruct each group to collect data and enter it in statistical software, use the appropriate application (Kruskal Wallis test), view the outcome, and analyze and report the outcome. ◦ Encourage students to discuss their approaches and findings within their groups.

		◦ Invite each group to present their classification results. ◦ A discussion on techniques used, the challenges encountered, and the insights gained from the data • The teacher shall discuss, summarise, and conclude the session.
Practical Training 4.5	Friedman test (2 sets of Data)	• Demonstration by the teacher ◦ The collection of relevant data, data entry in statistical software, use of the appropriate application (Friedman test), viewing the outcome, analyzing it, and reporting the outcome. • Hands-on training ◦ Divide students into small groups (3-5 in number) ◦ The students should be provided with sample datasets for hands-on practice. ◦ Instruct each group to collect data and enter it in statistical software, use the appropriate application (Friedman test), view the outcome, and analyze and report the outcome. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to present their classification results. ◦ A discussion on the techniques used, the challenges encountered, and the insights gained from the data • The teacher shall discuss, summarise, and conclude the session.
Experiential learning Activity		
Experiential learning No	Name	Activity details
Experiential-Learning 4.1	Application of Chi-square test and Fisher's exact test using secondary data	Data Collection -Collection of relevant data from hospitals, surveys, interviews, secondary data, etc by the students Data Entry and Cleaning: Once the data is collected, students should enter it into statistical software/ Tools Identification of Appropriate statistical test- Chi-square test and Fisher's exact test Appropriate use of statistical tools and calculation

		Interpreting of Statistics: After calculating, students should interpret the results to draw meaningful conclusions about the dataset. The teacher shall discuss, summarise, and conclude the session.
Experiential-Learning 4.2	Application of Mann-Whitney U test using secondary data	Data Collection -Collection of relevant data from hospitals, surveys, interviews, secondary data, etc by the students Data Entry and Cleaning: Once the data is collected, students should enter it into statistical software/ Tools Identification of Appropriate Statistical Test-Mann-Whitney U Appropriate use of statistical tools and calculation Interpreting of Statistics: After calculating, students should interpret the results to draw meaningful conclusions about the dataset. The teacher shall discuss, summarise, and conclude the session.
Experiential-Learning 4.3	McNemar's test and Wilcoxon's signed rank test.	Data Collection -Collection of relevant data from hospitals, surveys, interviews, secondary data, etc by the students Data Entry and Cleaning: Once the data is collected, students should enter it into statistical software/ Tools Identification of Appropriate Statistical test-McNemar's test and Wilcoxon Signed rank Appropriate use of statistical tools and calculation Interpreting of Statistics: After calculating, students should interpret the results to draw meaningful conclusions about the dataset. The teacher shall discuss, summarise, and conclude the session.
Experiential-Learning 4.4	Application of Kruskal Wallis test using secondary data	Data Collection -Collection of relevant data from hospitals, surveys, interviews, secondary data, etc by the students Data Entry and Cleaning: Once the data is collected, students should enter it into statistical software/ Tools Identification of Appropriate Statistical Test-Kruskal Wallis test Appropriate use of statistical tools and calculation Interpreting of Statistics: After calculating, students should interpret the results to draw meaningful conclusions about the dataset. The teacher shall discuss, summarise, and conclude the session.
Experiential-Learning 4.5	Application of Friedman test using secondary data	Data Collection -Collection of relevant data from hospitals, surveys, interviews, secondary data, etc by the students Data Entry and Cleaning: Once the data is collected, students should enter it into statistical software/ Tools Identification of Appropriate Statistical Test-Friedman test Appropriate use of statistical tools and calculation Interpreting of Statistics: After calculating, students should interpret the results to draw meaningful conclusions about the

	dataset. The teacher shall discuss, summarise, and conclude the session.

Modular Assessment

Assessment method

Hour

Instructions - Conduct a structured Modular assessment. Assessment will be for 25 marks per credit. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C.

Assessment method-Structured Educational Video- Assign each student one non-parametric tests. for making a Structured Educational Video. (25 marks)

Student instructions

1. Prepare the script for the assigned non-parametric test, which includes – content, objectives, Key points and Step-by-Step Explanation of One Test.
2. Record the video and submit it to the mentor.

Or

Any practical in converted form can be taken for assessment.

Or

Any of the experiential as portfolio/ refelections / presentations can be taken as assessment.

2

Module 5 : Disease frequency; Demography and Vital statistics

Module Learning Objectives

(At the end of the module, the students should be able to)

- Define and explain the basic measures of disease frequency, demography, and vital statistics
- Identify the appropriate use of measures of disease frequency, demography, and vital statistics in public health.
- Estimate the intensity of public health problems by using different measures.

Unit 1 Measures

1. Measures of disease Frequency: Incidence and prevalence.
2. Odds ratio, Relative Risk and Risk difference, and their confidence intervals
3. Definition and computation of the measures Rate, Ratio, and Proportion
4. Demography and its importance and applications. Fertility measures
5. Vital statistics and its importance and applications. Birth rate, Mortality rates, Morbidity rates, and Hospital-related statistics.

References: 45,46,47,48,49,50,51,52,53,54,55

3A	3B	3C	3D	3E	3F	3G	3H
1	CO1,CO3,CO4	Define, compute, and explain the differences between the measures Rate, Ratio, and Proportion.	1	Lecture	CK	Know	L&PPT
2	CO1,CO3,CO4	Define incidence and prevalence (distinguish between point prevalence and period prevalence).	1	Lecture	CK	Know	L&PPT
3	CO1,CO3,CO4	Calculate the incidence and prevalence rates from raw data and explain the use of rates in public health.	2	Practical Training 5.1	PSY-SET	Shows-how	CD

4	CO1,CO3,CO4	Define and explain Odds ratio (OR), Relative Risk (RR), and risk difference in relevance to epidemiological research.	1	Lecture	CAP	Knows-how	L&PPT
5	CO1,CO3,CO4	Calculate and interpret OR, RR	3	Practical Training 5.2	PSY-GUD	Shows-how	BL,D,PT,PER
6	CO1,CO3,CO4	Calculate Confidence Interval for OR & RR.	3	Practical Training 5.3	PSY-GUD	Shows-how	BL,D,PT,PER
7	CO1,CO3,CO4	Explain Vital statistics, their importance, their uses and methods of obtaining vital statistics, Birth rate, Mortality rates, Morbidity rates, and Hospital-related statistics	1	Lecture	CAN	Knows-how	BL,L&PPT
8	CO1,CO3,CO4	Define Demography and explain the importance of statistics in demography. Define fertility measures (Total Fertility Rate (TFR), Age-Specific Fertility Rates(ASFR), Gross Reproduction Rate (GRR), and Net Reproduction Rate (NRR).).	1	Lecture	CAN	Knows-how	L&PPT
9	CO1,CO3,CO4	Calculate vital statistics and demographic statistics (Birth rates, death rates)	2	Practical Training 5.4	PSY-GUD	Shows-how	BL,D,PT,PER,PBL
10	CO1,CO3,CO4	Search the secondary data from freely available websites (like Census of India/NFHS/WHO fact sheets, etc.) to calculate measures of Vital Statistics and measures of Demography.	3	Experiential-Learning 5.1	PSY-GUD	Shows-how	BL,BS,D,PT,PER,PBL
11	CO1,CO3,CO4	Calculate measures of Vital Statistics for at least any three Indian states and at least any 3-time points using the secondary data.	2	Experiential-Learning 5.2	PSY-GUD	Shows-how	BL,BS,D,IBL,PT,PBL,PSM
12	CO1,CO3,CO4	Calculate the demographic measures for at least three Indian states and at least three-time points using the secondary data.	2	Experiential-Learning 5.3	PSY-ORG	Shows-how	BL,BS,D,DIS,PER,PBL
13	CO1,CO3,CO4	Compare & Contrast measures of Vital statistics & Demography for at least three Indian states and discuss.	2	Experiential-Learning 5.4	PSY-ORG	Shows-how	BL,BS,D,DIS,PT,P

							ER,PSM
14	CO1,CO3,CO4	Compare & Contrast measures of Vital statistics & Demography for at least any three years for three Indian states and discuss.	2	Experiential-Learning 5.5	PSY-ORG	Shows-how	BL,IBL,PAL,PER,PBL
15	CO1,CO3,CO4	Prepare a one-page report on data analysis and findings of the secondary data analysis	2	Experiential-Learning 5.6	PSY-GUD	Shows-how	BL,D,PT,PER,PBL

Practical Training Activity

Practical No	Name	Activity details
Practical Training 5.1	Incidence rate and prevalence rate calculation.	• Demonstration by the teacher ◦ Collection of relevant data, data entry, manual work, entering statistical software, use of the appropriate application, viewing the outcome, analysis, and reporting the outcome. • Hands-on training ◦ Divide students into small /three groups. ◦ The students should be provided with sample datasets for hands-on practice. ◦ Instruct each group to collect data and work manually. ◦ Instruct each group to collect and enter data in statistical software, use appropriate applications, view the outcome, and analyze and report it. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to present their classification results. ◦ A discussion on the techniques used, the challenges encountered, and the insights gained from the data • The teacher shall discuss, summarise, and conclude the session.
Practical Training 5.2	Calculation of OR, RR	• Calculation of OR, RR, and Confidence Interval for OR & RR using Statistical Software (3 Sets of Data)

		• Demonstration by the teacher ◦ Collection of relevant data, data entry, manual work, entering in statistical software, use of the appropriate application, viewing the outcome, analysis, and reporting the outcome. • Hands-on training ◦ Divide students into small /three groups. ◦ The students should be provided with sample datasets for hands-on practice. ◦ Instruct each group to collect data and work manually. ◦ Instruct each group to collect data and enter it in statistical software, use appropriate applications, view the outcome, and analyze and report the outcome. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to present their classification results. ◦ A discussion on the techniques used, the challenges encountered, and the insights gained from the data • The teacher shall discuss, summarise, and conclude the session • Divide the students into two groups, and a quiz can be conducted between the groups
Practical Training 5.3	Calculation of OR, RR	• Calculation of OR, RR, and Confidence Interval for OR & RR using Statistical Software (3 Sets of Data) • Demonstration by the teacher ◦ Collection of relevant data, data entry, manual work, entering in statistical software, use of the appropriate application, viewing the outcome, analysis, and reporting the outcome. • Hands-on training ◦ Divide students into small /three groups. ◦ The students should be provided with sample datasets for hands-on practice. ◦ Instruct each group to collect data and work manually. ◦ Instruct each group to collect data and enter it in statistical software, use appropriate applications, view the outcome, and analyze and report the outcome. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to present their classification results. ◦ A discussion on the techniques used, the challenges encountered, and the insights gained from the data

		The teacher shall discuss, summarise, and conclude the session Divide the students into two groups, and a quiz can be conducted between the groups
Practical Training 5.4	Vital statistics and Demographic statistics(3 Sets of Data)	- Calculation of Vital statistics and Demographic statistics(3 Sets of Data) Crude birth rate, Age-specific birth rates, Crude death rate, Age-specific death rates, neonatal mortality rate, postneonatal mortality rate, Infant mortality rate, Maternal mortality rate, Morbidity rates, Disease-specific mortality rate, and Fertility rates. - Demonstration by the teacher - Collection of relevant data, data entry, work manually, entering in Statistical software, use of the appropriate application, viewing the outcome, analysis, and reporting the outcome. - Hands-on training - Divide students into small /three groups. - The students should be provided with sample datasets for hands-on practice. - Instruct each group to collect data and work manually. - Instruct each group to collect data and enter it in statistical software, use the appropriate application, view the outcome, and analyze and report the outcome. - Encourage students to discuss their approaches and findings within their groups. - Invite each group to present their classification results. - A discussion on the techniques used, the challenges encountered, and the insights gained from the data - The teacher shall discuss, summarize, and conclude the session - Divide the students into two groups, and a quiz can be conducted between the groups
Experiential learning Activity		
Experiential learning No	Name	Activity details

Experiential-Learning 5.1	Secondary data collection is used to calculate measures used in vital statistics and demographics.	Get the secondary data from freely available websites (like Census of India/NFHS/WHO fact sheets, etc.) to calculate Vital Statistics and Demography measures. Data Collection - Secondary data collection for at least any three Indian states and for any three time points by the students Data Entry and Cleaning: Students should enter the data into Excel statistical software/ Tools once the data is collected. The teacher shall discuss, summarize, and conclude the session.
Experiential-Learning 5.2	Calculation of measures used in Vital Statistics	Calculation of measures used in Vital Statistics for three Indian states and three time points Identification of Appropriate Statistical Test- Appropriate use of statistical tools and calculation Interpreting of Statistics: After calculating, students should interpret the results to draw meaningful conclusions about the dataset. The teacher shall discuss, summarize, and conclude the session.
Experiential-Learning 5.3	Calculation of measures used in Demography	Data Collection - Calculation of measures used in Demography for three Indian states and three time points by the students Identification of Appropriate Statistical Test- Appropriate use of statistical tools and calculation Interpretation of Statistics: After calculating, students should interpret the results to draw meaningful conclusions about the dataset. The teacher shall discuss, summarize, and conclude the session.
Experiential-Learning 5.4	Measure of vital statistics & demography	Measure of vital statistics & demography for at least three states and discuss. Crude birth rate, Age-specific birth rates, Crude death rate, Age-specific death rates, neonatal mortality rate, postneonatal mortality rate, Infant mortality rate, Maternal mortality rate, Morbidity & for any two Disease-specific mortality rate, and Fertility rates Data Collection - Measure vital statistics & demography for at least three states and discuss. Compare & contrast the rates for different states. (what rates are similar and different using statistical tests) Data Entry and Cleaning: Once the data is collected, students should enter it into statistical software/ Tools Identification of Appropriate Statistical Test- Appropriate use of statistical tools and calculation Interpreting of Statistics: After calculating, students should interpret the results to draw meaningful conclusions about the dataset. The teacher shall discuss, summarize, and conclude the session.
Experiential-Learning 5.5	Measures of vital statistics & demography	Data Collection - Measure vital statistics & demography for at least three states and discuss. Compare & contrast the rates for different time points. (what rates are similar and different using statistical tests)

	.	Data Entry and Cleaning: Once the data is collected, students should enter it into statistical software/ Tools Identification of Appropriate Statistical Test- Appropriate use of statistical tools and calculation Interpreting of Statistics: After calculating, students should interpret the results to draw meaningful conclusions about the dataset. The teacher shall discuss, summarize, and conclude the session.
Experiential-Learning 5.6	Secondary data analysis.	The teacher shall give an overview of the one-page report. Step 1: Define a clear title, background information (2 to 3 lines), and the study objective (one line). Step 2: Describe the data sources, variables used, cleaning (if applicable), and processing procedures. (4 to 5 lines) Step 3: Explain the statistical methods and tools used to analyze the data. Various statistical methods, such as descriptive and inferential, hypothesis testing, correlation, and regression analysis, can be used. (4 to 5 lines) Use simple data visualization techniques like tables or charts. (one chart/one table) Step 4: Present analysis results and interpretations. This section should highlight the main findings that address the objective. (4 to 5 lines). Step 5: Summarize analysis findings (2 to 3 lines). Suggest a recommendation based on results(2 to 3 lines). The teacher shall review the report and give feedback on the report's content.
Modular Assessment		
Assessment method		Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 25 marks per credit. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Open-response questions: (25 marks) 1. Frame 5 open response questions to assess the student's real-world understanding of disease frequency and vital statistics. 2. Prepare rubrics and grade accordingly.		2

Example- Open response question- You are tasked with evaluating the effectiveness of a new vaccination program for reducing the incidence of a specific disease in a region from. Describe how you would use incidence rates and prevalence rates to assess the impact of the vaccination program.

Expected Response: Incidence Rates: Measure the number of new cases of the disease during a specific period after the vaccination program is implemented. A decrease in the incidence rate would suggest the program is effective in preventing new cases.

Prevalence Rates: Assess the overall number of cases, including existing and new cases, before and after the vaccination program. A reduction in prevalence may also indicate that the vaccination program is reducing the number of people currently affected by the disease.

Assessment rubrics - *Excellent (5 Marks): understanding of the topic with minimal errors.*Very Good (4 Marks): Has good grasp but has some minor mistakes.*good(3Marks)

*Fair (2 points): Understanding is limited, with several errors.

*Poor (1 point): major misunderstandings or wrong answers.

Or

Any practical in converted form can be taken for assessment.

Or

Any of the experiential as portfolio/ refelections / presentations can be taken as assessment.

Module 6 : Correlation and Regression Analysis

Module Learning Objectives

(At the end of the module, the students should be able to)

1. Describe how correlation is used to identify relationships between variables
2. Describe how regression analysis is used to predict outcomes

Unit 1 Correlation and Regression Analysis

1. Concept, properties, computation, and applications of correlation. Understanding of the scatter diagram
2. Simple linear correlation, Karl Pearson's correlation coefficient, Spearman's rank correlation.
3. Linear and multiple regression analysis of their application and interpretation.
4. Logistic regression analysis: Concept and application.
5. Survival Analysis. Concept and application.

References: 56,57,58,59,60,61,62,63,64,65,66,67,68

3A	3B	3C	3D	3E	3F	3G	3H
1	CO1,CO2,CO3 ,CO4	Understand and describe the Concept of correlation and its importance in statistical analysis. Differentiate between positive, negative, zero, and spurious correlations. Understand and discuss the scatter diagram and properties of correlation coefficients.	1	Lecture	CK	Know	L&PPT
2	CO1,CO2,CO3 ,CO4	Explain the Pearson correlation coefficient and Spearman's rank correlation coefficient.	1	Lecture	CAN	Knows- how	L&PPT

3	CO1,CO2,CO3,CO4	Calculate and Interpret the Pearson Correlation Coefficient using Statistical tools/ Software	2	Practical Training 6.1	PSY-SET	Shows-how	BL
4	CO1,CO2,CO3,CO4	Apply and interpret Spearman's rank correlation coefficient using Statistical tools / Software.	2	Practical Training 6.2	PSY-SET	Shows-how	BL,D,DIS,PT,PER,PBL
5	CO1,CO2,CO3,CO4	Apply and interpret statistical techniques to calculate the Pearson correlation coefficients.	2	Experiential-Learning 6.1	PSY-GUD	Shows-how	BL,D,DIS,IBL,PL,PT,PER,PBL
6	CO1,CO2,CO3,CO4	Apply and interpret statistical techniques to calculate Spearman's rank correlation coefficients.	2	Experiential-Learning 6.2	PSY-GUD	Shows-how	BL,D,DIS,PL,PT,PER,PBL
7	CO1,CO2,CO3,CO4	Understand and describe the Concept of simple, linear, and multiple regression analysis, their application, and interpretation.	1	Lecture	CAP	Knows-how	L&PPT
8	CO1,CO2,CO3,CO4	Explain Logistic regression, its Assumptions, application, and interpretation.	1	Lecture	CAP	Knows-how	L&PPT
9	CO1,CO2,CO3,CO4	Demonstrate Simple Linear Regression Analysis using Statistical Software/tools.	2	Practical Training 6.3	PSY-SET	Shows-how	BL,D,IBL,PAL,PT,PER
10	CO1,CO2,CO3,CO4	Demonstrate Linear Regression Analyses with real-world datasets.	2	Experiential-Learning 6.3	PSY-GUD	Shows-how	BL,BS,D,PT,PER,PBL
11	CO1,CO2,CO3,CO4	Demonstrate Linear Regression Analyses with real-world datasets.	2	Experiential-Learning 6.4	PSY-GUD	Shows-how	BS,D,PL,PT,PER,PBL,TBL
12	CO1,CO2,CO3	Perform Binomial/Binary Logistic Regression Analysis using Statistical	2	Practical	PSY-	Shows-	BL,C_L,

	,CO4	Software/tools		Training 6.4	GUD	how	D,PT,PER ,PBL
13	CO1,CO2,CO3 ,CO4	Demonstrate Regression Analyses-with real-world datasets related to Binomial Logistic.	2	Experiential-Learning 6.5	PSY-GUD	Shows-how	BL,D,DIS ,PAL,PT,PER
14	CO1,CO2,CO3 ,CO4	Analyses and interpret Regression Analyses- Calculate Linear Regression their findings with real-world datasets related to Binomial Logistic	2	Experiential-Learning 6.6	AFT-CHR	Shows-how	BL,D,PT, PBL
15	CO1,CO2,CO3 ,CO4	Explain the Concept of Survival Analysis – Kaplan-Meier method and its application and interpretation	1	Lecture	CAN	Knows-how	L&PPT
16	CO1,CO2,CO3 ,CO4	Perform Survival Analysis - Kaplan-Meier method using Statistical Software	2	Practical Training 6.5	PSY-SET	Shows-how	BL,D,PE R,TBL
17	CO1,CO2,CO3 ,CO4	Apply statistical techniques on real-world datasets to calculate Survival Analysis - Kaplan-Meier method, and interpret their findings.	1	Experiential-Learning 6.7	AFT-SET	Does	BS,IBL,P BL,RLE

Practical Training Activity

Practical No	Name	Activity details
Practical Training 6.1	Pearson Correlation Coefficient (1 Set of Data each)	• Demonstration by the teacher ◦ Calculation of Pearson Correlation Coefficient using Statistical Software/tools • Hands-on training ◦ Divide students into small groups ◦ The students should be provided Sample datasets or case studies for hands-on practice. ◦ Instruct each group to calculate the Pearson correlation coefficient for their assigned dataset. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to present their calculated correlation coefficients and interpretations. ◦ Facilitate the discussion on the strength and direction of the correlation, the significance level, and the potential implications of the results.

		• The teacher shall summarize the key concepts covered in the session.
Practical Training 6.2	Spearman's rank correlation coefficient (1 Set of Data each)	• Demonstration by the teacher ◦ Calculation of Spearman's rank correlation coefficient using Statistical Software/tools • Hands-on training ◦ Divide students into small groups ◦ The students should be provided Sample datasets or case studies for hands-on practice. ◦ Instruct each group to calculate Spearman's rank correlation coefficient for their assigned dataset. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to present their calculated correlation coefficients and interpretations. ◦ Facilitate the discussion on the strength and direction of the correlation, the significance level, and the potential implications of the results. • The teacher shall summarize the key concepts covered in the session.
Practical Training 6.3	Simple Linear Regression Analysis using Statistical Software (1 Set of Data)	• Demonstration by the teacher ◦ Calculation of Simple Linear Regression using Statistical Software/tools • Hands-on training ◦ Divide students into small groups ◦ The students should be provided Sample datasets or case studies for hands-on practice. ◦ Instruct each group to calculate Simple Linear Regression for their assigned dataset. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to present their calculated correlation coefficients and interpretations. ◦ Facilitate the discussion on the strength and direction of the correlation, the significance level, and the potential implications of the results. • The teacher shall summarize the key concepts covered in the session.

Practical Training 6.4	Binomial Logistic Regression Analysis(1 Set of Data)	• Demonstration by the teacher ◦ Calculation of Binomial Logistic Regression using Statistical Software/tools • Hands-on training ◦ Divide students into small groups ◦ The students should be provided Sample datasets or case studies for hands-on practice. ◦ Instruct each group to calculate Binomial logistic regression for their assigned dataset. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to present their calculated correlation coefficients and interpretations. ◦ Facilitate the discussion on the strength and direction of the correlation, the significance level, and the potential implications of the results. • The teacher shall summarize the key concepts covered in the session.
Practical Training 6.5	Survival Analysis - Kaplan-Meier method (1 Set of Data)	• Demonstration by the teacher ◦ Calculation of Survival Analysis - Kaplan-Meier method using Statistical Software/tools • Hands-on training ◦ Divide students into small groups ◦ The students should be provided Sample datasets or case studies for hands-on practice. ◦ Instruct each group to calculate Survival Analysis - Kaplan-Meier method for their assigned dataset. ◦ Encourage students to discuss their approaches and findings within their groups. ◦ Invite each group to present their calculated correlation coefficients and interpretations. ◦ Facilitate the discussion on the strength and direction of the correlation, the significance level, and the potential implications of the results. • The teacher shall summarize the key concepts covered in the session.

Experiential learning Activity		
Experiential learning No	Name	Activity details
Experiential-Learning 6.1	Pearson correlation coefficients	Objective: This experiential learning activity aims to deepen understanding of Pearson correlation coefficients by engaging students in hands-on exploration and analysis of real-world data sets. Materials Needed: 1. Data sets (can be sourced from disciplines such as Epidemiology, economics, sociology, psychology, etc.); 2. Graphing software or tools like Excel or Google Sheets; 3. Calculator (optional, depending on the software used) Activity Steps: Data Selection: - Students shall choose their data from a given set of options. Data Analysis: Using software like Excel, Google Sheets, or other relevant statistical software, the student shall input the data and use the appropriate function to calculate the correlation coefficient. Visualization: Students shall create scatterplots of the data to visually represent the relationship between the variables. Conclusion: The student shall summarize the key takeaways from the activity.
Experiential-Learning 6.2	Spearman's rank correlation coefficients	Objective: This experiential learning activity aims to deepen their understanding of Spearman's rank correlation coefficients by engaging students in hands-on exploration and analysis of real-world data sets. Materials Needed: 1. Data sets (can be sourced from disciplines such as Epidemiology, economics, sociology, psychology, etc.); 2. Graphing software or tools like Excel or Google Sheets; 3. Calculator (optional, depending on the software used) Activity Steps: Data Selection: - Students shall choose their data from a given set of options. Data Analysis: - Using software like Excel, Google Sheets, or other relevant Statistical software, the student shall input the data and use the appropriate function to calculate Spearman's rank correlation coefficient. Visualization: Students shall create scatterplots of the data to represent the relationship between the variables visually. Conclusion: The student shall summarize the key takeaways from the activity.
Experiential-Learning 6.3	Linear Regression Analyses.	Objective: This experiential learning activity aims to deepen understanding of Linear Regression Analyses by engaging students in hands-on exploration and analysis of real-world data sets. Materials Needed: 1. Data sets (can be sourced from disciplines such as Epidemiology, economics, sociology, psychology, etc.); 2. Graphing software or tools like Excel or Google Sheets; 3. Calculator (optional, depending on the software used) Activity Steps: Data Selection: - Students shall choose their data from a given set of options.

		Data cleaning and preparation ensure the data is formatted correctly for analysis. The Student will calculate summary statistics and visualize the data using appropriate graphs (e.g., scatterplots) to understand the relationships between variables.
Experiential-Learning 6.4	Linear Regression Analyses	Data Analysis: - Using software like Excel, Google Sheets, or other relevant Statistical software, the student shall perform linear regression analysis and visualize the data using appropriate graphs (e.g., scatterplots) to understand the relationships between variables. Interpretation: Student shall interpret the results of their regression analysis, paying attention to the coefficients, significance levels, and goodness-of-fit measures
Experiential-Learning 6.5	Regression Analyses.	Objective: This experiential learning activity aims to deepen understanding of Binomial Logistic Regression Analyses by engaging students in hands-on exploration and analysis of real-world data sets. Materials Needed: 1. Data sets (can be sourced from disciplines such as Epidemiology, economics, sociology, psychology, etc.); 2. Graphing software or tools like Excel or Google Sheets; 3. Calculator (optional, depending on the software used) Activity Steps: Data Selection: - Students shall choose their data from a given set of options. Data cleaning and preparation ensure the data is formatted correctly for analysis. The Student will calculate summary statistics and visualize the data using appropriate graphs (e.g., scatterplots) to understand the relationships between variables.
Experiential-Learning 6.6	linear regression analyses	Data Analysis: - Using software like Excel, Google Sheets or other relevant Statistical software, the student shall perform Binomial Logistic regression analysis and visualize the data using appropriate graphs (e.g., scatterplots) to understand the relationships between variables. Interpretation: Student shall interpret the results of their regression analysis, paying attention to the coefficients, significance levels, and goodness-of-fit measures
Experiential-Learning 6.7	Survival Analysis - Kaplan-Meier method	Introduction: Introducing survival analysis and its significance in analyzing time-to-event data, such as when a patient experiences a particular event (e.g., disease recurrence, death). Kaplan-Meier method is a non-parametric approach used to estimate the survival function from censored data. Data Selection: Students shall choose their own set of data from healthcare, epidemiology, and social sciences Data Exploration: Students shall explore their chosen data sets, identify the survival times and censoring indicators, and clean and prepare data, ensuring the data is formatted correctly for survival analysis. Students shall calculate summary statistics, such as the median survival time, and visualize the data using appropriate graphs (e.g., Kaplan-Meier survival curves).

	Kaplan-Meier Survival Analysis: Students shall perform Kaplan-Meier survival analysis using statistical software or tools like R, Python, or specialized survival analysis packages, estimate the survival function, plot the Kaplan-Meier survival curve, and interpret the results.

Modular Assessment	

Assessment method	Hour

Instructions - Conduct a structured Modular assessment. Assessment will be for 25 marks per credit. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C.	2

1. Any practical in converted form can be taken for assessment.	

(10 Marks) Or	

Any of the experiential as portfolio/ refelections / presentations can be taken as assessment.(10 Marks)	

2. Practical Record book (15Marks)	

Table 4 : Practical Training Activity

Practical No	Practical name	Hours
1.1	Data handling	2
1.2	Graphically representinon of qualitative data	2
1.3	Diagrammatic and graphical representation of quantitative and qualitative data	2
1.4	Calculation of measures of Central Tendency (3 Sets of Data)	2
1.5	Calculation of measures of Dispersion (3 Sets of Data)	2
2.1	Normal Data	2
2.2	Interpretation of Normal Data.	2
2.3	Calculate the mean and variance of normal, binomial, and poison distribution.	2
2.4	Standard Error and confidence interval	2
2.5	Standard Error and confidence interval Estimation.	2
2.6	Perform of probability sampling	2
2.7	Non-probability sampling	2
2.8	Sample size for Descriptive study Designs.	2
2.9	Sample size for analytical studies.	2
2.10	Sample size for experimental study Design.	2

3.1	Null and alternate hypothesis.	2
3.2	Type I & type II errors	2
3.3	Tests of significance	2
3.4	Data significance and power.	2
3.5	'Z' test Calculation using statistical tools/software.	2
3.6	Dependent 't' test.	2
3.7	Independent 't' test	2
3.8	'F' test Calculation.	2
3.9	'ANOVA' test Analysis	2
3.10	Annova test - Repeated	2
4.1	Chi-square test and Fisher's exact test (2 Sets of Data for each)	2
4.2	Mann-Whitney U test (2 Sets of Data)	2
4.3	McNemar's test and Wilcoxon Signed rank test (2 Sets of Data for each)	2
4.4	Kruskal Wallis test (2 Sets of Data)	2
4.5	Friedman test (2 sets of Data)	2
5.1	Incidence rate and prevalence rate calculation.	2
5.2	Calculation of OR, RR	3
5.3	Calculation of OR, RR	3
5.4	Vital statistics and Demographic statistics(3 Sets of Data)	2
6.1	Pearson Correlation Coefficient (1 Set of Data each)	2

6.2	Spearman's rank correlation coefficient (1 Set of Data each)	2
6.3	Simple Linear Regression Analysis using Statistical Software (1 Set of Data)	2
6.4	Binomial Logistic Regression Analysis(1 Set of Data)	2
6.5	Survival Analysis - Kaplan-Meier method (1 Set of Data)	2

Table 5 : Experiential learning Activity

Experiential learning No	Experiential name	Credit Hours
1.1	Data collection, entry, and cleaning collected data	3
1.2	Presentation of the data .	3
1.3	Measures of central tendency manually/ statistical tool/ software	2
1.4	Measures of dispersion	2
1.5	Descriptive data analysis	3
2.1	Probability and experimental probability.	2
2.2	Normal, binomial, and poison distribution.	2
2.3	Normal, binomial, and poison Distribution.	2
2.4	Confidence interval estimation.	2
2.5	Confidence interval - Identify and interpret	2
2.6	Sample size and Sampling designs.	2
2.7	Sample size for an observational study.	3
2.8	Sample size for analytical study.	3
2.9	Calculate sample size for RCT.	2
2.10	Study design, sampling techniques, and sample size formula.	2
2.11	Probability sampling techniques.	2
2.12	Non-probability sampling techniques.	2
3.1	Parametric/non-parametric test	3

3.2	level of significance, power, type I & type II errors, and p-value.	3
3.3	Z test	3
3.4	Paired/dependent t-test'.	3
3.5	Unpaired/independent t-test.	3
3.6	F test.	3
3.7	ANOVA. test	3
3.8	ANOVA	3
3.9	Parametric test	2
4.1	Application of Chi-square test and Fisher's exact test using secondary data	3
4.2	Application of Mann-Whitney U test using secondary data	3
4.3	McNemar's test and Wilcoxon's signed rank test.	3
4.4	Application of Kruskal Wallis test using secondary data	2
4.5	Application of Friedman test using secondary data	2
5.1	Secondary data collection is used to calculate measures used in vital statistics and demographics.	3
5.2	Calculation of measures used in Vital Statistics	2
5.3	Calculation of measures used in Demography	2
5.4	Measure of vital statistics & demography	2
5.5	Measures of vital statistics & demography .	2

5.6	Secondary data analysis.	2
6.1	Pearson correlation coefficients	2
6.2	Spearman's rank correlation coefficients	2
6.3	Linear Regression Analyses.	2
6.4	Linear Regression Analyses	2
6.5	Regression Analyses.	2
6.6	linear regression analyses	2
6.7	Survival Analysis - Kaplan-Meier method	1

Table 6 : Assessment Summary: Assessment is subdivided in A to G points**6 A : Number of Papers and Marks Distribution**

Subject Code	Paper	Theory	Practical	Total
UNIPG-BS	1	100	NA	100

6 B : Scheme of Assessment**Credit frame work**

UNIPG-BS has 6 modules of 8 credits which includes 240 Notional Learning Hours. One Credit will be having 30 Hours of learner participation and teaching, practical and experiential learning will in the ratio of 1:2:3 i.e. One credit will have 5 hours of teaching, 10 hours of practical training and 13 hours of experiential learning and 2 hours of modular assessment for 25 marks.

Module wise Assessment: will be done at the end of each module. Evaluation includes learners active participation to get Credits and Marks. Each Module may contain one or more credits.

Summative Assessment: Summative Assessment (University examination) will be carried out at the end of Semester I.

6 C : Calculation Method for Modular Grade Points (MGP)

Module Number & Name (a)	Credits (b)	Actual No. of Notional Learning Hours (c)	Attended Number of notional Learning hours (d)	Maximum Marks of assessment of modules (e)	Obtained Marks per module (f)	MGP = $\frac{d}{c} \times \frac{f}{e} \times 100$
1. Fundamentals of Statistics	1	30		25		
2. Probability, Probability Distributions, Sampling Techniques, and Sample Size Determinations	2	60		50		
3. Tests of significance and parametric statistical tests	2	60		50		
4. Non-parametric statistical tests	1	30		25		
5. Disease frequency; Demography and Vital statistics	1	30		25		
6. Correlation and Regression Analysis	1	30		25		
$\text{MGP} = \frac{(\text{Number of Notional learning hours attended in a module}) \times (\text{Marks obtained in the modular assessment})}{(\text{Total number of Notional learning hours in the module}) \times (\text{Maximum marks of the module})} \times 100$						

6 D : Semester Evaluation Methods for Semester Grade point Average (SGPA)

SGPA will be calculated at the end of the semester as an average of all Module MGPs. Average of MGPs of the Semester For becoming eligible for Summative assessment of the semester, student should get minimum of 60% of SGPA

SGPA = Average of MGP of all modules of all papers = add all MGPs in the semester/ no. of modules in the semester

Evaluation Methods for Modular Assessment

A S.No	B Module number and Name	C MGP
1	Fundamentals of Statistics	C1
2	Probability, Probability Distributions, Sampling Techniques, and Sample Size Determinations	C2
3	Tests of significance and parametric statistical tests	C3
4	Non-parametric statistical tests	C4
5	Disease frequency; Demography and Vital statistics	C5
6	Correlation and Regression Analysis	C6
	Semester Grade point Average (SGPA)	$(C1+C2+C3+C4+C5+C6) / \text{Number of modules}(6)$

S. No	Evaluation Methods
1.	Method explained in the Assessment of the module or similar to the objectives of the module.

6 E : Question Paper Pattern

MD/MS UNANI Examination UNIPG-BS

Sem I

Time: 3 Hours ,**Maximum Marks:** 100

INSTRUCTIONS: All questions compulsory

		Number of Questions	Marks per question	Total Marks
Q 1	Analytical based structured question (ABQ)	1	20	20
Q 2	Short answer questions (SAQ)	8	5	40
Q 3	Long answer questions (LAQ)	4	10	40

Instructions for the paper setting.

1. Questions should be drawn based on the table 6F.
2. Marks assigned for the module in 6F should be considered as the maximum marks.
3. Refer table 6F before setting the questions. Questions should not be framed on the particular unit if indicated “NO”.
4. There will be a single application-based question (ABQ) worth 20 marks. No other questions should be asked from the same module where the ABQ is framed.
5. Except the module on which ABQ is framed, at least one Short answer question should be framed from each module.
6. Long answer question should be analytical based structured questions assessing the higher cognitive ability.
7. Use the Blue print provided in 6G or similar blue print created based on instructions 1 to 6.

6 F : Distribution for summative assessment (University examination)

S.No	List of Module/Unit	ABQ	SAQ	LAQ
(M-1)Fundamentals of Statistics Marks: (10)				
1	(U-1) Fundamentals of Statistics	No	Yes	Yes
(M-2)Probability, Probability Distributions, Sampling Techniques, and Sample Size Determinations Marks: (25)				
1	(U-1) Probability and Probability Distributions	Yes	Yes	Yes
2	(U-2) Sampling techniques and Sample size Determinations	Yes	No	Yes
(M-3)Tests of significance and parametric statistical tests Marks: (25)				
1	(U-1) Testing of hypothesis	Yes	Yes	Yes
2	(U-2) Parametric tests	Yes	Yes	Yes
(M-4)Non-parametric statistical tests Marks: (15)				
1	(U-1) Non-parametric methods	No	Yes	Yes
(M-5)Disease frequency; Demography and Vital statistics Marks: (15)				
1	(U-1) Measures	No	Yes	Yes
(M-6)Correlation and Regression Analysis Marks: (10)				
1	(U-1) Correlation and Regression Analysis	No	Yes	No

6 G : Blue Print for Summative assessment (University Examination)

Question No	Type of Question	Question Paper Format
Q1	Application based Questions 1 Question 20 marks All compulsory	M2.U1, . M2.U2 M3.U1, . M3.U2
Q2	Short answer Questions Eight Questions 5 Marks Each All compulsory	1. M1.U1 Or . M6.U1 2. M2.U1 3. M3.U1 Or . M3.U2 4. M3.U2 5. M4.U1 6. M5.U1 7. M6.U1 8. M3.U2
Q3	Analytical Based Structured Long answer Questions Four Questions 10 marks each All compulsory	1. M1.U1 Or . M2.U1 Or . M3.U1 Or . M5.U1 2. M2.U1 Or . M1.U1 Or . M3.U2 Or . M5.U1 3. M3.U2 Or . M1.U1 Or . M2.U1 Or . M5.U1 4. M5.U1 Or . M2.U1 Or . M1.U1 Or . M3.U1

Reference Books/ Resources

S.No	References
1	P.S.S. Sunder Rao, J. Richard, Introduction to Biostatistics and Research Methods, Prentice-Hall of India Private Limited, 2006.
2	Daniel, W.W. (2006): Biostatistics: A foundation for analysis in the health Sciences, John Wiley & Sons, 7th edition (Unit 5).
3	Indrayan A, Basic Methods of Medical Research, Third Edition, AITBS Publishers, J 5/6 Krishna Nagar, Delhi – 110051, India.
4	Goon A.M., Gupta M. K., Dasgupta B (2008): Fundamentals of Statistics, Published by Prentice Hall, 2nd edition.
5	Gupta S.C.& Kapoor V.K, (2000): Fundamentals of & Mathematical Statistics, Sultan Chand Sons 10th edition.
6	Altman D G, (2006): Practical Statistics for Medical Research, London: Chapman and Hall, 2nd edition.
7	Armitage, P., Statistical Methods in Medical Research, London, Blackwell Scientific Publications, 1989.
8	Bhat B. R, Srivenkatramana T and Rao Madhava K.S. (1996): Statistics: A Beginner's Text, Vol. I, New Age International (P) Ltd.
9	Croxtan F.E, Cowden D.J and Kelin S (1973): Applied General Statistics, Prentice Hall of India.
10	Bhat B.R, Srivenkatramana T and Rao Madhava K.S. (1997): Statistics: A Beginner's Text, Vol. II, New Age International (P) Ltd.
11	Mood A.M, Graybill F.A and Boes D.C. (1974): Introduction to the Theory of Statistics, McGraw Hill.
12	Ali Z, Bhaskar SB. Basic statistical tools in research and data analysis. Indian J Anaesth. 2016 Sep;60(9):662-669. doi: 10.4103/0019-5049.190623. Erratum in: Indian J Anaesth. 2016 Oct;60(10):790. PMID: 27729694; PMCID: PMC5037948. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5037948/
13	Rohatgi, V. K. (1984): An Introduction to Probability Theory and Mathematical Statistics, Wiley Eastern, 3rd edition (Chapter 14-14.5 for SPRT).
14	Rohatgi, V.K. and Saleh, A.K. (2001): An Introduction to Probability and Statistics, John Wiley & Sons, 3rd edition (Chapters 8 - 8.3, 9, 10- 10.1,10.2,10.6, 11 - 11.3)
15	William G. Cochran, (1997): Sampling Techniques, John Wiley & sons 3rd edition.
16	Murthy M N (2012): Sampling Theory and methods, Statistical Publishing Society, Calcutta 2nd edition.
17	Levy PS, Lemeshow S (1999): Sampling of Populations: Methods and Applications, New York: Wiley Interscience, 3 rd edition.
18	Sampath S. (2000): Sampling Theory and Methods, Narosa Publishing House.
19	Sukhatme B.V(1984): Sample Survey Methods and Its Applications, Indian Society of Agricultural Statistics.
20	Des Raj (2000): Sample Survey Theory, Narosa Publishing House.

21	Edward P.J., Ford J.S. and Lin (1974): Probability for Statistical Decision-Making, Prentice Hall.
22	Hodges J.L and Lehman E.L (1964): Basic Concepts of Probability and Statistics, Holden-Day.
23	David S (1996): Elementary Probability, Oxford Press.
24	Health Research Methodology, A Guide for Training in Research Methods, World Health Organization, Oxford University Press, 1993.
25	Rohatgi, V.K. and Saleh, A.K. (2001): An Introduction to Probability and Statistics, John Wiley & Sons. (Chapter 8, Section 8.1 through 8.8)
26	Johnson, R.A. and Wichern, D.W. Applied Multivariate Statistical Analysis, Pearson Education, Asia 5th edition.
27	Zar, J.H. (2006): Biostatistical Analysis, Pearson education, 4th edition Chapter 18 (18.1, 18.2, 18.4, 18.5).
28	Biostatistics Student solutions manual: A foundation for analysis in the health sciences; Wanye W Daniel, 10th Ed, Wiley Series, 2011.
29	Hogg, R. V., McKean, J. W. and Craig, A. T. (2006): Introduction to Mathematical Statistics, 6 th edition, Pearson Education.
30	G Casella and R.L. Berger (2002): Statistical Inference, Thomson Duxbury, 2 nd edition.
31	Rao, C.R. (1974): Linear Statistical Inference and Its Applications. New Delhi
32	Vijay K. Rohatgi, A.K. Md. Ehsanes Saleh. Third Edition: An Introduction to Probability and Statistics, Wiley.
33	Rees, D.G. (1989): Essential of Statistics. London: Chapman and Hall.
34	Regier, Mary, H. (1985): Biomedical Statistics with Computing. New York: Research Studies Press (A Division of John Wiley & Sons)
35	R Bonita, R Beaglehole. T Kjellström, (2006): Basic Epidemiology 2nd Edition. http://apps.who.int/iris/bitstream/10665/43541/1/9241547073_eng.pdf
36	Dicker, Richard, (2006): Principles of Epidemiology in Public Health Practice, 3 rd edition. http://www.cdc.gov/opphss/csels/dsepd/ss1978/ss1978.pdf
37	RC Brownson and DB Petittis (1998): Applied Epidemiology: Theory to Practice. Oxford University Press, 2nd edition.
38	Conover, W. J. (2006): Practical Non-parametric Methods in Statistics, 2 nd edition, (Unit 5).
39	Pathak, K.B. and F. Ram, (1998): Techniques of Demographic Analysis, Mumbai, Himalaya Publishing House, Chapter 4
40	Anderson T.W and Sclove S.L (1978) An Introduction to the Statistical Analysis of Data, Houghton Mifflin Co.
41	Cooke, Cramer and Clarke (): Basic Statistical Computing, Chapman and Hall.
42	Mood A.M, Graybill F.A and Boes D.C. (1974): Introduction to the Theory of Statistics, McGraw Hill.

43	Snedecor G.W and Cochran W. G. (1967): Statistical Methods. Iowa State University Press.
44	Spiegel, M. R. (1967): Theory & Problems of Statistics, Schaum's Publishing Series.
45	R Bonita, R Beaglehole. T Kjellström, (2006): Basic Epidemiology 2 nd Edition. http://apps.who.int/iris/bitstream/10665/43541/1/9241547073_eng.pdf
46	Dicker, Richard, (2006): Principles of Epidemiology in Public Health Practice, 3 rd edition. http://www.cdc.gov/opphss/csels/dsepd/ss1978/ss1978.pdf
47	Essentials of Biostatistics & Research Methodology" authored by Indranil Saha and Bobby Paul
48	Essentials of Biostatistics in Public Health, Lisa M Sullivan 2nd Ed, 2009.
49	High yield Biostatistics, Epidemiology and Public Health, Anthony N Glaster, 4th Ed, Lippincott Williams and Wilkins, 2013.
50	Jacob S. Siegel, David A. Swanson (2004): The methods and Materials of Demography, Elsevier Inc.
51	Murdock S.R., Ellis D.R., Applied Demography : An Introduction for Basic Concepts Methods and Data, Bouldev, Co., West View Press,1991.
52	United Nations Manual X, Indirect Techniques of Demography Estimation, New York, United Nations Population Division,1983
53	Singh S.N., M.K.Premi, P.S.Bhatia , Ashish Bose Population transition in India Vol.1 & 2, B.R. Publishing Corporation, Division of D.K Publishers. Distributors (P) Ltd , Delhi 110007,1989.
54	Omran, A.R. The Clark-Omran System of research design in epidemiology. Raleigh, NC: University of North Carolina, 1972.
55	Pauli, H.G. Training in research methodology: (Advisory Committee on Medical Research, 25th Session, Geneva, 10-13 October 1983). Geneva: World Health Organization, 1983.
56	Montgomery, D. C., Peck, E. A. and Vining, G. G. (2003): Introduction to Linear regression analysis, John Wiley and Sons, Inc. 3 rd edition Chapters 2, 3, 4, 5, 6, 8 (8.1,8.2), 9, 10, 12 (12.1,12.3,12.4), 14 (14.1.2).
57	Zar, J.H. (2006): Biostatistical Analysis, Pearson education, 4th edition Chapter 18 (18.1, 18.2,18.4,18.5).
58	Survival analysis: A self learning text, David GK, Mitchel K. Springer, 2nd Ed, 2008
59	Categorical data analysis, Alan Agresti. Wiley 2nd Ed, 2007. 2. 2.Survival analysis techniques for censored and truncated data, Klein JP, Moeschberger. Springer, 2003. 3. 3.Analysing categorical data. Jeffrey SS, Springer 2003.
60	Hosmer, D.W. and Lemeshow, S.(1989): Applied Logistic Regression, John Wiley & Sons Inc, 2 nd edition.
61	Hill, A.B., Principles of Medical Statistics, London, Edward Arnold, 1981.
62	Reid, Norma, G., Research Methods and Statistics in Health Care, London, Adward Arnold, 1987
63	Cooke, Cramer and Clarke (): Basic Statistical Computing, Chapman and Hall.
64	Hoel P.G (1971): Introduction to Mathematical Statistics, Asia Publishing House.

65	Freund J.E (2001): Mathematical Statistics, Prentice Hall of India.
66	Cochran W.G and Cox G.M (1957): Experimental Designs, John Wiley and Sons.
67	Das M.N and Giri (1986): Design and Analysis of Experiments, Springer Verlag
68	Kempthorne O. (1965): The Design and Analysis of Experiments, Wiley Eastern.

Abbreviations

Domain	
CK	Cognitive/Knowledge
CC	Cognitive/Comprehension
CAP	Cognitive/Application
CAN	Cognitive/Analysis
CS	Cognitive/Synthesis
CE	Cognitive/Evaluation
PSY-SET	Psychomotor/Set
PSY-GUD	Psychomotor/Guided response
PSY-MEC	Psychomotor/Mechanism
PSY-ADT	Psychomotor Adaptation
PSY-ORG	Psychomotor/Origination
AFT-REC	Affective/ Receiving
AFT-RES	Affective/Responding
AFT-VAL	Affective/Valuing
AFT-SET	Affective/Organization
AFT-CHR	Affective/ characterization
T L Method	
L	Lecture
L&PPT	Lecture with PowerPoint presentation
L&GD	Lecture & Group Discussion
L_VC	Lecture with Video clips
REC	Recitation
SY	Symposium
TUT	Tutorial
DIS	Discussions
BS	Brainstorming
IBL	Inquiry-Based Learning
PBL	Problem-Based Learning

CBL	Case-Based Learning
PrBL	Project-Based Learning
TBL	Team-Based Learning
TPW	Team Project Work
FC	Flipped Classroom
BL	Blended Learning
EDU	Edutainment
ML	Mobile Learning
ECE	Early Clinical Exposure
SIM	Simulation
RP	Role Plays
SDL	Self-directed learning
PSM	Problem-Solving Method
KL	Kinaesthetic Learning
W	Workshops
GBL	Game-Based Learning
LS	Library Session
PL	Peer Learning
RLE	Real-Life Experience
PER	Presentations
D-M	Demonstration on Model
PT	Practical
X-Ray	X-ray Identification
CD	Case Diagnosis
LRI	Lab Report Interpretation
DA	Drug Analysis
D	Demonstration
D-BED	Demonstration Bedside
DL	Demonstration Lab

DG	Demonstration Garden
FV	Field Visit
JC	Journal Club
Mnt	Mentoring
PAL	Peer Assisted Learning
C_L	Co Learning
DSN	Dissection
PSN	Prosection

**Competency-Based Dynamic Curriculum for MD/ MS UNANI
(PRESCRIBED BY NCISM)**

Semester I Course - Research Methodology

(SUBJECT CODE : UNIPG-RM)

(Applicable from 2024-25 batch, from the academic year 2024-25 onwards until further notification by NCISM)



**BOARD OF UNANI, SIDDHA AND SOWA RIGPA
NATIONAL COMMISSION FOR INDIAN SYSTEM OF MEDICINE
NEW DELHI-110026**

PREFACE

The field of Unani, with its rich history and profound insights into health and well-being, demands a rigorous and evidence-based approach to research. To advance the understanding and application of Unani principles, it is essential that postgraduate students are equipped with a solid foundation in research methodology.

This syllabus has been carefully crafted to provide students with a comprehensive insight into literature search, framing research questions, stating hypotheses, research design, data analysis, ethical considerations, and scientific writing. By mastering these essential skills, students will be well-prepared to conduct independent research, contribute to the scholarly literature, and advance the field of Unani.

The syllabus covers a wide range of topics, from the fundamentals of research to advanced techniques such as systematic reviews and meta-analyses. In an effort directed to learner-centric education, it also incorporates practical and experiential elements, including case-based learning and hands-on exercises, to ensure that students can apply their knowledge to real-world research challenges. At the same time, the syllabus provides an adequate opportunity for a teacher to kindle research acumen amongst students.

It is believed that this syllabus will serve as a valuable resource for postgraduate students in Unani. By diligently studying and applying the principles outlined herein, students can develop the skills and knowledge necessary to conduct rigorous and meaningful research that will contribute to the advancement of Unani.

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NCISM**Competency/Outcome-Based Dynamic Curriculum for MD/ MS UNANI****Subject Code : UNIPG-RM****Summary & Credit Framework**

Module Number & Name	Credits	Notional Learning Hours	Maximum Marks of assessment of modules (Formative assessment)	Module Marks for Summative Assessment (University Examination)
1. Research Basics	1	30	25	20
2. Ethics and Regulatory Aspects in Research	1	30	25	10
3. Research Types - Part 1	2	60	50	20
4. Research Types - Part 2	1	30	25	20
5. Research Types - Part 3	2	60	50	20
6. Research Communication	2	60	50	10
	9	270	225	100

Credit frame work

UNIPG-RM has 6 modules of 9 credits which includes 270 Notional Learning Hours. One Credit will be having 30 Hours of learner participation and teaching, practical and experiential learning will in the ratio of 1:2:3 i.e. One credit will have 5 hours of teaching, 10 hours of practical training and 13 hours of experiential learning and 2 hours of modular assessment for 25 marks.

Course Code and Name of Course

Course code	Name of Course
UNIPG-RM	Semester I Course - Research Methodology

Table 1 : Course learning outcomes and mapped Program learning outcomes

CO No	A1 Course learning Outcomes (CO) UNIPG-RM At the end of the course UNIPG-RM, the students should be able to-	B1 Course learning Outcomes mapped with program learning outcomes.
CO1	Demonstrates decision-making based on acquired knowledge, understanding various research types.	PO1,PO4
CO2	Conduct a comprehensive literature review to identify research gaps and define areas for future study.	PO3,PO4
CO3	Evaluate and appraise the literature to assess research gaps and the necessity for new studies.	PO3,PO8
CO4	Design and conduct research protocols using appropriate study designs and develop effective assessment tools tailored for Unani.	PO4,PO7
CO5	Implement and monitor ethical and regulatory guidelines throughout the research process.	PO5,PO8
CO6	Prepare and disseminate research findings through presentations, publications in indexed journals and other professional platforms adhering to publication ethics.	PO7,PO8
CO7	Deliver impactful presentations of research projects to peers, demonstrating clarity, analysis, and professional communication.	PO6,PO7
CO8	Utilize information technology tools to enhance research capabilities, manage observations, and improve analytical accuracy.	PO5,PO6
CO9	Apply advanced instrumentation and modern techniques in Unani research to elevate study quality, accuracy and integrity.	PO2,PO5

Table 2 : Course contents (Modules- Credits and Marks)

2A Module Number	2B Module & units	2C Number of Credits	2D Notional Learning hours				2E Marks
			Theory	Practical Training	Experiential Learning including modular assessment	Total	
1	M-1 Research Basics The module 'Research Basics' provides a comprehensive foundation in research, focusing on integrating Unani principles with contemporary scientific methodologies. It emphasizes the significance of conducting thorough literature reviews, critically appraising classical Unani texts alongside modern studies, and understanding evidence-based practices in Unani. The module also guides learners in identifying relevant research problems and developing clear, well-informed research questions and hypotheses, bridging the gap between traditional knowledge and modern scientific inquiry. • M1U1 Overview of research process and evidence-based medicine • M1U2 Research methods in Unani Medicine • M1U3 Literature search and critical appraisal of literature • M1U4 Identification of research problem • M1U5 Research question and Hypothesis	1	5	10	15	(30)	20
2	M-2 Ethics and Regulatory Aspects in Research The module 'Ethics and Regulatory Aspects in Research' covers essential ethical principles and guidelines crucial for conducting research in Unani. It provides insights into the constitution and functioning of Institutional Ethics Committees for both human and animal studies, ensuring adherence to ethical standards. The module also highlights the National Pharmacovigilance Program for Unani, focusing on adverse drug reporting	1	5	10	15	(30)	10

	methods. Additionally, it explores the scope and significance of Intellectual Property Rights (IPR) and patents, ensuring researchers understand their role in safeguarding innovations in the field of Unani. • M2U1 Basics of Ethics and Ethics Guidelines • M2U2 Institutional Ethics Committees Institutional Ethics Committees (Human and Animal) - constitution and review process • M2U3 National Pharmacovigilance Program National Pharmacovigilance Program for Unani medicine and Adverse Drug reporting methods • M2U4 Scope and Importance of IPR and Patents						
3	M-3 Research Types - Part 1 The module 'Research Types - Part 1' offers a comprehensive understanding of various research types relevant to Unani. It introduces learners to both qualitative and quantitative research methodologies, providing a detailed exploration of descriptive and observational study designs. The module emphasizes the importance of selecting appropriate research designs based on the nature of the inquiry, enabling researchers to systematically investigate Unani concepts and clinical practices. This balanced approach to qualitative and quantitative research ensures a thorough understanding of different study frameworks, allowing for a more nuanced and evidence-based exploration of Unani. • M3U1 Different types of research • M3U2 Qualitative Research • M3U3 Descriptive study designs • M3U4 Observational study designs	2	10	20	30	(60)	20
4	M-4 Research Types - Part 2 The module 'Research Types - Part 2' focuses on critical aspects of research accuracy and innovation in Unani. It begins with an in-depth examination of bias in research and various strategies to minimize or eliminate it, ensuring	1	5	10	15	(30)	20

	the validity of study outcomes. The module then explores the methodology of Randomized Controlled Trials (RCTs), a gold standard in clinical research, and their application in Unani studies. Finally, it introduces learners to emerging and innovative study designs, equipping researchers with modern tools to advance evidence-based Unani while maintaining rigorous scientific standards. • M4U1 Bias and ways to eliminate bias • M4U2 Randomized Controlled Trials • M4U3 Newer study designs						
5	M-5 Research Types - Part 3 The module 'Research Types - Part 3' examines essential research domains in Unani. It covers preclinical studies as a foundation for drug research, highlights the significance of literary research, and emphasizes the development of tailored research tools. Additionally, it addresses the use of appropriate assessment tools and terminology, ensuring researchers are equipped to conduct rigorous investigations in Unani. • M5U1 Preclinical studies • M5U2 Drug research • M5U3 Literary research • M5U4 Development of tools • M5U5 Assessment Tools Use of appropriate assessment tools and terminology	2	10	20	30	(60)	20
6	M-6 Research Communication The module 'Research Communication' focuses on key elements of presenting research in Unani. It covers writing research protocols, proposals, and synopses, along with the structure of dissertations. Learners will also explore the types and formats of journal articles and gain insights into conducting systematic reviews and meta-analyses, essential for synthesizing evidence in the field. • M6U1 Research protocol writing	2	10	20	30	(60)	10

	Research protocol/proposal/Synopsis writing • M6U2 Dissertation contents and structure • M6U3 Types and structure of journal articles • M6U4 Systematic review and meta-analysis • M6U5 Publication guidelines • M6U6 Referencing • M6U7 Scientometrics • M6U8 Publication Ethics						
		9	45	90	135	270	100

Table 3 : Modules - Learning objectives

3A Sr.No	3B Course Outcome	3C Learning Objective (At the end of the (lecture/practical/experiential) learning session, the students should be able to)	3D Notional learning Hours	3E Lecture/ Practical Training/ Experiential Learning	3F Domain/ Sub Domain	3G Level (Does/Sh ows how/ Knows h ow/Kno w)	3H Teaching Learning Methods
Module 1 : Research Basics							
Module Learning Objectives (At the end of the module, the students should be able to) 1. Describe the importance of evidence-based medicine, its levels, and the research process 2. Conduct literature review and critical appraisals of articles 3. Identify a research problem 4. Frame research question, hypotheses, and objectives							
Unit 1 Overview of research process and evidence-based medicine							
References: 1,2,3							
3A	3B	3C	3D	3E	3F	3G	3H
1	CO1,CO2,CO3	Describe research process and importance of evidence-based medicine	1	Lecture	CC	Knows-how	L&PPT
2	CO1,CO2,CO3	Elaborate the current status of Unani medicine research	2	Practical Training 1.1	PSY-GUD	Knows-how	PBL
3	CO1,CO2,CO3	Identify the level of evidence in Unani research	2	Experiential-Learning 1.1	CC	Knows-how	CBL,DIS
Unit 2 Research methods in Unani Medicine							

References: 4

3A	3B	3C	3D	3E	3F	3G	3H
1	CO1,CO2,CO3	Appreciate research concepts in Unani medicine system	1	Lecture	CC	Knows-how	FC
2	CO1,CO2,CO3	Demonstrate different research concepts in Unani medicine systems with examples	2	Practical Training 1.2	PSY-GUD	Shows-how	DIS,PrBL
3	CO1,CO2,CO3	List out the challenges and probable solutions in Unani medicine research	2	Experiential-Learning 1.2	PSY-GUD	Shows-how	BS,PrBL

Unit 3 Literature search and critical appraisal of literature

References: 5

3A	3B	3C	3D	3E	3F	3G	3H
1	CO1,CO2,CO3	Describe the systematic approach of literature search using biomedical databases, search engines and software	1	Lecture	CC	Knows-how	L&PPT
2	CO1,CO2,CO3	Demonstrate literature search in medical databases	2	Practical Training 1.3	PSY-GUD	Shows-how	D,DIS
3	CO1,CO2,CO3	Conduct a literature search for a given scenario	3	Experiential-Learning 1.3	PSY-GUD	Shows-how	BS

Unit 4 Identification of research problem

References: 6,7

3A	3B	3C	3D	3E	3F	3G	3H
1	CO1,CO2,CO3	Describe the methods for identifying the research problem	1	Lecture	CC	Knows-how	L&PPT
2	CO1,CO2,CO3	Enlist different ways of identifying the research problem	2	Practical Training 1.4	PSY-GUD	Shows-how	PBL
3	CO1,CO2,CO3	Identify the research problem	3	Experiential-Learning 1.4	CAN	Shows-how	CBL

Unit 5 Research question and Hypothesis

References: 8

3A	3B	3C	3D	3E	3F	3G	3H
1	CO1,CO2,CO3	Define and explain characteristics of good research question, hypotheses- types and formulation, framing objectives	1	Lecture	CC	Know	FC
2	CO1,CO2,CO3	Demonstrate the qualities of good research questions (PICO/T and FINER approach), Demonstrate the importance of framing appropriate hypotheses and pertinent objectives.	2	Practical Training 1.5	PSY-GUD	Shows-how	PBL
3	CO1,CO2,CO3	Frame research questions, hypotheses, and study objectives.	3	Experiential-Learning 1.5	CAP	Knows-how	BS,PBL

Practical Training Activity

Practical No	Name	Activity details
Practical	Elaborate the current	The teacher will discuss a minimum of one major research initiative like Ministry of Ayush research

Training 1.1	status of Unani medicine research	initiatives in COVID-19, or any other current important Unani medicine research projects or research projects of other systems of medicine. Students can be divided into groups, and each group will be given a specific assignment, such as the whole system approach or the Black Box approach, and asked to summarise the impressions (uniqueness, relevance, importance) about the given research project. Brainstorming and group discussions of prospective research topics of the Unani topics.
Practical Training 1.2	Demonstrate different research concepts in Unani medicine systems with examples	The teacher will demonstrate a few research concepts quoted in Unani medicine texts. Students will be divided into groups. Each group should refer to Unani medicine texts quoting research concepts, enlist any five in their prospective study area, and submit assignments. Students will be encouraged to do GD on the submitted assignments and present their relevance and applications to current research trends.
Practical Training 1.3	Display and demonstrate literature search in medical databases	The teacher will demonstrate searching relevant articles using search engines by following MeSH terms, standard Unani medicine terms [WHO publication], Filtering & Boolean operators; LitMaps; and e-resources of Unani medicine systems. Following these students will do a teacher-guided activity. Compilation Students should be asked to select one topic and do a narrative review / Systematic review using the MeSH terms, compile at least 15 results, and submit it. Students should be aware using of the Namaste Portal.
Practical Training 1.4	Enlist different ways of identifying the research problem	The teacher will demonstrate different ways of identifying research problems like limitations/ lacunae/ research gap/ evidence gap/ future scope of published studies, current trends, integration of disciplines/systems, clinical observations, expert opinion, brainstorming, and national/ local thrust areas with examples. TBL The group of students will discuss the research problems and will present them under the points of the current scenario of the problem, Knowledge gap, Need of research question, Hypothesis, and Null hypothesis formation.
Practical Training 1.5	Demonstrate the qualities of good research questions using PICO/T in the clinical scenario and the FINER approach in both clinical and non-clinical	The teacher will demonstrate how to frame a research question (define and redefine), hypotheses, and objectives with examples reflecting different research types and subjects. Students will refer to a minimum of 5 research articles related to the study area and evaluate the research question, hypotheses, and objectives in these articles based on the criteria as demonstrated by the teacher. Fishbowl activity – Clinical scenarios will be given by the teacher. The half group will form the research question / Hypothesis / Objectives on the scenario. The other group will observe the question /Hypothesis with PICOT and FINER guidelines and will discuss it Group activity

	scenarios, hypotheses, and objectives.	A group of students will review the 5 articles, understand the research question and variables, and observe using PICOT and FINER guidelines.
Experiential learning Activity		
Experiential learning No	Name	Activity details
Experiential-Learning 1.1	Identify the level of evidence in Unani medicine research	The teacher will divide students into 2 to 5 groups. The teacher will give a few scenarios or topics (both from Unani medicine and contemporary medicine, for example, hypertension, diabetes, yoga procedures, therapeutic procedures, etc.) to a group of students. Each group should gather research works for each level of the evidence pyramid. In the end, the lacunae in evidence across the different examples will be identified and summarised.
Experiential-Learning 1.2	List out the challenges and probable solutions in Unani medicine research.	The teacher will divide students into 2 to 5 groups. Each group should be assigned one concept quoted in Unani medicine texts in the hospital community and record the challenges. Students shall share their observations and the teacher will summarise.
Experiential-Learning 1.3	Conduct a literature search for a given scenario	Students will identify a topic of interest related to their specialty and do a literature search using the systematic approach and then evaluate the collected literature under the guidance of a teacher.
Experiential-Learning 1.4	Identify the research problem	Students will be divided into 2 to 5 groups and each group will be involved in identifying the research problem using any of the methods demonstrated by the teacher, followed by a presentation and discussion.
Experiential-Learning 1.5	Frame research questions, hypotheses, and study objectives.	For the research problem identified in the previous unit “Research problem”, students will frame the research question, hypotheses, and objectives followed by discussion regarding the same as well as other possible research question formats.
Modular Assessment		
Assessment method		Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 25 marks per credit. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per		2

table 6 C.

Project work: (25 marks)

Develop a research question, hypothesis, and objectives based on a given case scenario.

(Evaluation based on following checklists)

- PICOT / FINER criteria
- Self-explanatory
- H0 & H1 (where applicable)
- Primary & secondary objectives, their clarity, and relevance to the study

Or

Any practical in converted form can be taken for assessment..

Or

Any of the experiential as portfolio/ refelections / presentations can be taken as an assessment.

Module 2 : Ethics and Regulatory Aspects in Research

Module Learning Objectives

(At the end of the module, the students should be able to)

1 Illustrate basic principles of research ethics

2 Describe the composition and role of the research ethics committee

3 Appraise the Pharmacovigilance program for Unani medicine and ADR reporting

4 Describe various types of IPR and patent process

Unit 1 Basics of Ethics and Ethics Guidelines

References: 9,10,11,12,13

3A	3B	3C	3D	3E	3F	3G	3H
1	CO5	Describe the history, need, role, and fundamental principles of ethics in research related to Humans and Animals.	1	Lecture	CC	Knows-how	FC,L_VC
2	CO5	Explain the history and contents of ICMR, ICH-GCP, and GCP-Unani medicine guidelines.	1	Lecture	CC	Knows-how	L&PPT
3	CO5	Comprehend the contents of ICMR, ICH-GCP and GCP-Unani medicine guidelines including the process of Clinical trial registration	1	Practical Training 2.1	PSY-GUD	Shows-how	DIS,PER
4	CO5	Enlist cases where the principle of autonomy and justice is upheld and compromised.	1	Practical Training 2.2	PSY-SET	Shows-how	PBL
5	CO5	Enlist cases where principles of beneficence/non-maleficence are upheld and compromised	1	Practical Training 2.3	PSY-SET	Shows-how	PBL
6	CO5	Demonstrate the ethical principles by developing a case scenario.	1	Experiential-Learning 2.1	AFT-VAL	Shows-how	CBL

7	CO5	Identify the ethical principles in a given case scenario.	1	Experiential-Learning 2.2	AFT-VAL	Shows-how	DIS,RP

Unit 2 Institutional Ethics Committees Institutional Ethics Committees (Human and Animal) - constitution and review process

References: 14,15,16,17

3A	3B	3C	3D	3E	3F	3G	3H
1	CO5	Explain the constitution, composition, review process, registration, and regulation of the Institutional human and animal ethics committee.	1	Lecture	CC	Knows-how	L&PPT
2	CO5	Construct the composition of the ethics committee through different case scenarios.	2	Practical Training 2.4	PSY-SET	Shows-how	CBL
3	CO5	Enlist the elements of the review process through different case scenarios	3	Practical Training 2.5	PSY-SET	Shows-how	CBL
4	CO5	Identify ethical issues specific to Unani medicine research through different case scenarios.	2	Practical Training 2.6	PSY-SET	Shows-how	CBL,PBL,RP
5	CO5	Demonstrate the review process of IHEC	6	Experiential-Learning 2.3	AFT-VAL	Shows-how	PBL,RP
6	CO5	Demonstrate the review process of IAEC	5	Experiential-Learning 2.4	AFT-VAL	Shows-how	PBL,RP

Unit 3 National Pharmacovigilance Program National Pharmacovigilance Program for Unani medicine and Adverse Drug reporting methods

References: 18,19,20,21

3A	3B	3C	3D	3E	3F	3G	3H

1	CO5	Explain the history, objectives, hierarchy, and ADR reporting method of the Pharmacovigilance program for Unani medicine & H drugs.	1	Lecture	CC	Knows-how	L&PPT

Unit 4 Scope and Importance of IPR and Patents

References: 22,23,24,25

3A	3B	3C	3D	3E	3F	3G	3H
1	CO5	Outline the importance and various forms of IPR (copyright, trademark, industrial design, geographical designs, patents).	1	Lecture	CC	Knows-how	FC,L&PPT

Practical Training Activity

Practical No	Name	Activity details
Practical Training 2.1	Identify the contents of ICMR, ICH-GCP, and GCP-Unani medicine guidelines including the process of Clinical trial registration.	Group Activity The teacher will present different sections of ICMR, ICH-GCP, and GCP-Unani medicine guidelines. Students will be divided into 2 to 5 groups and each group will be assigned one key section from these guidelines and students will read and present the summary of the section. Following this, the teacher will demonstrate the process of Clinical trial registration. Students will assess the CTRI website.
Practical Training 2.2	Enlist cases where the principle of autonomy and justice is upheld and compromised.	The teacher will discuss cases like the Nuremberg trials, and Tuskegee Syphilis Experiments or create any case scenario related to the said ethics principles. Students will be divided into 2 to 5 groups and each group will be given a case scenario like decision making, informed consent, patient information sheet, treatment discrimination based on cultural or social status, voluntariness to withdraw, privacy, confidentiality, research misconduct, etc. The groups have to identify and analyze which ethics principle is upheld or compromised and also to suggest any corrective measures if required. Role plays by groups The importance of the Informed Consent form, Random selection of patients using software, ADR protocol, and Patient withdrawal guidelines should be emphasized.
Practical	Enlist cases where	The teacher will discuss cases such as Tuskegee Syphilis Experiments, Stanley Milgram's infamous experiment, or create any case

Training 2.3	principles of beneficence/non-maleficence are upheld and compromised	scenario related to the said ethics principles. Students will be divided into 2 to 5 groups and each group will be given a case scenario to assess the risk-benefit ratio (for example vaccination trials, and anti-cancer trials). The groups have to suggest any corrective measures if possible. Brainstorming Discussions about ethics in Vaccination trials, New drug discovery, and Ethical approaches to enroll subjects having disorders like hypertension, Diabetes, Paediatric patients, etc, or are already on another medication.
Practical Training 2.4	Construct the composition of the ethics committee through different case scenarios.	The teacher will present the composition of the ethics committee. Students will be divided into 2 to 5 groups and each group will be given a case scenario like quorum requirements, gender representation, presence of sponsor representative during IEC, qualifications and responsibilities of members, absence of a veterinarian, CCSEA nominee, etc. The group has to identify, analyze, and present the mistake in the ethics committee composition. The teacher facilitates discussion among groups and summarises the key points.
Practical Training 2.5	Revise the elements of the review process through different case scenarios	The teacher will present the elements of the review process. Students will be divided into 2 to 5 groups and each group will be given a case scenario like wrong risk identification, review by voting/unanimous call, review in an emergency, expedited review, waiver of IEC review, conflict of interest, etc. Each group will identify, analyze, and present the mistake in the ethics review process. The teacher facilitates discussion among groups and summarises the key points.
Practical Training 2.6	Identify ethical issues specific to Unani medicine research through different case scenarios.	The teacher will present case scenarios specific to Unani medicine research, like the benefit of survey studies to participants, mineral formulations, cultural issues of certain medicines/ingredients, and discuss related ethical issues. Students will be divided into 2 to 5 groups and each group will be given a case scenario like ethics involved in therapeutic procedures, add-on therapy, yoga intervention, new dosage form, use of fewer animals, vulnerable population, sponsored pharma product, etc. Each group will analyze the ethical issues involved and suggest possible solutions. The teacher facilitates discussion among groups and summarises the key points.
Experiential learning Activity		
Experiential learning No	Name	Activity details
Experiential-Learning 2.1	Appraise the ethical principles by developing a case scenario.	Students will be divided into groups and the teacher will assign ethics principles for scenario development like privacy, confidentiality, voluntary participation, anonymity, no harm to participants, informed consent, vulnerability, etc. The group will develop the script for a skit to be enacted.

Experiential-Learning 2.2	Identify the ethical principles in a given case scenario.	The groups will enact the developed skit and other groups will identify the ethical principle. The teacher facilitates discussion among groups and summarises key aspects.
Experiential-Learning 2.3	Demonstrate the review process of IHEC	The teacher will develop dummy research protocols on human participants with challenging scenarios like an incomplete application form, need for insurance, deviation from initial protocol, violation, involving vulnerable populations like children, terminally ill, differently abled, etc. Students are divided into groups and each group will be given a dummy protocol, a week before the class and explained that they will be members of a mock IE review committee. During the class, each group will perform the mock review in front of the class and decide whether to approve or suggest changes for resubmission or reject. The teacher will facilitate discussion among groups and summarise key aspects.
Experiential-Learning 2.4	Demonstrate the review process of IAEC	The teacher will develop dummy research protocols involving animals with challenging scenarios like an incomplete application form, including higher animals, multiple animal groups, procedures causing harm to animals, redundant animal experiments, etc. Each group will be given a dummy protocol, a week before the class and explained that they will be members of a mock IAE review committee. During the class, each group will perform the mock review in front of the class and decide whether to approve or suggest changes for resubmission or reject. The teacher will facilitate discussion among groups and summarise key aspects.

Modular Assessment

Assessment method	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 25 marks per credit. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Mock review process (Formative assessment is based on the presentation done during Experiential Learning in Unit-2—institutional ethics committees (human and animal)—constitution and review process) • <i>Assessment Checklist for IHEC mock review:</i> Trial protocol, written informed consent form(s), subject recruitment procedures (e.g. advertisements), written information to be provided to subjects, investigator's brochure on the study drugs, safety information, information about payments and compensation, investigator's curriculum vitae <i>Assessment Checklist for IAEC mock review:</i> Trial protocol, respective forms, criteria for animal selection and number required, investigator's brochure on the study drugs, safety information, information about analyses and disposal, investigator's curriculum vitae, visit to the animal house and look for the infrastructure and facilities. Or	2

Any practical in converted form can be taken for assessment..

Or

Any of the experiential as portfolio/ refelections / presentations can be taken as assessment.. (25 Marks)

Module 3 : Research Types - Part 1

Module Learning Objectives

(At the end of the module, the students should be able to)

- 1 Understand types of research
- 2 Comprehend different methods based on the type of research
- 3 Apply study designs in Unani medicine Research

Unit 1 Different types of research

References: 26,95

3A	3B	3C	3D	3E	3F	3G	3H
1	CO4	Distinguish different types of research	1	Lecture	CK	Knows-how	L&PPT
2	CO4	Display different types of research with examples	2	Practical Training 3.1	PSY-GUD	Shows-how	FC

Unit 2 Qualitative Research

References: 29

3A	3B	3C	3D	3E	3F	3G	3H
1	CO4	Describe qualitative research - definition, characteristics, relevance, types, methods of data collection, and ways to maintain robustness like credibility, transferability, dependability, and confirmability.	3	Lecture	CC	Knows-how	L&GD,PE R
2	CO4	Identify the methods used in qualitative research.	4	Practical	PSY-	Shows-	CBL,DIS

				Training 3.2	GUD	how	
3	CO4	Moderate/participate in Focussed Group Discussions and interviews to illustrate the methods of qualitative research.	6	Experiential-Learning 3.1	PSY-GUD	Shows-how	PBL,RP

Unit 3 Descriptive study designs

References: 31,98,99

3A	3B	3C	3D	3E	3F	3G	3H
1	CO4	Explain and distinguish various types of descriptive studies (Case report, Case series, Cross-sectional, longitudinal)	3	Lecture	CC	Knows-how	L&PPT
2	CO4	Differentiate the descriptive studies in published literature – Case report	2	Practical Training 3.3	PSY-GUD	Shows-how	CBL,SDL
3	CO4	Differentiate the descriptive studies in published literature – Case series	2	Practical Training 3.4	PSY-GUD	Shows-how	CBL,SDL
4	CO4	Differentiate the descriptive studies in published literature – Cross-sectional study	2	Practical Training 3.5	PSY-GUD	Shows-how	CBL,SDL
5	CO4	Differentiate the descriptive studies in published literature – Longitudinal study	2	Practical Training 3.6	PSY-GUD	Shows-how	CBL,SDL
6	CO4	Acquire the knowledge of conducting various descriptive studies in hospital community/classroom/hostel.	10	Experiential-Learning 3.2	PSY-GUD	Shows-how	PrBL,TP W

Unit 4 Observational study designs

References: 32,33,102,103

3A	3B	3C	3D	3E	3F	3G	3H

1	CO4	Distinguish various types of observational studies (case-control, cohort, and cross-sectional analytical) and their applications	3	Lecture	CC	Knows-how	L&PPT
2	CO4	Differentiate the cross-sectional analytical studies in published literature.	2	Practical Training 3.7	PSY-GUD	Shows-how	CBL,SDL
3	CO4	Differentiate the case-control studies in published literature.	2	Practical Training 3.8	PSY-GUD	Shows-how	CBL,SDL
4	CO4	Differentiate the cohort studies in published literature.	2	Practical Training 3.9	PSY-GUD	Shows-how	CBL,SDL
5	CO4	Acquire the knowledge of conducting various observational studies.	10	Experiential-Learning 3.3	PSY-GUD	Shows-how	PBL,TPW

Practical Training Activity

Practical No	Name	Activity details
Practical Training 3.1	Demonstrate different types of research with examples	The teacher refers to and discusses a minimum of five research articles related to different types of research such as qualitative research, quantitative research, applied research, exploratory, translational research, implementation, and integrative/interdisciplinary research, and classifies them under the category.
Practical Training 3.2	Differentiate methods used in qualitative research.	The teacher refers to and discusses do-don'ts in Focus group discussion (FGD), preparation of interview schedule and guide, interpretation of recorded interview (transcript, code, category, theme, sub-theme), and creating sociograms.
Practical Training 3.3	Appraise the descriptive studies in published literature – Case report	The teacher refers to and discusses a few Case reports. The student identifies the prerequisite for a case report and observations to be made and documented while dealing with a rare/ unique/interesting case. Each Student should select an article regarding the case report and review it through CARE Guidelines. Ask students to download the Checklist review the article as per the checklist and submit it.
Practical Training 3.4	Differentiate the descriptive studies in published literature –	The teacher refers to and discusses a few Case series. The student identifies the prerequisite for a case series, and observations to be made and documented. Each Student should select an article regarding the case series and review it through the Guidelines. Ask students to download

	Case series	the Checklist review the article as per the checklist and submit it.
Practical Training 3.5	Identify the descriptive studies in published literature – Cross-sectional study	The teacher refers to and discusses research articles/previous thesis on cross-sectional studies like ICMR InDIAB. The student identifies/ summarises the basic elements (setting, location, time, mode of selection, sampling), merits, and demerits of the cross-sectional study.
Practical Training 3.6	Differentiate the descriptive studies in published literature – longitudinal study	The teacher refers to and discusses research articles/previous studies on longitudinal studies like the Framingham Study. The student identifies/ summarises the basic elements (time, common characteristics of the group, assessment parameters), merits and demerits, and the applicability of the longitudinal study.
Practical Training 3.7	Identify the cross-sectional analytical studies in published literature.	The teacher refers to and discusses research articles/previous thesis on cross-sectional analytical studies. The student identifies/ summarises the basic elements (characteristics, data collection methods, bias), merits and demerits, applicability of cross-sectional analytical studies.
Practical Training 3.8	Appraise the case-control studies in published literature.	The teacher refers to and discusses research articles/previous theses on case-control studies. The student identifies/ summarises the basic elements (characteristics, data collection methods, bias, confounder, effect modifier, risk factors), merits and demerits, and applicability of case-control studies. The student should be assigned one article regarding a Case-control study. Review the article following STROBE guidelines and submit the report.
Practical Training 3.9	Appraise the cohort studies in published literature.	The teacher refers to discuss research articles on cohort studies. The student identifies/ summarises the basic elements (characteristics, data collection methods, bias, confounder, effect modifier, risk factors), merits and demerits, and applicability of cohort studies. Brainstorming Students should be given activities to think about cohort study research questions as per Unani.
Experiential learning Activity		
Experiential learning No	Name	Activity details
Experiential-	Moderate/participate in	Students will be divided into 2 to 5 groups and each group will be assigned activities such as selection of an ideal qualitative

Learning 3.1	FGD, In-depth interview.	research method for a specific research problem, role play on sensitive and non-sensitive topics for FGD, role play depicting desirable and undesirable characters regarding moderator, participants, and interviewer. While one group is performing a role-play of FGD, the other groups can be involved in transcript and sociogram preparation.
Experiential-Learning 3.2	Acquire the knowledge of conducting various descriptive studies in the hospital community/classroom/hostel.	Students will be divided into 2 to 5 groups. Each group will be assigned a different study design and study setting such as a hospital community/classroom/hostel. Later the students should present the findings, followed by a group discussion on methodology aspects. The teacher will summarise the key points.
Experiential-Learning 3.3	Acquire the knowledge of conducting various observational studies.	Students will be divided into 2 to 5 groups. Each group identifies a scenario/ topic for observational study and further designs a study considering the basic elements (selection of case and matching control, bias elimination, measurement of exposure and outcome) of each study design. Students should review observational studies from indexed journals review them under STROBE guidelines and submit them.

Modular Assessment

Assessment method	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 25 marks per credit. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Case-based evaluation: (25 Marks) Each student will be given a published paper on a specific study design to evaluate the elements of the respective study design. Assessment of the review based on the summary of the given published research paper emphasizing the elements of the respective research design and Any practical in converted form can be taken for assessment.. Or Any of the experiential as portfolio/ refelections / presentations can be taken as assessment.. (25 Marks)	4

Module 4 : Research Types - Part 2

Module Learning Objectives

(At the end of the module, the students should be able to)

1 Understand different research designs used for interventional studies.

2 Comprehend merits, demerits, and applications of different designs.

3 Apply study designs in Unani medicine Research.

Unit 1 Bias and ways to eliminate bias

References: 34,35,36,37

3A	3B	3C	3D	3E	3F	3G	3H
1	CO1,CO4	Explain bias at various stages of clinical trials and describe ways to eliminate bias such as randomization, blinding, and control.	1	Lecture	CC	Knows-how	FC,L&G D,L&PPT

Unit 2 Randomized Controlled Trials

References: 104

3A	3B	3C	3D	3E	3F	3G	3H
1	CO4	Explain various types (pilot/ proof of concept/ exploratory, randomized/ blinded/ controlled, Superiority/No- inferiority/ equivalence, phases of clinical trials) and methodological details (defining eligibility and withdrawal criteria, outcome assessment and variables, safety monitoring) of Interventional studies.	3	Lecture	CC	Knows-how	CBL,FC, L&PPT
2	CO4	Appraise the Interventional study designs in published literature.	10	Practical	PSY-	Shows-	CBL

				Training 4.1	GUD	how	
3	CO4	Acquire the knowledge of conducting various interventional studies.	4	Experiential-Learning 4.1	AFT-VAL	Shows-how	BS,CBL,PER
4	CO4	Acquire the knowledge of conducting various interventional studies.	4	Experiential-Learning 4.2	AFT-VAL	Shows-how	BS,CBL,PER
5	CO4	Acquire the knowledge of conducting various interventional studies.	5	Experiential-Learning 4.3	AFT-VAL	Shows-how	BS,CBL,PER

Unit 3 Newer study designs

References:

3A	3B	3C	3D	3E	3F	3G	3H
1	CO4	Non-conventional study designs (Black box design, n-1 design, whole system research, flexible-dose design)	1	Lecture	CK	Knows-how	DIS,FC,L&PPT

Practical Training Activity

Practical No	Name	Activity details
Practical Training 4.1	Appraise the Interventional study designs in published literature.	The teacher refers to and discusses research articles/previous theses on different types of interventional studies.

Experiential learning Activity

Experiential learning No	Name	Activity details
Experiential-	Acquire the knowledge	Students will be divided into groups and each group will appraise the methodology for studies involving interventions of different

Learning 4.1	of conducting various interventional studies.	natures such as diet/therapeutic procedure /medicine/counseling through published literature and present in the forthcoming class. Each student will review the article, methodology, assessment criteria, inclusion and exclusion criteria, and study design and will present it.
Experiential-Learning 4.2	Acquire the knowledge of conducting various interventional studies.	Each group will then present the observations on the methodology, followed by a group discussion on differences between the methodologies, merits/demerits of various interventional studies, and identification of challenges and possible solutions in the case of Unani medicine studies.
Experiential-Learning 4.3	Acquire the knowledge of conducting various interventional studies.	Further, each group will design an interventional study on the topic given by the teacher and present.

Modular Assessment

Assessment method	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 25 marks per credit. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Case-based evaluation: Each student will be given a published paper on an interventional study design. Checklist of assessment: The assessment will be based on the article review done by the student over the elements of the respective interventional study design, like objectives, literature review, sampling techniques, randomization, blinding, methodology, statistical analysis, results, discussion, and outcomes. Or Any practical in converted form can be taken for assessment.. Or Any of the experiential as portfolio/ refelections / presentations can be taken as assessment.. (25 Marks)	2

Module 5 : Research Types - Part 3

Module Learning Objectives

(At the end of the module, the students should be able to)

1 Comprehend the characteristics, methodology, and utility of different research studies.

2 Apply these different research studies in the context of Unani medicine.

Unit 1 Preclinical studies

References: 38,39

3A	3B	3C	3D	3E	3F	3G	3H
1	CO4,CO9	Explain the basics of in silico, in vitro, and in vivo studies.	3	Lecture	CC	Knows-how	L&PPT
2	CO4,CO9	Demonstrate cell culture studies and animal procedures.	1	Practical Training 5.1	PSY-GUD	Shows-how	FV,L_VC
3	CO4,CO9	Demonstrate the utility of in-vitro and in-vivo studies in the Unani medicine context.	2	Practical Training 5.2	PSY-GUD	Shows-how	FV
4	CO4,CO9	Demonstrate in silico studies.	2	Practical Training 5.3	PSY-GUD	Shows-how	L_VC
5	CO4,CO9	Acquaint with instrumentation and procedures related to the in silico, in vitro, and in vivo studies.	6	Experiential-Learning 5.1	AFT-VAL	Shows-how	FV

Unit 2 Drug research

References: 40

3A	3B	3C	3D	3E	3F	3G	3H

1	CO4,CO9	Describe protocols for drug quality testing.	1	Lecture	CK	Knows-how	FC,L&PPT
2	CO4,CO9	Explain and demonstrate different instrumentation used in drug research.	1	Lecture	CK	Knows-how	D,FV,L_VC
3	CO4,CO9	Review principles and applications of instruments.	2	Practical Training 5.4	PSY-SET	Shows-how	DIS,FV,L_VC
4	CO4,CO9	Check the quality of a drug/formulation.	3	Practical Training 5.5	PSY-SET	Shows-how	L_VC,PT
5	CO4,CO9	Acquaint with pharmacy college/QC unit in Unani medicine pharmacy.	4	Experiential-Learning 5.2	AFT-VAL	Shows-how	FV,SDL

Unit 3 Literary research

References: 92,93,94,105,106

3A	3B	3C	3D	3E	3F	3G	3H
1	CO4,CO9	Define and describe the scope of literary research and the steps of manuscriptology.	1	Lecture	CK	Knows-how	L&PPT
2	CO4,CO9	Explore available manuscript resources.	5	Practical Training 5.6	PSY-SET	Shows-how	ML,SDL
3	CO4,CO9	Acquaint with manuscript library/ Oriental study institutions/ University Sanskrit departments/IKS center in IITs or Video on steps of manuscriptology.	5	Experiential-Learning 5.3	AFT-VAL	Shows-how	FV,SDL

Unit 4 Development of tools

References: 41

3A	3B	3C	3D	3E	3F	3G	3H
1	CO4,CO9	Explain the importance and types of tools.	1	Lecture	CK	Knows-how	L&GD
2	CO4,CO9	Describe stages of tool development and methods for validating developed tools.	1	Lecture	CC	Knows-how	L&GD
3	CO4,CO9	Demonstrate the process of tool development and validation.	3	Practical Training 5.7	PSY-SET	Shows-how	CBL,DIS
4	CO4,CO9	Develop a questionnaire.	5	Experiential-Learning 5.4	AFT-VAL	Shows-how	SDL

Unit 5 Assessment Tools Use of appropriate assessment tools and terminology

References: 42,43,44,45,46,47,48

3A	3B	3C	3D	3E	3F	3G	3H
1	CO4,CO9	Identify appropriate assessment tool.	1	Lecture	CK	Knows-how	L&PPT
2	CO4,CO9	Demonstrate standard terminologies (e.g. WHO, ICD 11, DSM V, NAMASTE)	1	Lecture	CK	Knows-how	D,L&PPT
3	CO4,CO9	Search and choose the appropriate assessment tool.	2	Practical Training 5.8	PSY-SET	Shows-how	DIS,SDL
4	CO4,CO9	Apply appropriate assessment tools in a given Unani medicine scenario	3	Experiential-Learning 5.5	AFT-VAL	Shows-how	DIS,SDL
5	CO4,CO9	Compare minimum 5 Unani medicine terms and compare with standard	3	Experiential-	AFT-	Shows-	DIS,PBL

		terminology.		Learning 5.6	VAL	how	
Practical Training Activity							
Practical No	Name	Activity details					
Practical Training 5.1	Demonstrate cell culture studies and animal procedures.	The teacher will demonstrate either in the lab or with the help of a video on cell culture and animal studies (animal handling, blood collection, dosing)					
Practical Training 5.2	Explore the utility of in-vitro and in-vivo studies in the Unani medicine context.	The teacher will facilitate a group discussion on landmark in-vitro, and in-vivo studies and explore the limitations/ challenges/ possibilities of in-vitro and in-vivo studies in Unani medicine like solubility of herbo-mineral formulations, therapeutic procedures, etc. Interaction with experts about designing and conducting in-vitro and in-vivo studies (Desirable)					
Practical Training 5.3	Demonstrate in-silico studies.	The teacher demonstrates the use of various software and databases to explore the utilities of in-silico studies in different domains like UNPD. Students in groups are encouraged to work on the provided domain and present their work Self Directed learning Awareness about Molecular docking and Demonstration of software of molecular docking.					
Practical Training 5.4	Review principles and applications of instruments.	The teacher demonstrates the functioning and utility of high-end instruments like Spectrophotometer, HPTLC, HPLC, GC, LCMS, XRD etc using repository videos.					
Practical Training 5.5	Check the quality of a drug/formulation.	The teacher demonstrates experiments on drug/formulation quality testing. Students are divided into groups and each group is given either an herb or a formulation, to carry out the quality testing of the same and record the findings. Include experiments like foreign matter, Moisture content, Total ash, Acid insoluble ash, Extractive values, Specific gravity, Tablet disintegration test, Tablet hardness, pH value, Acid value, friability test, thin layer chromatography etc. (Practical demonstration may be combined with Experiential learning -EL-5.2)					
Practical Training 5.6	Explore available manuscript resources.	The teacher demonstrates online Manuscript Search. Student searches online Manuscript catalogs related to Unani medicine or published literature and compiles them (Desirable).					
Practical	Demonstrate the process	The teacher demonstrates a minimum of two published articles regarding tool development and tool validation. Students are					

Training 5.7	of tool development and validation.	divided into groups and are encouraged to search published articles on tool development and validation. The teacher facilitates discussion among the group and highlights the robustness of the tool. [Tool includes an index, scale, questionnaire, medical instrumentation, software, apps etc.]
Practical Training 5.8	Search & choose the appropriate assessment tool.	The teacher demonstrates criteria for choosing assessment tools such as relevance (eg. ethnicity, time frame), specificity (eg. Pain assessment in OA and RA), and requirement (eg. diagnosis, screening). Students are divided into groups and instructed to choose appropriate assessment tools for at least 2 clinical conditions (like WHO-QoL, Diabetic risk assessment, pain, and Unani medicine items). The teacher facilitates discussion among the groups and highlights the key concepts. Peer group learning Students should collect at least five assessment tools from the previous article, Studies, and compile the information, and share it.
Experiential learning Activity		
Experiential learning No	Name	Activity details
Experiential-Learning 5.1	Acquaint with instrumentation and procedures related to in silico, in vitro, and in vivo studies.	After the visit, the student will write their observations about the facility, laboratory instrumentation, animal procedures, safety guidelines.
Experiential-Learning 5.2	Acquaint with pharmacy college/QC unit in Unani pharmacy.	Students visit the pharmacy college/QC unit in Unani medicine pharmacy and compile their observations. This activity can be clubbed with Practical 5.2.
Experiential-Learning 5.3	Acquaint with a manuscript library.	Visit a manuscript library or Oriental study institutions/ University Sanskrit departments/IKS center at IITs or Departments related to Unani medicine. Optional – Repository Video on steps of manuscriptology.
Experiential-Learning 5.4	Develop a questionnaire.	Develop a questionnaire for Unani medicine. Group activity based on various tools useful for Unani medicine (Desirable).
Experiential-Learning 5.5	Apply appropriate assessment tools in a	Students will be divided into groups and given the task of searching for assessment tools from either theses, published articles, or projects in a given Unani medicine scenario followed by brainstorming on the utility and limitations

	given Unani medicine scenario	Assessment tools from various articles compilation (at least 5) The questionnaire designing for an assessment of physiological functions. Review of questionnaire design from various articles
Experiential-Learning 5.6	Define a minimum of 5 Unani medicine terms and compare them with standard terminology.	The teacher will define a minimum of 5 Unani medicine terms and compare them with standard terminology. Students are divided into groups and each group works on a minimum of two terms of Unani medicine, coins Standard operative definitions for the same, and presents. The teacher facilitates discussion among groups and summarises the key concepts. Refer to Namaste portal, WHO terminology, articles, and Book-Translational Unani by Sanjeev Rastogi.
Modular Assessment		
Assessment method		Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 25 marks per credit. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. SAQ: 5 questions (1 question from each unit) – 25 Marks • Field report evaluation: 25 marks Evaluation of summary reports of Field visits, experiments in the lab, or demonstrated instruments: The report will be evaluated on the basis of active participation during the visit/lab, observation book detailing the observations during the visit/lab, and record-keeping. or Any practical in converted form can be taken for assessment.. (25 Marks) and Any of the experiential as portfolio/ refelections / presentations can be taken as assessment.. (25 Marks)		4

Module 6 : Research Communication

Module Learning Objectives

(At the end of the module, the students should be able to)

1. Prepare a synopsis/research protocol/proposal and enlist dissertation contents
2. Manage references using the Reference Manager Tool
3. Comprehend types and structures of different journal articles and prepare articles as per reporting guidelines
4. Identify misconduct in scientific writing and its consequences
5. Differentiate between credible and predatory journals

Unit 1 Research protocol writing Research protocol/proposal/Synopsis writing

References: 49,50,51,52,53

3A	3B	3C	3D	3E	3F	3G	3H
1	CO4,CO5,CO6,CO7,CO8	Explain the basic structure of the synopsis [Randomisation table, dummy table, GANTT chart, expected outcome, Budget]	2	Lecture	CC	Knows-how	L&PPT
2	CO4,CO5,CO6,CO7,CO8	Explain a checklist of synopsis/protocol and differentiate between academic protocol and funding proposal.	1	Lecture	CC	Knows-how	D,L&GD
3	CO4,CO5,CO6,CO7,CO8	Demonstrate the key points and processes of synopsis/protocol writing.	5	Practical Training 6.1	PSY-GUD	Shows-how	D,L&GD
4	CO4,CO5,CO6,CO7,CO8	Prepare an outline of the synopsis.	3	Experiential-Learning 6.1	AFT-VAL	Shows-how	CBL,DIS,SDL
5	CO4,CO5,CO6,CO7,CO8	Retrieve information about different funding agencies and their schemes especially applicable to students.	3	Experiential-Learning 6.2	AFT-VAL	Shows-how	CBL,DIS,SDL

Unit 2 Dissertation contents and structure

References: 54,55,56,57,58,59

3A	3B	3C	3D	3E	3F	3G	3H
1	CO4,CO5,CO6 ,CO7,CO8	Explain the structure of the dissertation for different study designs (IMRAD); Orientation to online theses repositories such as Shodhganga.	1	Lecture	CC	Knows- how	L&PPT
2	CO4,CO5,CO6 ,CO7,CO8	Appreciate the structure of the dissertation with a focus on specific requirements as per the type and design of the research.	3	Practical Training 6.2	PSY- GUD	Shows- how	CBL,DIS, PER
3	CO4,CO5,CO6 ,CO7,CO8	Critically appraise the result and discussion section of the thesis.	5	Experiential- Learning 6.3	AFT- VAL	Shows- how	DIS,PBL, SDL

Unit 3 Types and structure of journal articles

References: 60,61

3A	3B	3C	3D	3E	3F	3G	3H
1	CO4,CO5,CO6 ,CO7,CO8	Explain the structure of different types of journal articles.	1	Lecture	CC	Knows- how	L&PPT
2	CO4,CO5,CO6 ,CO7,CO8	Demonstrate the structure of different types of articles.	2	Practical Training 6.3	PSY- GUD	Shows- how	D,L&GD
3	CO4,CO5,CO6 ,CO7,CO8	Present an article in the journal club.	4	Experiential- Learning 6.4	AFT-RES	Shows- how	DIS,PER

Unit 4 Systematic review and meta-analysis

References: 62,63

3A	3B	3C	3D	3E	3F	3G	3H
1	CO4,CO5,CO6	Elaborate the process of Systematic review and meta-analysis.	1	Lecture	CC	Knows-	L&PPT

	,CO7,CO8					how	
Unit 5 Publication guidelines References: 64,65,66,67,68,69,70							
3A	3B	3C	3D	3E	3F	3G	3H
1	CO4,CO5,CO6,CO7,CO8	Explain publication guidelines such as STROBE, PRISMA, ARRIVE, CARE, CONSORT, etc and their variations.	1	Lecture	CK	Knows-how	L&PPT
2	CO4,CO5,CO6,CO7,CO8	Access different reporting guidelines.	2	Practical Training 6.4	PSY-GUD	Shows-how	D,ML,SD L
3	CO4,CO5,CO6,CO7,CO8	Review a published article by using a checklist of particular reporting guidelines.	3	Experiential-Learning 6.5	PSY-GUD	Shows-how	CBL,DIS,PER
Unit 6 Referencing References: 71,72,73,74,75,76,77,78,79							
3A	3B	3C	3D	3E	3F	3G	3H
1	CO4,CO5,CO6,CO7,CO8	Explain the need for referencing and bibliography. Enlist the different citation styles and references manager.	1	Lecture	CC	Knows-how	L&PPT
2	CO4,CO5,CO6,CO7,CO8	Demonstrate using any one reference manager tool.	4	Practical Training 6.5	PSY-GUD	Shows-how	D,PT
3	CO4,CO5,CO6,CO7,CO8	Appreciate referencing styles for different types of documents like journal articles, books, book chapters, conference proceedings, dissertations, online content, and Unani medicine texts	3	Experiential-Learning 6.6	AFT-RES	Shows-how	PL,PBL,SDL
Unit 7 Scientometrics References: 80,81,82,83,84							

3A	3B	3C	3D	3E	3F	3G	3H
1	CO4,CO5,CO6,CO7,CO8	Explain journal impact factors (indexing databases, cite score, impact factor, Altimetric) and authors' impact metrics (h index, I 10 indices, G index).	1	Lecture	CC	Knows-how	L&PPT
2	CO4,CO5,CO6,CO7,CO8	Select an appropriate journal and identify its quality using scientometrics	2	Practical Training 6.6	PSY-GUD	Shows-how	D,DIS
3	CO4,CO5,CO6,CO7,CO8	Acquire knowledge about various aspects of scientometry.	3	Experiential-Learning 6.7	AFT-RES	Shows-how	SDL

Unit 8 Publication Ethics

References: 85,86,87,88,89,90,91

3A	3B	3C	3D	3E	3F	3G	3H
1	CO4,CO5,CO6,CO7,CO8	Explain ethical issues in publication (authorship criteria, plagiarism, falsification & fabrication of data).	1	Lecture	CK	Knows-how	L&PPT
2	CO4,CO5,CO6,CO7,CO8	Review guidelines related to Publication ethics (WAME, COPE, ICMJE, OSPA).	2	Practical Training 6.7	PSY-GUD	Shows-how	D,DIS
3	CO4,CO5,CO6,CO7,CO8	Check plagiarism using online software.	2	Experiential-Learning 6.8	PSY-GUD	Shows-how	SDL

Practical Training Activity

Practical No	Name	Activity details
Practical Training 6.1	Demonstrate the key points of synopsis/protocol	The teacher will demonstrate the key contents of the synopsis (title, introduction, need of study, research question, hypothesis, primary and secondary objectives) with a few examples.

	writing.	
Practical Training 6.2	Appreciate the structure of the dissertation with a focus on specific requirements as per the type and design of the research.	Students will be divided into groups and each group will be allotted a dissertation of a particular research design (clinical study, survey study, literary research, drug research, etc.) and they will be required to identify its specific elements (such as case report form in clinical study or questionnaire in survey study).
Practical Training 6.3	Demonstrate the structure of different types of articles.	The teacher will refer to different types of articles like editorial, original research articles, case reports, case series, case snippets, review articles, letters to the editor, short communication, perspective/ opinion/viewpoint, commentary, book review, debate/ discussions, vignette, etc. highlighting their structure and will explain the criteria to select a specific type. At the end of the session, the teacher will explain the concept of a journal club and allocate different types of articles to a group of students.
Practical Training 6.4	Access different reporting guidelines.	The teacher will demonstrate the different reporting guidelines using https://www.equator-network.org/
Practical Training 6.5	Demonstrate using any one reference manager tool.	The teacher will demonstrate the different features (searching, downloading, creating a library, importing to Word document etc) of any one reference manager tool such as EndNote, Mendeley, or Zotero. Following this, students will install the reference manager software, explore its features and then conduct an activity using the tool.
Practical Training 6.6	Select an appropriate journal and identify its quality using scientometrics.	The teacher will demonstrate the method of selecting an appropriate journal using manuscript matching tools like Journalfinder, Jane, Edanz, Endnote etc. and will subsequently demonstrate different metrics of journals shortlisted by the matching tools. Based on scientometrics, the teacher will explain how to identify predatory journals.
Practical Training 6.7	Review guidelines related to Publication ethics (WAME, COPE, ICMJE, OASPA).	The teacher demonstrates various guidelines related to Publication ethics like WAME, COPE, ICMJE, and OASPA- Open Access Scholarly Publishing Association.
Experiential learning Activity		

Experiential learning No	Name	Activity details
Experiential-Learning 6.1	Prepare an outline of the synopsis.	Students will be divided into groups and each group will be given a topic reflecting different types of research (drug research, clinical study, literary research, survey study, animal study, tool development etc) to prepare a framework of the synopsis, the students will present and critically appraise the key components.
Experiential-Learning 6.2	Retrieve information about different funding agencies and their schemes especially applicable for students.	Students will visit the websites of different funding agencies (Ministry of Ayush, ICMR, DST, DBT, CSIR, and others) browse through the different schemes, and select suitable schemes for postgraduate work.
Experiential-Learning 6.3	Critically appraise the result and discussion section of the thesis.	Students are divided into groups and each group will be assigned a dissertation/ research article (which follows the standard structure of the results and discussion section) to appreciate the difference between results and discussion along with the link between the two.
Experiential-Learning 6.4	Present an article in the journal club.	Students will present the articles allocated to them during the practical and critically review them under the guidance of the teacher.
Experiential-Learning 6.5	Review a published article by using a checklist of particular reporting guidelines.	Students will be divided into groups and each group will be assigned a different type of article. They have to check the contents of the article against the applicable reporting guidelines and present them.
Experiential-Learning 6.6	Appreciate referencing styles for different types of documents like journal articles, books, book chapters, conference proceedings, dissertations, online content, and Unani medicine texts.	Students will be given different types of documents and asked to prepare referencing for the same following standard guidelines (like peer-reviewed journals).

Experiential-Learning 6.7	Acquire knowledge about various aspects of scientometry.	Students will be divided into groups and each group will search different author metrics for a minimum of 10 personalities/authors.
Experiential-Learning 6.8	Check plagiarism using online software.	Students will be divided into groups and each group will be given a topic to prepare a review and subject to plagiarism check using online free plagiarism software/ tools.

Modular Assessment

Assessment method	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 25 marks per credit. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Critical review of a published article. Each student will be given a published article for review based on relevant publication guidelines. The student's review will be assessed on 1. Selection of appropriate guidelines (5 marks) 2. Review of article by ticking off the checklist (5 marks) 3. Summary of review mentioning guidelines, describing missed elements, and positive aspects of the paper (15 marks) and Any practical in converted form can be taken for assessment.(25 Marks) or Any of the experiential as portfolio/ reelections / presentations can be taken as assessment.(25 Marks)	4

Table 4 : Practical Training Activity

Practical No	Practical name	Hours
1.1	Elaborate the current status of Unani medicine research	2
1.2	Demonstrate different research concepts in Unani medicine systems with examples	2
1.3	Display and demonstrate literature search in medical databases	2
1.4	Enlist different ways of identifying the research problem	2
1.5	Demonstrate the qualities of good research questions using PICO/T in the clinical scenario and the FINER approach in both clinical and non-clinical scenarios, hypotheses, and objectives.	2
2.1	Identify the contents of ICMR, ICH-GCP, and GCP-Unani medicine guidelines including the process of Clinical trial registration.	1
2.2	Enlist cases where the principle of autonomy and justice is upheld and compromised.	1
2.3	Enlist cases where principles of beneficence/non-maleficence are upheld and compromised	1
2.4	Construct the composition of the ethics committee through different case scenarios.	2
2.5	Revise the elements of the review process through different case scenarios	3
2.6	Identify ethical issues specific to Unani medicine research through different case scenarios.	2
3.1	Demonstrate different types of research with examples	2
3.2	Differentiate methods used in qualitative research.	4
3.3	Appraise the descriptive studies in published literature – Case report	2
3.4	Differentiate the descriptive studies in published literature – Case series	2

3.5	Identify the descriptive studies in published literature – Cross-sectional study	2
3.6	Differentiate the descriptive studies in published literature – longitudinal study	2
3.7	Identify the cross-sectional analytical studies in published literature.	2
3.8	Appraise the case-control studies in published literature.	2
3.9	Appraise the cohort studies in published literature.	2
4.1	Appraise the Interventional study designs in published literature.	10
5.1	Demonstrate cell culture studies and animal procedures.	1
5.2	Explore the utility of in-vitro and in-vivo studies in the Unani medicine context.	2
5.3	Demonstrate in-silico studies.	2
5.4	Review principles and applications of instruments.	2
5.5	Check the quality of a drug/formulation.	3
5.6	Explore available manuscript resources.	5
5.7	Demonstrate the process of tool development and validation.	3
5.8	Search & choose the appropriate assessment tool.	2
6.1	Demonstrate the key points of synopsis/protocol writing.	5
6.2	Appreciate the structure of the dissertation with a focus on specific requirements as per the type and design of the research.	3
6.3	Demonstrate the structure of different types of articles.	2
6.4	Access different reporting guidelines.	2
6.5	Demonstrate using any one reference manager tool.	4
6.6	Select an appropriate journal and identify its quality using scientometrics.	2

6.7	Review guidelines related to Publication ethics (WAME, COPE, ICMJE, OASPA).	2

Table 5 : Experiential learning Activity

Experiential learning No	Experiential name	Credit Hours
1.1	Identify the level of evidence in Unani medicine research	2
1.2	List out the challenges and probable solutions in Unani medicine research.	2
1.3	Conduct a literature search for a given scenario	3
1.4	Identify the research problem	3
1.5	Frame research questions, hypotheses, and study objectives.	3
2.1	Appraise the ethical principles by developing a case scenario.	1
2.2	Identify the ethical principles in a given case scenario.	1
2.3	Demonstrate the review process of IHEC	6
2.4	Demonstrate the review process of IAEC	5
3.1	Moderate/participate in FGD, In-depth interview.	6
3.2	Acquire the knowledge of conducting various descriptive studies in the hospital community/classroom/hostel.	10
3.3	Acquire the knowledge of conducting various observational studies.	10
4.1	Acquire the knowledge of conducting various interventional studies.	4
4.2	Acquire the knowledge of conducting various interventional studies.	4
4.3	Acquire the knowledge of conducting various interventional studies.	5
5.1	Acquaint with instrumentation and procedures related to in silico, in vitro, and in vivo studies.	6
5.2	Acquaint with pharmacy college/QC unit in Unani pharmacy.	4
5.3	Acquaint with a manuscript library.	5

5.4	Develop a questionnaire.	5
5.5	Apply appropriate assessment tools in a given Unani medicine scenario	3
5.6	Define a minimum of 5 Unani medicine terms and compare them with standard terminology.	3
6.1	Prepare an outline of the synopsis.	3
6.2	Retrieve information about different funding agencies and their schemes especially applicable for students.	3
6.3	Critically appraise the result and discussion section of the thesis.	5
6.4	Present an article in the journal club.	4
6.5	Review a published article by using a checklist of particular reporting guidelines.	3
6.6	Appreciate referencing styles for different types of documents like journal articles, books, book chapters, conference proceedings, dissertations, online content, and Unani medicine texts.	3
6.7	Acquire knowledge about various aspects of scientometry.	3
6.8	Check plagiarism using online software.	2

Table 6 : Assessment Summary: Assessment is subdivided in A to G points**6 A : Number of Papers and Marks Distribution**

Subject Code	Paper	Theory	Practical	Total
UNIPG-RM	1	100	NA	100

6 B : Scheme of Assessment**Credit frame work**

UNIPG-RM has 6 modules of 9 credits which includes 270 Notional Learning Hours. One Credit will be having 30 Hours of learner participation and teaching, practical and experiential learning will in the ratio of 1:2:3 i.e. One credit will have 5 hours of teaching, 10 hours of practical training and 13 hours of experiential learning and 2 hours of modular assessment for 25 marks.

Module wise Assessment: will be done at the end of each module. Evaluation includes learners active participation to get Credits and Marks. Each Module may contain one or more credits.

Summative Assessment: Summative Assessment (University examination) will be carried out at the end of Semester I.

6 C : Calculation Method for Modular Grade Points (MGP)

Module Number & Name (a)	Credits (b)	Actual No. of Notional Learning Hours (c)	Attended Number of notional Learning hours (d)	Maximum Marks of assessment of modules (e)	Obtained Marks per module (f)	MGP = $\frac{d \times f}{c \times e} \times 100$
1. Research Basics	1	30		25		
2. Ethics and Regulatory Aspects in Research	1	30		25		
3. Research Types - Part 1	2	60		50		
4. Research Types - Part 2	1	30		25		
5. Research Types - Part 3	2	60		50		
6. Research Communication	2	60		50		
$\text{MGP} = \frac{((\text{Number of Notional learning hours attended in a module}) \times (\text{Marks obtained in the modular assessment}))}{((\text{Total number of Notional learning hours in the module}) \times (\text{Maximum marks of the module}))} \times 100$						

6 D : Semester Evaluation Methods for Semester Grade point Average (SGPA)

SGPA will be calculated at the end of the semester as an average of all Module MGPs. Average of MGPs of the Semester For becoming eligible for Summative assessment of the semester, student should get minimum of 60% of SGPA

SGPA = Average of MGP of all modules of all papers = add all MGPs in the semester/ no. of modules in the semester

A S.No	B Module number and Name	C MGP
1	Research Basics	C1
2	Ethics and Regulatory Aspects in Research	C2
3	Research Types - Part 1	C3
4	Research Types - Part 2	C4
5	Research Types - Part 3	C5
6	Research Communication	C6
	Semester Grade point Average (SGPA)	$(C1+C2+C3+C4+C5+C6) / \text{Number of modules}(6)$

S. No	Evaluation Methods
1.	Method explained in the Assessment of the module or similar to the objectives of the module.

6 E : Question Paper Pattern

MD/MS UNANI Examination

UNIPG-RM

Sem I

Time: 3 Hours ,**Maximum Marks:** 100

INSTRUCTIONS: All questions compulsory

		Number of Questions	Marks per question	Total Marks
Q 1	Analytical based structured question (ABQ)	1	20	20
Q 2	Short answer questions (SAQ)	8	5	40
Q 3	Long answer questions (LAQ)	4	10	40
				100

Instructions for the paper setting.

1. Questions should be drawn based on the table 6F.
2. Marks assigned for the module in 6F should be considered as the maximum marks.
3. Refer table 6F before setting the questions. Questions should not be framed on the particular unit if indicated “NO”.
4. There will be a single application-based question (ABQ) worth 20 marks. No other questions should be asked from the same module where the ABQ is framed.
5. Except the module on which ABQ is framed, at least one Short answer question should be framed from each module.
6. Long answer question should be analytical based structured questions assessing the higher cognitive ability.
7. Use the Blue print provided in 6G or similar blue print created based on instructions 1 to 6.

6 F : Distribution for summative assessment (University examination)

S.No	List of Module/Unit	ABQ	SAQ	LAQ
(M-1)Research Basics Marks: (20)				
1	(U-1) Overview of research process and evidence-based medicine	No	Yes	No
2	(U-2) Research methods in Unani Medicine	No	Yes	Yes
3	(U-3) Literature search and critical appraisal of literature	No	Yes	Yes
4	(U-4) Identification of research problem	Yes	Yes	No
5	(U-5) Research question and Hypothesis	Yes	Yes	Yes
(M-2)Ethics and Regulatory Aspects in Research Marks: (10)				
1	(U-1) Basics of Ethics and Ethics Guidelines	No	Yes	Yes
2	(U-2) Institutional Ethics Committees	No	Yes	Yes
3	(U-3) National Pharmacovigilance Program	No	No	No
4	(U-4) Scope and Importance of IPR and Patents	No	No	No
(M-3)Research Types - Part 1 Marks: (20)				
1	(U-1) Different types of research	No	No	No
2	(U-2) Qualitative Research	Yes	Yes	No
3	(U-3) Descriptive study designs	Yes	No	Yes
4	(U-4) Observational study designs	Yes	Yes	No
(M-4)Research Types - Part 2 Marks: (20)				
1	(U-1) Bias and ways to eliminate bias	No	Yes	No
2	(U-2) Randomized Controlled Trials	Yes	Yes	Yes
3	(U-3) Newer study designs	No	No	No
(M-5)Research Types - Part 3 Marks: (20)				
1	(U-1) Preclinical studies	No	Yes	Yes
2	(U-2) Drug research	No	Yes	Yes
3	(U-3) Literary research	No	Yes	Yes
4	(U-4) Development of tools	Yes	No	Yes
5	(U-5) Assessment Tools	No	Yes	Yes
(M-6)Research Communication Marks: (10)				
1	(U-1) Research protocol writing	No	Yes	Yes
2	(U-2) Dissertation contents and structure	No	Yes	No

3	(U-3) Types and structure of journal articles	No	Yes	Yes
4	(U-4) Systematic review and meta-analysis	No	No	No
5	(U-5) Publication guidelines	No	Yes	No
6	(U-6) Referencing	No	Yes	No
7	(U-7) Scientometrics	No	Yes	No
8	(U-8) Publication Ethics	No	Yes	Yes

6 G : Blue Print for Summative assessment (University Examination)

Question No	Type of Question	Question Paper Format
Q1	Application based Questions 1 Question 20 marks All compulsory	M1.U4, . M1.U5 M3.U2, . M3.U3, . M3.U4 M4.U2 M5.U4
Q2	Short answer Questions Eight Questions 5 Marks Each All compulsory	1. M1.U1 Or . M1.U2 Or . M1.U3 2. M1.U4 Or . M1.U5 Or . M2.U1 3. M2.U2 Or . M3.U2 Or . M3.U4 4. M4.U1 Or . M4.U2 Or . M5.U1 5. M5.U2 Or . M5.U3 Or . M5.U5 6. M6.U1 Or . M6.U2 Or . M6.U3 7. M6.U5 Or . M6.U6 8. M6.U7 Or . M6.U8
Q3	Analytical Based Structured Long answer Questions Four Questions 10 marks each All compulsory	1. M1.U2 Or . M1.U3 Or . M1.U5 Or . M2.U1 2. M2.U2 Or . M3.U3 Or . M4.U2 Or . M5.U1 3. M5.U2 Or . M5.U3 Or . M5.U4 Or . M5.U5 4. M6.U1 Or . M6.U3 Or . M6.U8

Reference Books/ Resources

S.No	References
1	https://scientific-publishing.webshop.elsevier.com/research-process/levels-of-evidence-in-research/
2	GRADE Methods in traditional medicine Jian-Ping Liu [?] <i>Integr Med Res.</i> 2022 Jun; 11(2): 100836. doi: 10.1016/j.imr.2022.100836
3	Evidence-based traditional medicine for transforming global health and well-being Bhushan Patwardhan [?] <i>J Ayurveda Integr Med.</i> 2023 Jul-Aug; 14(4): 100790. doi: 10.1016/j.jaim.2023.100790
4	Selected sections from classical texts of Unani medicine
5	https://ayushportal.nic.in/
6	<i>Health Research Fundamentals: A Companion to NIECer 101 Course (First Edition)</i> by P Manickam and Tarun Bhatnagar, ICMR – NIE publication, ISBN-13 979-8889359418
7	The Craft of Research, Wayne C. Booth , University of Chicago Press, ISBN-13 978-0226239736
8	Research Question, Objectives & Hypotheses KSUMSC, https://ksumsc.com › 03 - Objectives _ Hypotheses
9	A Public Documentary on the History of Research Ethics https://www.youtube.com/watch?v=9zfrpFwIwug
10	Exploitation and ethics in clinical trials https://www.youtube.com/watch?v=HOBiWaH-Owo
11	Ethics in qualitative research https://www.youtube.com/watch?v=CAquVX1bF7U
12	Franco NH. Animal Experiments in Biomedical Research: A Historical Perspective. <i>Animals</i> (Basel). 2013 Mar 19;3(1):238-73. doi: 10.3390/ani3010238. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4495509/
13	Kiani AK, Pheby D, Henahan G, Brown R, Sieving P, Sykora P, et.al. International Bioethics Study Group. Ethical considerations regarding animal experimentation. <i>J Prev Med Hyg.</i> 2022 Oct 17;63(2 Suppl 3):E255-E266. doi: 10.15167/2421-4248/jpmh2022.63.2S3.2768. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9710398/
14	ICMR National ethical guidelines for biomedical and health research involving human participants 2017. https://ethics.ncdirindia.org/asset/pdf/ICMR_National_Ethical_Guidelines.pdf
15	ICH-GCP guidelines. https://database.ich.org/sites/default/files/ICH_E6%28R3%29_DraftGuideline_2023_0519.pdf
16	Jung SY, Kang JW, Kim TH. Monitoring in clinical trials of complementary and alternative medicine. <i>Integr Med Res.</i> 2021 Jun;10(2):100666. doi: 10.1016/j.imr.2020.100666. Epub 2020 Sep 23. PMID: 32989415; PMCID: PMC7510525
17	Mock Research Ethics Board: Engaging students in REBs through active learning. https://www.youtube.com/watch?v=xjg4mGfC2qA
18	M Ajanal, S Nayak, Buduru S Prasad, A Kadam, Adverse drug reaction and concepts of drug safety in Ayurveda: An overview. <i>Journal of Young Pharmacists.</i> 2013;5(4): 116-120. https://doi.org/10.1016/j.jyp.2013.10.001 .
19	Ayushsuraksha. https://www.ayushsuraksha.com/

20	Pharmacovigilance https://aiia.gov.in/pharmacovigilance/
21	Objectionable advertisements https://aiia.gov.in/pharmacovigilance/objectionable-advertisement/
22	World Intellectual Property Organization (WIPO) https://www.wipo.int/about-ip/en/
23	Indian Patent office. https://www.ipindia.gov.in/
24	Indian Patent search https://iprsearch.ipindia.gov.in/publicsearch
25	Cadbury v Nestlé: The Kit Kat trademark war explained. Read more at: https://www.campaignindia.in/article/cadbury-v-nestle-the-kit-kat-trademark-war-explained/420468
26	Kothari CR (2004). Research Methodology –Methods and Techniques(Second Revised Edition). New Age International Publishers-New Delhi, Page -185
27	Mack N. Qualitative research methods: A data collector's field guide. North Carolina, USA: Family Health International;2005
28	R Bonita, R Beaglehole, T Kjellström. Basic epidemiology <i>2nd edition</i> . WHO Library Cataloguing-in-Publication Data. World Health Organization 2006
29	MKC Nair, Remadevi S, Anish TS Harikumar Nair GS, Ajith Kumar K, Leena ML. Editors. An Introduction to Research Methodology. Kerala University of Health Sciences Thrissur, Kerala, 2017
30	M. C. Sobhana. Editor., Ergonomics in Ayurveda, Vaidyaratnam P.S. Varier Ayurveda College, Kottakkal, 2014
31	Ross C. Brownson, Diana B. Petitti. Editors. Applied Epidemiology- Theory to Practice. Edited by, New York, Oxford University Press 1998
32	John W. Creswell. Research design: qualitative, quantitative, and mixed methods approach. 4th ed. SAGE Publications India Pvt. Ltd.
33	Dona Schneider, David E. Lilienfeld editors. Lilienfeld's Foundations of Epidemiology. Oxford University Press 2015, 4 th ed
34	Study designs: Part 4 – Interventional studies, Rakesh Aggarwal and Priya Ranganathan, Perspect Clin Res. 2019 Jul-Sep; 10(3): 137–139. doi:10.4103/picr.PICR_91_19
35	https://www.nccih.nih.gov/grants/pilot-studies-common-uses-and-misuses
36	https://ebooks.inflibnet.ac.in/socp3/chapter/pilot-study-and-pre-test/
37	https://www.youtube.com/@tejastech2015
38	Sanjeev Rastogi <i>Editor</i> . Translational Ayurveda. A. R. Baydoun. Cell culture techniques. https://www.cambridge.org/core .
39	Guide for the care and use of Laboratory animals. Eighth Edition. The National Academies Press, Washington, DC, 2011
40	Analytical Procedures and Methods Validation for Drugs and Biologics- Guidance for Industry. U.S. Department of Health and Human Services, Centre for Drug Evaluation and Research (CDER) July 2015

41	https://www.igntu.ac.in/eContent/IGNTU-eContent-857627652716-MSW-2-Dr.HanjabamShukhdebaSharma-SOCIALWORKRESEARCH-1,2,3,4,5.pdf
42	WHO international standard terminologies on Ayurveda. Geneva: World Health Organization; 2022. Licence: CC BY-NC-SA 3.0 IGO, ISBN 978-92-4-006493-5 (electronic version), ISBN 978-92-4-006494-2 (print version)
43	WHO international standard terminologies on Siddha medicine. Geneva: World Health Organization; 2022. Licence: CC BY-NC-SA 3.0 IGO. ISBN 978-92-4-006497-3 (electronic version), ISBN 978-92-4-006498-0 (print version)
44	WHO international standard terminologies on Unani medicine. Geneva: World Health Organization; 2022. Licence: CC BY-NC-SA 3.0 IGO ISBN 978-92-4-006495-9 (electronic version), ISBN 978-92-4-006496-6 (print version)
45	http://ccras.nic.in/content/national-ayush-morbidity-and-standardized-terminologies-portal-namstp
46	Thrigulla, Saketh Ram & Narayanam, Srikanth. (2023). Initiatives: National Ayush Morbidity and Standardized Terminologies Electronic (NAMASTE) Portal. Journal of Ayurveda and Integrative Medicine. 14. 100781. 10.1016/j.jaim.2023.100781.
47	https://icd.who.int/en
48	Masic I, Milinovic K. On-line biomedical databases-the best source for quick search of the scientific information in the biomedicine. <i>Acta Inform Med</i> . 2012;20(2):72-84. doi:10.5455/aim.2012.20.72-84
49	Basic Structure of Synopsis https://search.app/9Y6iB974ZySGHJZJ6https://www.who.int/groups/research-ethics-review-committee/recommended-format-for-a-research-protocol https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5198475/
50	Research Synopsis Guidelines 2015 https://www.researchgate.net/publication/279917593_Research_synopsis_guidelines
51	Protocol Writing https://search.app/GyFGM2kKvfNGtSdCA
52	Funding Agencies https://search.app/EGkbqnNKspfvZu2d7https://search.app/hoaKGNf2EYbHdibh7https://search.app/7Dnxm2MVLPDqDwdR7
53	Video https://www.youtube.com/watch?v=4UZNYFOqFwk
54	Medical dissertation basics: analysis of a course of study for medical students https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9174066/
55	Subhash Chandra Parija, Vikram Kate. Thesis Writing for Master's and Ph.D. Program. Editors. Springer Nature Singapore Pte Ltd. 2018
56	E-Repository Shodhganga https://shodhganga.inflibnet.ac.in/
57	Tips and tricks for writing a scientific manuscript https://pubmed.ncbi.nlm.nih.gov/33261307/
58	Dissertation discussion chapter – how to plan, structure and write it https://youtu.be/N57UpjRr2BA?si=ZGRr3aZwfeF5VAZX

59	How to write a dissertation conclusion chapter - 4 key structure sections with examples & questions https://youtu.be/taLnJ5tuxlY?si=EnQp6u9vhOg4Gq_zhhttps://youtu.be/ZIe0wV4Z_U8?si=NG-Lge8JMn7VwxZy
60	Explain the structure of different types of journal articles https://www.springer.com/gp/authors-editors/authorandreviewertutorials/writing-a-journal-manuscript/types-of-journal-articles/10285504https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8167915/ https://www.researchgate.net/publication/349198216_How_many_types_of_research_articleshttps://youtu.be/xSmBT7_UUEk?si=B-sMEWPbSlbAaY8Zhttps://www.springer.com/gp/authors-editors/journal-author
61	Structure of different types of journal articles https://www.youtube.com/watch?v=NfyMD8g5jfkhttps://www.ncbi.nlm.nih.gov/pmc/articles/PMC8167915/
62	Introduction to systematic review and meta-analysis EunJin Ahn, Hyun Kang Korean J Anesthesiol. 2018 Apr; 71(2): 103–112. doi: 10.4097/kjae.2018.71.2.103
63	http://ps://main.icmr.nic.in/sites/default/files/upload_documents/BEGINNERS_GUIDE_FINAL_BOOK.pdfhttps://guides.library.harvard.edu/meta-analysis
64	Guidelines https://www.equator-network.org/
65	CONSORT GUIDELINE https://www.equator-network.org/reporting-guidelines/consort/ https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6398298/
66	STROBE Guideline https://www.equator-network.org/reporting-guidelines/strobe/ https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6398292/
67	PRISMA Guideline https://www.equator-network.org/reporting-guidelines/prisma/ https://search.app/Y6P4HK2k6jpjxwbv7https://pubmed.ncbi.nlm.nih.gov/36233208/ https://youtu.be/HKToL6M7tbE?si=CulIac3FZl7DV1ln
68	ARRIVE Guidelines https://www.equator-network.org/reporting-guidelines/improving-bioscience-research-reporting-the-arrive-guidelines-for-reporting-animal-research/ https://pubmed.ncbi.nlm.nih.gov/32663219/ https://youtu.be/CIP0Tz7MEPc?si=ilmXfrrE2CQ506Wc
69	CARE Guidelines https://www.equator-network.org/reporting-guidelines/care/ https://pubmed.ncbi.nlm.nih.gov/28529185/
70	Variation & different reporting guidelines https://youtu.be/n9BPxEzjWrl?si=4o9wyQm2I2JmQYCFhttps://youtu.be/2gB0wtwjkos?si=6uh9Ypttvvik8J2qhttps://www.nlm.nih.gov/services/research_report_guide.htmlhttps://onlinecourses.swayam2.ac.in/nou24_ge73/preview

71	Preserving the Integrity of Citations and References by All Stakeholders of Science Communication https://pubmed.ncbi.nlm.nih.gov/26538996/
72	The accuracy of references in PhD theses: a case study https://pubmed.ncbi.nlm.nih.gov/23981024/
73	The prevalence and inaccessibility of Internet references in the biomedical literature at the time of publication https://pubmed.ncbi.nlm.nih.gov/17213493/ https://www.ncbi.nlm.nih.gov/books/NBK7267/ https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9997612/ Demonstrate using any one reference manager tool.
74	How To Use Microsoft word https://youtu.be/N2yWk0Dlpt4?si=9NIbHiBLR6vwptw
75	How To Use Zotero https://www.youtube.com/watch?v=tnbwKj6-pD8 https://www.youtube.com/watch?v=JG7Uq_JFDzE
76	How To Use Mendeley https://www.youtube.com/watch?v=PjXnfBSq4Lg
77	WASP (Write a Scientific Paper): The use of bibliographic management software https://pubmed.ncbi.nlm.nih.gov/30241900/
78	Reference management: A critical element of scientific writing https://pubmed.ncbi.nlm.nih.gov/26952149/ Referencing Style
79	Vancouver referencing style https://youtu.be/C_wk3L8u7o0?si=ZTskxMdYoGMHeI-E How to cite and reference a journal article https://youtu.be/MLwEHV_gqUE?si=hPInyXL4rA_ZkrT1 https://www.youtube.com/watch?v=XpkL0y1PjF0
80	Journal impact factors https://link.springer.com/article/10.1007/s00005-021-00621-w
81	Cite score- https://rdcu.be/dOM73 https://www.youtube.com/watch?v=Ui_X30Dqrzk
82	Authors impact metrics https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9595167/
83	Quality verification using scientometrics- https://doi.org/10.1016/j.joi.2018.05.001
84	Various aspects of scientometry- https://youtu.be/9Qq_8_FHKpc?si=Wm0mgwFyGcQRBV6P https://youtu.be/NZBMXkNdn2Y?si=sj2xxBVbjOMngcX1 https://pubmed.ncbi.nlm.nih.gov/33583970/
85	Publication ethics videos https://youtu.be/LmMDIBENHhU?si=k5KH3fThr0ITN4wm https://youtu.be/oieXfTtPDdM?si=rrpKZG7NXFXWJfwp
86	Authorship Criteria PDF https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9122129/ https://stmjournals.com/pdf/Author-Guidelines-stmjournals.pdf
87	WAME review guideline https://wame.org/recommendations-on-publication-ethics-policies-for-medical-journals
88	COPE guideline https://publicationethics.org/guidance/Guidelines
89	Falsification and fabrication of data https://scientific-publishing.webshop.elsevier.com/manuscript-review/research-fraud-falsification-and-fabrication-research-data/ https://www.ncbi.nlm.nih.gov/books/NBK214564/?report=reader

90	ICMJE and OSPA https://www.icmje.org/recommendations/https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3192379/
91	Publication process https://www.youtube.com/watch?v=GQepuG1yX-8
92	World's biggest Online Collection of Indian Manuscripts & Antique Books https://indianmanuscripts.com/ayurveda-manuscripts
93	Gujarat Ayurveda University, Digital Ayurvedic Manuscripts Database http://www.ayurvedamanuscripts.com/index.php
94	National Center of Indian Medical Heritage, AYUSH Manuscripts Advanced Repository (AMAR) https://niimh.nic.in/amar/index.php
95	R Bonita, R Beaglehole, T Kjellström. Basic epidemiology 2nd edition. WHO Library Cataloguing-in-Publication Data. World Health Organization 2006
96	Mack N. Qualitative research methods: A data collector's field guide. North Carolina, USA: Family Health International;2005
97	Ross C. Brownson, Diana B. Petitti. Editors. Applied Epidemiology- Theory to Practice. Edited by, New York, Oxford University Press 1998
98	Bilal Ahmad Wani, Shaheen Ahmad Mir. Basics of Research Methodology and Medical Statistics for Ayurveda Scholars. Ayurveda Sanskrit Pustak Bhandaar, Jaipur Page -95 ISBN-978-93-84277-8-5
99	Ranjith Kumar. Research Methodology a step- by -step guide for beginners:(Third Edition) SAGE Publications Ltd Page -92 ISBN 978-1-84920-300-5
100	John W. Creswell. Research design: qualitative, quantitative, and mixed methods approach. 4th ed. SAGE Publications India Pvt. Ltd.
101	Dona Schneider, David E. Lilienfeld editors. Lilienfeld's Foundations of Epidemiology. Oxford University Press 2015, 4 th ed
102	Laake P, Benestad HB, Olsen BR, editors. Research methodology in the medical and biological sciences. Academic Press; 2007 Nov 5. Page -71, ISBN: 978-0-12-373874-5
103	Research Methods in Community Medicine: Surveys, Epidemiological Research, Programme Evaluation, Clinical Trials, Sixth Edition. J. H. Abramson and Z. H. Abramson © 2008 John Wiley & Sons Ltd. ISBN: 978-0-470-98661-5
104	Bhide A, Shah PS, Acharya G. A simplified guide to randomized controlled trials. Acta Obstetrica et Gynecologica Scandinavica. 2018;97(4):380–7. Available from: https://doi.org/10.1111/aogs.13309
105	Jagannatha S. Manuscriptology: An entrance. 1 st ed. New Delhi: Parimal publications; 1996
106	Shivaganesha Murthy R S. Introduction to Manuscriptology. 1 st ed. New Delhi: Sharada Publishing House; 1996

Abbreviations

Domain	
CK	Cognitive/Knowledge
CC	Cognitive/Comprehension
CAP	Cognitive/Application
CAN	Cognitive/Analysis
CS	Cognitive/Synthesis
CE	Cognitive/Evaluation
PSY-SET	Psychomotor/Set
PSY-GUD	Psychomotor/Guided response
PSY-MEC	Psychomotor/Mechanism
PSY-ADT	Psychomotor Adaptation
PSY-ORG	Psychomotor/Origination
AFT-REC	Affective/ Receiving
AFT-RES	Affective/Responding
AFT-VAL	Affective/Valuing
AFT-SET	Affective/Organization
AFT-CHR	Affective/ characterization
T L Method	
L	Lecture
L&PPT	Lecture with PowerPoint presentation
L&GD	Lecture & Group Discussion
L_VC	Lecture with Video clips
REC	Recitation
SY	Symposium
TUT	Tutorial
DIS	Discussions
BS	Brainstorming
IBL	Inquiry-Based Learning
PBL	Problem-Based Learning

CBL	Case-Based Learning
PrBL	Project-Based Learning
TBL	Team-Based Learning
TPW	Team Project Work
FC	Flipped Classroom
BL	Blended Learning
EDU	Edutainment
ML	Mobile Learning
ECE	Early Clinical Exposure
SIM	Simulation
RP	Role Plays
SDL	Self-directed learning
PSM	Problem-Solving Method
KL	Kinaesthetic Learning
W	Workshops
GBL	Game-Based Learning
LS	Library Session
PL	Peer Learning
RLE	Real-Life Experience
PER	Presentations
D-M	Demonstration on Model
PT	Practical
X-Ray	X-ray Identification
CD	Case Diagnosis
LRI	Lab Report Interpretation
DA	Drug Analysis
D	Demonstration
D-BED	Demonstration Bedside
DL	Demonstration Lab

DG	Demonstration Garden
FV	Field Visit
JC	Journal Club
Mnt	Mentoring
PAL	Peer Assisted Learning
C_L	Co Learning
DSN	Dissection
PSN	Prosection

Competency-Based Dynamic Curriculum for MD/ MS Unani
(PRESCRIBED BY NCISM)

Semester II

Applied Basics of Tashreehul Badan

(Human Anatomy)

(SUBJECT CODE : UNIPG-AB-TB)

(Applicable from 2024-25 batch, from the academic year 2024-25 onwards until further
notification by NCISM)



BOARD OF UNANI, SIDDHA AND SOWA-RIGPA
NATIONAL COMMISSION FOR INDIAN SYSTEM OF MEDICINE
NEW DELHI-110026

Preface

The postgraduate education program in Tahreehul Badan is designed to nurture specialists capable of delivering high-quality healthcare and advancing scientific research. By establishing uniform training guidelines nationwide, this curriculum ensures that students develop the necessary expertise to address the evolving needs of the medical community and society. Additionally, it equips them with teaching skills to integrate Tahreehul Badan with related subjects, fostering a holistic educational approach while remaining aware of their limitations.

Prepared by subject-content experts from the National Commission for Indian System of Medicine, the document underscores the foundational importance of Tashreehul Badan in medical sciences. A competency-based dynamic curriculum bridges classical Unani insights with modern advancements, enabling postgraduate students to grasp core aspects like microscopic anatomy, embryology, genetics, gross anatomy, and neuroanatomy. This comprehensive approach cultivates critical thinking, practical expertise, and research skills, preparing students for specialized clinical practices and academic roles.

The curriculum also emphasizes ethical conduct, empathetic interactions, and effective communication with students, colleagues, and donors' families. By promoting work ethics and eliminating personal prejudices, the program shapes well-rounded professionals. It aims to inspire students to contribute meaningfully to the field of Tashreehul Badan blending time-tested Unani principles with contemporary scientific discoveries, ensuring the growth of both individual practitioners and the discipline itself.

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NCISM
(NATIONAL COMMISSION FOR INDIAN SYSTEM OF MEDICINE)

Competency-Based Dynamic Curriculum for MD/ MS Unani
Applied Basics of Tashreehul Badan (UNIPG-AB-TB)

Summary & Credit Framework
Semester II

Module Number & Name	Credits	Notional Learning Hours	Maximum Marks of assessment of modules (Formative Assessment)
M 1. (History of Anatomy & Unani concepts of Human Body formation) تاریخ تشریح لبدن و جسم انسان کی تشکیل کے متعلق یونانی نظریہ	2	60	50
M 2. (Unani Terminology and their Etymology related to human Anatomy) تشریح لبدن کے متعلق یونانی اصطلاحات اور ان کی وجہ تسمیہ	1	30	25
M 3. (Concepts of formation of organs and embryogenesis according to Unani system of medicine) (Concepts of formation of organs and embryogenesis according to Unani system of medicine)	2	60	50
M 4. (Definition, classification, Anatomy of simple organs according to Unani system of medicine and its applied aspects) طب یونانی کے مطابق اعضاء مفردہ کی تعریف، تقسیم مع اطلاقی پہلو	4	120	100
M 5. (Definition, Classification, Anatomy and Applied aspects of compound organs according to Unani system of Medicine) طب یونانی کے مطابق اعضاء مرکبہ کی تعریف، تقسیم اور تشریح مع اطلاقی پہلو	4	120	100
M 6. (Definition, Classification and Anatomy of Joints with its applied aspects according to Unani system of Medicine) طب یونانی کے مطابق مفاصل کی تعریف، تقسیم و تشریح مع اطلاقی پہلو	3	90	75
	16	480	400

Credit frame work

UNIPG-AB-TB consists of 6 modules totaling 16 credits, which correspond to 480 Notional Learning Hours. Each credit comprises 30 hours of learner engagement, distributed across teaching, practical, and experiential learning in the ratio of 1:2:3. Accordingly, one credit includes 5 hours of teaching, 10 hours of practical training, 13 hours of experiential learning, and 2 hours allocated for modular assessment, which carries 25 marks.

Important Note: The User Manual MD/MS Unani is a valuable resource that provides comprehensive details about the curriculum file. It will help you understand and implement the curriculum. Please read the User Manual before reading this curriculum file. The curriculum file has been thoroughly reviewed and verified for accuracy. However, if you find any discrepancies, please note that the contents related to the MSE should be considered authentic. In case of difficulty and questions regarding the curriculum, write to syllabus24uni@ncismindia.org.

Course Code and Name of Course

Course code	Name of Course
UNIPG-AB-TB	Applied Basics of Tashreehul Badan (Human Anatomy)

Table 1 : Course learning outcomes and mapped Program learning outcomes

CO No	A1 Course learning Outcomes (CO) UNIPG-AB-TB At the end of the course UNIPG-AB-TB, the students should be able to	B1 Course learning Outcomes mapped with program learning outcomes.
CO 1	Demonstrate and apply knowledge of human anatomy and procedural management	PO1,PO2,PO8
CO 2	Correlate Unani principles to human anatomy	PO3,PO5,PO6
CO 3	Demonstrate gross and microscopic anatomy through research and innovations with the help of advanced techniques.	PO3,PO5,PO8
CO 4	Illustrate developmental Anatomy (Genetics, Embryology, Surface Anatomy, Surgical anatomy, Neuroanatomy and functional pathways)	PO2,PO5,PO6
CO 5	Interpret radiological anatomy and describe clinical application of anatomical knowledge, recent advances and its correlation with forensic anatomy.	PO1,PO5,PO6,PO8
CO 6	Describe the fundamentals of Unani medicine and its Application in the field of research in anatomy.	PO3,PO4,PO6,PO7,PO8
CO 7	Communicate anatomy law, basic Unani anatomical concepts and ethics to the learners and researchers	PO1,PO3,PO4,PO6

Table 2 : Course contents (Modules- Credits and Notional Learning Hours)

2A Module Number	2B Module & units	2C Number of Credits	Notional Learning Hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
1	M-1 تاریخ تشریح البدن و جسم انسان کی تشکیل کے متعلق یونانی نظریہ (History of Anatomy & Unani concepts of Human Body formation) This module explores the historical evolution of anatomy during the ancient period, specifically in relation to the Unani system of medicine. It highlights the significant anatomical contributions made by Greek, Roman, Arab, Persian, and Indian scholars of Unani system of medicine. Additionally, this module provides a detailed exploration of the historical practices of dissection and cadaver preservation and its methods along with ethical considerations involved in these practices. Furthermore, the module offers a comprehensive understanding of the fundamental principles of Unani system of medicine, particularly focusing on the role and importance of Anasir-e-Arba'a and Akhlat-e- Arba'a in the formation of the human body. By the end of this module, learners will gain an in-depth perspective on the anatomical foundations of Unani system of medicine and its historical progression, enriching their understanding of its theoretical and practical applications. M1.U1 عہد عتیق میں طب یونانی سے متعلق تاریخ تشریح البدن 1.1.1 عہد عتیق میں طب یونانی سے متعلق تاریخ تشریح البدن (History of Anatomy in Ancient period related to Unani system of medicine) M1.U2 طب یونانی میں تقطیع نعش اور تحفظ نعش کی تاریخ 1.2.1 طب یونانی میں تقطیع نعش کی تاریخ (History of dissection in Unani system of medicine) 1.2.2 طب یونانی میں تحفظ نعش کی تاریخ (History of preservation of cadaver in Unani system of medicine)	2	10	20	30	60

	• M1.U3 تشریح البدن میں یونانی، رومی، عربی، فارسی و ہندوستانی اطباء کی خدمات 1.3.1 (Anatomical Contributions of Greek scholars of Unani system of medicine) تشریح البدن میں یونانی اطباء کی خدمات 1.3.2 (Anatomical Contributions of Roman scholars of Unani system of medicine) تشریح البدن میں رومی اطباء کی خدمات 1.3.3 (Anatomical Contributions of Arab scholars of Unani system of medicine) تشریح البدن میں عربی اطباء کی خدمات 1.3.4 (Anatomical Contributions of Persian scholars of Unani system of medicine) تشریح البدن میں فارسی اطباء کی خدمات 1.3.5 (Anatomical Contributions of Indian scholars of Unani system of medicine) تشریح البدن میں ہندوستانی اطباء کی خدمات • M1.U4 (Role and importance of Anasir-e-Arba'a and Akhlat Arba'a in the formation of Human body and its applied aspects) جسم انسان کی تشکیل میں عناصر اربعہ و اخلاط اربعہ کا کردار و اہمیت اور انکا اطلاقی پہلو 1.4.1 (Role and importance of Anasir-e-Arba'a in the formation of Human body and its applied aspects) جسم انسان کی تشکیل میں عناصر اربعہ کا کردار و اہمیت اور انکا اطلاقی پہلو 1.4.2 (Role and importance of Akhlat Arba'a in the formation of Human body and its applied aspects) جسم انسان کی تشکیل میں اخلاط اربعہ کا کردار و اہمیت اور انکا اطلاقی پہلو					
2	M-2 (Unani Terminology and their Etymology related to human Anatomy) This module offers a comprehensive exploration of the specialized terminology in <i>Tashreeul Badan</i>, emphasizing its linguistic origins and historical development. It examines the etymology and meaning of essential Unani terms related to the anatomy of simple and compound organs, providing a deeper understanding of how these terms have been shaped and standardized over time. Additionally, the module expands its focus to include terminology associated with microscopic structures of the human body.	1	5	10	15	30

	By tracing the linguistic roots of these terms, students will gain valuable insights into their conceptual foundations within the Unani medical tradition. The module also highlights the alignment of these terminologies with classical Unani doctrines and their significance within contemporary medical discourse. Through this detailed study, learners will develop proficiency in Unani anatomical terminology, empowering them to interpret classical texts with precision and apply this knowledge effectively in both medical practice and research. • M2.U1 تشریح ظاہری سے متعلق یونانی اصطلاحات اور انکی وجہ تسمیہ 2.1.1 (Unani terminology and its etymology related to gross anatomy) • M2.U2 بدن انسان کی خوردبینی ساختوں سے متعلق یونانی اصطلاحات اور انکی وجہ تسمیہ 2.2.1 (Unani terminology and its etymology related to microscopic structures of human body)					
3	M-3 (Concepts of formation of organs and embryogenesis according to Unani system of medicine) This module offers a comprehensive exploration of the structural composition of organs in accordance with the principles of Anasir-e-arba'a. Furthermore, this module explores the definition and classification of organs within the Unani framework, distinguishing between simple and compound organs based on their structural and functional attributes. A key focus of this module is the concept of Takhleeq-e-Janeen as described in classical Unani literature. The discussion provides a detailed exploration of the stages of embryonic development, growth and differentiation based on principles of Unani system of medicine. Additionally, the module offers a comparative analysis between the Unani concept of Takhleeq-e-Janeen and modern human embryology, identifying similarities, differences, and points of convergence between traditional and contemporary scientific perspectives. • M3.U1 Composition of organs according to Anasir-e-Arba'a and its applied aspects. 3.1.1 (Role of Anasir Arba & Temperament in composition of organs.)	2	10	20	30	60

	3.1.2.2 (Anasir Arba in the light of Periodic Table) M3.U2 Classification of organs according to Unani System of Medicine) 3.2.1 (Definition of simple and compound organ in Unani Medicine) 3.2.2 (Concepts of organs in Unani Medicine.) 3.2.3 (Concepts of organs in contemporary Medicine) M3.U3 (Concepts of Takhleeq-e Janeen in Unani system of Medicine.) 3.3.1 (Unani Concepts of Takhleeq Janeen) M3.U4 (Comparison of Unani Concepts of Takhleeq-e Janeen with Modern human Embryology.) 3.4.1 (Concepts of Embryogenesis in Modern Medicine)					
4	M-4 (Definition, classification, Anatomy of simple organs according to Unani system of medicine and its applied aspects) This module provides a thorough description of the definition and classification of simple organs (<i>Aaz'a Mufrida</i>) of the human body as described in the Unani system of medicine. This module explores the anatomy of bones, cartilages, muscles, ligaments, tendons, membranes, fat, nerves, blood vessels, bone marrow, nails, and hair, providing detailed insights into their anatomical significance. The module explores the unique characteristics of each structure, explaining their composition and properties. It explores how these components are classified in Unani system of medicine based on their structure and elemental composition according to the concept of <i>Anasir-e-Arba'a</i>. Special emphasis is placed on the applied aspects of these structures, highlighting their importance in health and diseases.	4	20	40	60	120

	• M4.U1 طب یونانی کے مطابق عظم کی تعریف ، تقسیم اور ان کا اطلاقی پہلو 4.1.1 (Definition of bone according to Unani system of medicine) طب یونانی کے مطابق عظم کی تعریف 4.1.2 (Classification and Applied Aspects of Bone according to Unani System of Medicine) طب یونانی کے مطابق عظم کی تقسیم اور ان کا اطلاقی پہلو • M4.U2 طب یونانی کے مطابق غضروف کی تعریف ، تقسیم اور ان کا اطلاقی پہلو 4.2.1 (Definition of cartilage according to Unani system of medicine) طب یونانی کے مطابق غضروف کی تعریف 4.2.2 (Classification and Applied Aspects of Cartilage in the Unani System of Medicine) طب یونانی کے مطابق غضروف کی تقسیم اور اس کا اطلاقی پہلو • M4.U3 طب یونانی کے مطابق لحم کی تعریف ، تقسیم اور ان کا اطلاقی پہلو 4.3.1 (Definition of Muscles according to Unani System of Medicine) طب یونانی کے مطابق عضلات کی تعریف 4.3.2 (Classification and Applied Aspects of Muscles according to Unani System of Medicine) طب یونانی کے مطابق عضلات کی تقسیم اور ان کا اطلاقی پہلو • M4.U4 طب یونانی کے مطابق اوتار اور رباط کی تعریف ، تقسیم اور ان کا اطلاقی پہلو 4.4.1 (Definition of Tendon according to Unani System of Medicine) طب یونانی کے مطابق وتر کی تعریف 4.4.2 (Definition of Ligaments according to Unani System of Medicine) طب یونانی کے مطابق رباط کی تعریف 4.4.3 (Classification and Applied Aspects of Tendon according to Unani System of Medicine) طب یونانی کے مطابق وتر کی تقسیم اور اس کا اطلاقی پہلو 4.4.4 (Classification and Applied Aspects of Ligaments according to Unani System of Medicine) طب یونانی کے مطابق رباط کی تقسیم اور اس کا اطلاقی پہلو					

	Aspects of Ligament according to Unani System of Medicine) M4.U5 طب یونانی کے مطابق اغشیہ کی تعریف ، تقسیم اور ان کا اطلاقی پہلو 4.5.1 (Definition of Membranes according to Unani System of Medicine) طب یونانی کے مطابق غشاء کی تعریف 4.5.2 (Classification and Applied Aspects of Membranes according to Unani System of Medicine) طب یونانی کے مطابق غشاء کی تقسیم اور اس کا اطلاقی پہلو M4.U6 طب یونانی کے مطابق شحم اور اعصاب کی تعریف، تقسیم اور ان کا اطلاقی پہلو 4.6.1 (Definition of Fat according to Unani System of Medicine) طب یونانی کے مطابق شحم کی تعریف 4.6.2 (Definition of Nerve according to Unani System of Medicine) طب یونانی کے مطابق عصب کی تعریف 4.6.3 (Classification and Applied Aspects of Fat according to Unani System of Medicine) طب یونانی کے مطابق شحم کی تقسیم اور اس کا اطلاقی پہلو 4.6.4 (Classification and Applied Aspects of Nerve according to Unani System of Medicine) طب یونانی کے مطابق عصب کی تقسیم اور اس کا اطلاقی پہلو M4.U7 طب یونانی کے مطابق عروق دموئیہ کی تعریف، تقسیم اور ان کا اطلاقی پہلو 4.7.1 (Definition of Blood Vessels according to Unani System of Medicine) طب یونانی کے مطابق عروق دموئیہ کی تعریف 4.7.2 (Classification and Applied Aspects of Blood Vessels according to Unani System of Medicine) طب یونانی کے مطابق عروق دموئیہ کی تقسیم اور ان کا اطلاقی پہلو M4.U8 طب یونانی کے مطابق مخ، ظفر اور شعر کی تعریف، تقسیم اور ان کا اطلاقی پہلو 4.8.1 (Definition of Bone marrow according to Unani System of Medicine) طب یونانی کے مطابق مخ کی تعریف					

	4.8.2 طب یونانی کے مطابق ظفر کی تعریف (Definition of Nail according to Unani System of Medicine) 4.8.3 طب یونانی کے مطابق شعر کی تعریف (Definition of Hair according to Unani System of Medicine) 4.8.4 طب یونانی کے مطابق مخ کی تقسیم اور اس کا اطلاقی پہلو (Classification and Applied Aspects of Bone marrow according to Unani System of Medicine) 4.8.5 طب یونانی کے مطابق ظفر کی تقسیم اور اس کا اطلاقی پہلو (Classification and Applied Aspects of Nail according to Unani System of Medicine) 4.8.6 طب یونانی کے مطابق شعر کی تقسیم اور اس کا اطلاقی پہلو (Classification and Applied Aspects of Hair according to Unani System of Medicine)					
5	M-5 طب یونانی کے مطابق اعضاء مرکبہ کی تعریف، تقسیم اور تشریح مع اطلاقی پہلو (Definition, Classification, Anatomy and Applied aspects of compound organs according to Unani system of Medicine) This module offers a comprehensive exploration of compound organs as described in the Unani system of medicine, covering their definition, classification, anatomical structure, and clinical significance. It begins by defining compound organs, outlining their exclusive characteristics and anatomical importance within the human body with explanation of unique Unani literatures of preserving and post serving structures of principal organs. This module also delves into their classification, providing a detailed analysis of the different types of compound organs based on Unani principles. Additionally, it examines the intricate anatomical features of these organs, highlighting their structural composition and physiological roles. Furthermore, the module highlights the applied aspects of compound organs, discussing their relevance in health, disease diagnosis, and treatment from Unani medical perspective. Through this in-depth study, learners will gain a holistic understanding of compound organs, integrating traditional Unani concepts with their practical applications in clinical practice. M5.U1 اعضاء مرکبہ کا تعارف و تقسیم بلحاظ اعضاء رکیبہ و غیر رکیبہ (Introduction of compound organs and Its classification according to A'aza-e- Ra'eesa (Principal organs) and Ā'aza-e- Ghair Ra'eesa (Accessory organs)) 5.1.1 اعضاء مرکبہ کا تعارف (Introduction of compound organs) 5.1.2 اعضاء مرکبہ کی تقسیم بلحاظ اعضاء رکیبہ و غیر رکیبہ (Classification of compound organs according	4	20	40	60	120

	to Principal and Accessory organs) M5.U2 تقسیم و تشریح (Introduction, Classification and Anatomy of A'aza-e-Haiwaniyah (Organs for circulation and respiration). 5.2.1 تعارف Introduction of <i>A'aza-e- Haiwaniyah</i> (Organs for circulation and respiration). 5.2.2 تقسیم و تشریح <i>اعضاء حیوانیہ کی تقسیم و تشریح</i> Classification and Anatomy of <i>A'aza-e- Haiwaniyah</i> (Organs for circulation and respiration). M5.U3 تقسیم و تشریح (Introduction, Classification and Anatomy of A'aza-e-Nafsaniya (organs for psychic functions) 5.3.1 تعارف <i>اعضاء نفسانیہ کا تعارف</i> (Introduction of <i>A'aza-e- Nafsaniya</i> (organs for psychic functions)) 5.3.2 تقسیم و تشریح <i>اعضاء نفسانیہ کی تقسیم و تشریح</i> (Classification and Anatomy of <i>A'aza-e- Nafsaniya</i> (organs for psychic functions)) M5.U4 تقسیم و تشریح (Introduction, classification and Anatomy of A'aza-e- Tabaiya (organs for nutrition and growth)) 5.4.1 تعارف <i>اعضاء طبیعیہ کا تعارف</i> (Introduction of <i>A'aza-e- Tabaiya</i> (organs for nutrition and growth)) 5.4.2 تقسیم و تشریح <i>اعضاء طبیعیہ کی تقسیم و تشریح</i> (Classification and Anatomy of <i>A'aza-e- Tabaiya</i> (organs for nutrition and growth)) M5.U5 تقسیم و تشریح (Introduction, Classification and Anatomy of A'aza-e-Tanasuliyah (organs for Reproduction) 5.5.1 تعارف <i>اعضاء تناسلیہ کا تعارف</i> (Introduction of <i>A'aza-e- Tanasuliyah</i> (organs for reproduction)) 5.5.2 تقسیم و تشریح <i>اعضاء تناسلیہ کی تقسیم و تشریح</i> (Classification and Anatomy of <i>A'aza-e- Tanasuliyah</i> (organs for reproduction))					

	اعضاء تناسلیہ کا تعارف 5.5.1 Introduction of A'aza-e- Tanasuliyah (organs for Reproduction) اعضاء تناسلیہ کی تقسیم و تشریح 5.5.2 Classification and Anatomy of A'aza-e- Tanasuliyah (organs for Reproduction) • M5.U6 اعضا حیوانیہ کے اعضا مہیہ و مودیہ کا یونانی نظریہ (Unani Concepts of Pre-serving and Post- Serving organs of A'aza-e- Haiwaniyah) اعضاء حیوانیہ کے اعضا مہیہ کا یونانی نظریہ 5.6.1 (Unani Concepts of Pre-serving organs of A'aza-e- Haiwaniyah) اعضاء حیوانیہ کے اعضا مودیہ کا یونانی نظریہ 5.6.2 (Unani Concepts of Post- Serving organs of A'aza-e- Haiwaniyah) • M5.U7 اعضا نفسانیہ کے اعضا مہیہ و مودیہ کا یونانی نظریہ (Unani Concepts of Pre-serving and Post- Serving organs of A'aza-e- Nafsaniya) اعضاء نفسانیہ کے اعضا مہیہ کا یونانی نظریہ 5.7.1 (Unani Concepts of Pre-serving organs of A'aza-e- Nafsaniya) اعضاء نفسانیہ کے اعضا مودیہ کا یونانی نظریہ 5.7.2 (Unani Concepts of Post- Serving organs of A'aza-e- Nafsaniya) • M5.U8 اعضا طبعیہ کے اعضا مہیہ و مودیہ کا یونانی نظریہ (Unani Concepts of Pre-serving and Post- Serving organs of A'aza-e- Tabaiya) اعضاء طبعیہ کے اعضا مہیہ کا یونانی نظریہ 5.8.1					

	(Unani Concepts of Pre-serving organs of A'aza-e- Tabaiya) اعضاء طبیعیہ کے اعضا مودیہ کا یونانی نظریہ 5.8.2 (Unani Concepts of Post- Serving organs of A'aza-e- Tabaiya) • M5.U9 (Unani Concepts of Pre-serving and Post- Serving organs of A'aza-e- Tanasuliyah) اعضا تناسلیہ کے اعضا مہیہ و مودیہ کا یونانی نظریہ اعضاء تناسلیہ کے اعضا مہیہ کا یونانی نظریہ 5.9.1 (Unani Concepts of Pre-serving organs of A'aza-e- Tanasuliyah) اعضاء تناسلیہ کے اعضا مودیہ کا یونانی نظریہ 5.9.2 (Unani Concepts of Post- Serving organs of A'aza-e- Tanasuliyah)					
6	M-6 (Definition, Classification and Anatomy of Joints with its applied aspects according to Unani system of Medicine) طب یونانی کے مطابق مفاصل کی تعریف، تقسیم و تشریح مع اطلاقی پہلو This section provides a comprehensive study of joints in the context of the Unani system of medicine, covering their definition, classification, anatomical structure, and applied aspects. It begins with a detailed definition of joints, explaining their fundamental role in body movement, stability, and overall musculoskeletal function. The classification of joints is explored according to Unani principles, categorizing them based on their structural composition, functional characteristics, and movement capabilities. Additionally, the anatomical study of joints focuses on their composition, including bones, cartilage, synovial membranes, and associated ligaments, offering a holistic understanding of their structure and biomechanics. The module further highlights the applied aspects of joints, discussing their significance in health, common disorders, and therapeutic approaches in Unani medicine. • M6.U1 (Introduction and classification of Joints in Unani system of medicine) طب یونانی کے مطابق مفاصل کا تعارف اور تقسیم 6.1.1 (Introduction of Joints in Unani system of medicine) طب یونانی کے مطابق مفاصل کا تعارف 6.1.2 (Classification of Joints in Unani system of medicine) طب یونانی کے مطابق مفاصل کی تقسیم	3	15	30	45	90

• M6.U2 طب یونانی کے مطابق مفصل ہیکل محوری کی تشریح (Anatomy of Joints of axial skeleton according to Unani system of medicine) 6.2.1 طب یونانی میں مفصل ہیکل محوری کی تشریح (Anatomy of Joints of axial skeleton in Unani medicine) • M6.U3 طب یونانی کے مطابق مفصل ہیکل طرفی کی تشریح (Anatomy of Joints of appendicular skeleton according to Unani system of medicine) 6.3.1 طب یونانی میں مفصل ہیکل طرفی کی تشریح (Anatomy of Joints of appendicular skeleton in Unani medicine) • M6.U4 طب یونانی کے مطابق مفصل کی اطلاقی تشریح (Applied anatomy of joints according to Unani system of Medicine) 6.4.1 مفصل کی اطلاقی تشریح (Applied anatomy of joints)						
		16	80	160	240	480

Table 3 : Modules - Unit - Module Learning Objectives and Session Learning Objective- Notional Learning Hours- Domain-Level- TL Methods

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical/experiential) learning session, the students should be able to)	3C Notional Learning Hours	3D Lecture/ Practical/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/ Shows how/ Knows how/ Know)	3G Teaching Learning Methods
Module 1 : کتب تاریخ تشریح البدن و جسم انسان کی تفہیم کے متعلق یونانی نظریہ : (History of Anatomy & Unani concepts of Human Body formation)						
Module Learning Objectives (At the end of the module, the students should be able to)						
1. Describe the history of Anatomy, Dissection and preservation of cadaver, contributions of Unani scholars in the field of Anatomy and the Role of arkan and akhlat in the formation of human body. 2. Illustrate and demonstrate history of Anatomy, history of dissection and preservation of cadaver. 3. Appraise the Anatomical Contributions of Greek, Roman, Arab, Persian and Indian scholars of Unani system of medicine. 4. Identify the Role of Anasir-e-Arba'a and Akhlat Arba'a in the formations of Human body and its applied aspects						
Unit 1 عہد عتیق میں طب یونانی سے متعلق تاریخ تشریح البدن 1.1.1 عہد عتیق میں طب یونانی سے متعلق تاریخ تشریح البدن (History of Anatomy in Ancient period related to Unani system of medicine) References: 34,35,38,39,40						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,C0 6,C0 7	Explore the history of Anatomy in Ancient period related to Unani system of medicine.	3	Lecture	CAN	Knows-how	L&GD,L&PPT
CO 1,CO 2,C0 6,C0 7	Demonstrate the history of Anatomy in Ancient period related to Unani system of medicine.	4	Practical1.1	AFT-REC	Shows-how	DIS,PER,SDL

CO 2,C0 6	Analyse the history of Anatomy in Ancient period related to Unani system of medicine.	5	Experiential - Learning1.1	AFT-REC	Does	C_L,DIS,PER,PrBL
Unit 2 طب یونانی میں طبع معش اور تحفظ معش کی تاریخ 1.2.1 طب یونانی میں تقطیع نعش کی تاریخ (History of dissection in Unani system of medicine) 1.2.2 طب یونانی میں تحفظ نعش کی تاریخ (History of preservation of cadaver in Unani system of medicine) References: 38,39,40,41						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,C0 6	Evaluate the history of dissection and preservation of cadaver according to Unani system of medicine.	2	Lecture	CE	Knows-how	L&GD,L&PPT
CO 2,C0 6	Illustrate the history of dissection and preservation of cadaver according to Unani system of medicine.	4	Practical1.2	PSY-MEC	Shows-how	C_L,DIS,PER,PrBL
CO 1,CO 2,C0 6	Explore the history of dissection and preservation of cadaver in Unani system of medicine	7	Experiential - Learning1.2	AFT-RES	Does	DIS,SDL
Unit 3 تشریح البدن میں یونانی، رومی، عربی، فارسی و ہندستانی اطباء کی خدمات 1.3.1 تشریح البدن میں یونانی اطباء کی خدمات (Anatomical Contributions of Greek scholars of Unani system of medicine) 1.3.2 تشریح البدن میں رومی اطباء کی خدمات (Anatomical Contributions of Roman scholars of Unani system of medicine) 1.3.3 تشریح البدن میں عربی اطباء کی خدمات (Anatomical Contributions of Arab scholars of Unani system of medicine) 1.3.4 تشریح البدن میں فارسی اطباء کی خدمات (Anatomical Contributions of Persian scholars of Unani system of medicine) 1.3.5 تشریح البدن میں ہندستانی اطباء کی خدمات (Anatomical Contributions of Indian scholars of Unani system of medicine) References: 1,2,3,4,5,38,39,40						

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 6,CO 7	Assess the anatomical contributions of Greek, Roman, Arab, Persian and Indian scholars of Unani system of medicine.	2	Lecture	CE	Knows-how	L&GD,L&PPT
CO 2,CO 6	Illustrate and demonstrate the anatomical contributions of Greek, Roman, Arab, Persian and Indian scholars of Unani system of medicine.	6	Practical1.3	PSY-GUD	Shows-how	DIS,PER,PrBL
CO 2,CO 6	Analyze the anatomical Contributions of Greek, Roman, Arab, Persian and Indian scholars of Unani system of medicine.	6	Experiential - Learning1.3	AFT-SET	Does	DIS,PER

Unit 4 جسم انسان کی تشکیل میں عناصر اربعہ و اخلاط اربعہ کا کردار و اہمیت اور انکا اطلاقی پہلو (Role and importance of Anasir-e-Arba'a and Akhlat Arba'a in the formation of Human body and its applied aspects)

1.4.1 جسم انسان کی تشکیل میں عناصر اربعہ کا کردار و اہمیت اور انکا اطلاقی پہلو (Role and importance of Anasir-e-Arba'a in the formation of Human body and its applied aspects)

1.4.2 جسم انسان کی تشکیل میں اخلاط اربعہ کا کردار و اہمیت اور انکا اطلاقی پہلو (Role and importance of Akhlat Arba'a in the formation of Human body and its applied aspects)

References: 5,7,9,13,14,27,30,35,36,37,42,43

3A	3B	3C	3D	3E	3F	3G
CO 2,CO 6,CO 7	Appraise the role and importance of <i>Anasir-e-Arba'a</i> and <i>Akhlat-e-Arba'a</i> in the formations of Human body and its applied aspects.	3	Lecture	CE	Knows-how	L&GD,L&PPT
CO 2,CO 6,CO 7	Illustrate and demonstrate the role and importance of <i>Anasir-e-Arba'a</i> and <i>Akhlat Arba'a</i> in the formation of Human body and its applied aspects.	6	Practical1.4	PSY-MEC	Shows-how	D,DIS,JC,PER
CO 2,CO 6,CO 7	Evaluate the role and importance of <i>Anasir-e-Arba'a</i> and <i>Akhlat Arba'a</i> in the formation of Human body and its applied aspects.	8	Experiential - Learning1.4	AFT-VAL	Does	DIS,JC,PER,SDL

Practical Training Activity

Practical 1.1 : History of Anatomy in Ancient period

Total Learning Hours: 4 Hours

Teacher's Demonstration and Discussion (45 Minutes):

- The teacher will explain the history of anatomy during the ancient period, specifically in relation to the Unani system of medicine.
- The method of conducting practical activities will be discussed.
- Topics will be assigned to the students.

Activity 2:Documentary/Reel Creation and Presentation (45 Minutes): Students will create and present a short documentary or reel using multimedia, focusing on the history of anatomy in the ancient period related to the Unani system of medicine.

Activity 3:Anatomical Drawings (45 Minutes): Students will create drawings that emphasize the ancient understanding of anatomy.

Activity 4:Analysis of the Edwin Smith Papyrus (30 Minutes): Students will analyze the Edwin Smith Papyrus to gain insights into ancient anatomical knowledge.

Activity 5:Group Discussion (45 Minutes): Students will participate in discussions about anatomical discoveries and contributions by ancient scholars, using information from classical Unani texts and literature.

Activity 6:Reporting and Summary (30 Minutes):

- Students will present their findings and outcomes from the practical activities.
- The teacher will provide feedback and summarize the key learnings for the students.

Practical 1.2 : Dissection and preservation of Cadaver

Total Learning Hours: 4 Hours

Activity 1:Teacher's Demonstration and Discussion (30 minutes):

- The teacher will explain the history of dissection and cadaver preservation in the Unani system of medicine.
- Methods for practical activities will be discussed, and topics will be assigned to students.

Activity 2:Chemical Preparation (45 minutes): Students will prepare preservative chemicals based on classical Unani texts and literature.

Activity 3:Timeline Creation (45 minutes): Students will create a timeline highlighting major milestones and discoveries in the history of dissection and preservation of cadavers in the Unani system of medicine.

Activity 4:Project Making (45 minutes): Students will design projects showcasing traditional preservation techniques, dissection methods, and their historical significance.

Activity 5:Group Discussion (45 minutes): Students will participate in group discussions focusing on traditional preservation techniques, dissection methods, and their history.

Activity 6:Reporting and Summary (30 minutes):

- Students will present the outcomes of their practical activities to the teacher.
- The teacher will provide feedback and summarize key points for the students.

Practical 1.3 : Anatomical contributions of Greek, Roman, Arab, Persian and Indian scholars

Total Learning Hours: 6 Hours

Activity 1:Teacher's Demonstration and Guidance (1 hour):

- The teacher will explain the anatomical contributions of Greek, Roman, Arab, Persian, and Indian scholars in the Unani system of medicine.
- The method for conducting practical activities will be discussed.
- Topics will be assigned to students.

Activity 2:Exploration (1.5 hours): Students will explore the anatomical contributions of these scholars through classical Unani texts and online databases.

Activity 3:Group Discussion (1 hour): Students will engage in group discussions on anatomical discoveries and descriptions made by these scholars.

Activity 4:Timeline Creation/Virtual Reality Exploration (1 hour): Students will either create a timeline showcasing anatomical discoveries or explore them using virtual reality tools.

Activity 5:Documentary/Reel Creation and Presentation (1 hour): Students will create a short documentary or reel using multimedia to highlight the anatomical discoveries and descriptions of these scholars, followed by a presentation.

Activity 6:Review and Summary (0.5 hours):

- Students will present their findings from the practical activities.
- The teacher will provide feedback and summarize key points for the students.

Practical 1.4 : *Anasir-e-Arba'a* and *Akhlat Arba'a*

Total Learning Hours: 6 Hours

Activity 1:Teacher's Demonstration (1 hour):

- The teacher will explain the role and importance of *Anasir-e-Arba'a* (earth, air, fire, water) and *Akhlat Arba'a* in the formation of the human body and its applied aspects.
- The teacher will also discuss the method for practical activities and assign topics to students.

Activity 2:Comparative Analysis (1.5 hours): Students will analyze the compositions of different body parts based on *Anasir-e-Arba'a* and *Akhlat Arba'a*, comparing them with modern scientific concepts of body fluids and elements.

Activity 3:Identification and Analysis (1 hour): Students will identify and analyze different body parts based on the composition of *Anasir-e-Arba'a* and *Akhlat Arba'a*.

Activity 4:Critical Review (1 hour): Students will critically analyze research papers related to the role of *Anasir-e-Arba'a* and *Akhlat Arba'a* in human body formation.

Activity 5:Group Discussion/Project (1 hour): Students will participate in group discussions or create projects on the role of *Anasir-e-Arba'a* and *Akhlat Arba'a* in body formation and their applied aspects.

Activity 6: Reporting and Summary (30 Minutes):

- Students will present their findings from the practical activities.
- The teacher will summarize and provide feedback on the practical activities.

Experiential learning Activity

Experiential-Learning 1.1 : History of Anatomy in Ancient period

Total Learning Hours: 5 Hours

Activity 1:Teacher's Demonstration and Discussion (1 hour):

- The teacher will explain the history of anatomy in the ancient period as it relates to the Unani system of medicine.
- Teaching and learning methods will be discussed, and topics will be assigned to students.

Activity 2:Exploration (1 hour): Students will explore the history of anatomy in the ancient period of the Unani system of medicine using classical Unani texts, online databases, or virtual reality platforms.

Activity 3:Creative Outputs (1 hour): Students will create maps, models, posters, or portraits related to the history of anatomy in the ancient period.

Activity 4:Timeline Creation (45 minutes): Students will develop a timeline highlighting major anatomical discoveries and contributions by ancient scholars in the context of the Unani system of medicine.

Activity 5:Presentation/Exhibition (45 minutes): Students will organize a presentation or exhibition showcasing the history of anatomy in the ancient period, including visual materials such as images, diagrams, and artifacts.

Activity 6:Reporting and Summary (30 minutes):

- Students will present their experiential learning activities to the teacher.
- The teacher will provide feedback and summarize the activities for the class.

Experiential-Learning 1.2 : Preservation of Cadaver

Total Learning Hours: 7 Hours

Activity 1:Teacher's Demonstration and Guidance (1 hour):

- The teacher will explain the anatomical contributions of Greek, Roman, Arab, Persian, and Indian scholars in the Unani system of medicine.
- The method for conducting practical activities will be discussed.
- Topics will be assigned to students.

Activity 2:Exploration (2.5 hours): Students will explore the anatomical contributions of these scholars through classical Unani texts and online databases.

Activity 3:Group Discussion (1 hour): Students will engage in group discussions on anatomical discoveries and descriptions made by these scholars.

Activity 4:Timeline Creation/Virtual Reality Exploration (1 hour): Students will either create a timeline showcasing anatomical discoveries or explore them using virtual reality tools.

Activity 5:Documentary/Reel Creation and Presentation (1 hour): Students will create a short documentary or reel using multimedia to highlight the anatomical discoveries and descriptions of these scholars, followed by a presentation.

Activity 6:Review and Summary (0.5 hours):

- Students will present their findings from the practical activities.
- The teacher will provide feedback and summarize key points for the students.

Experiential-Learning 1.3 : Anatomical Contributions of Greek, Roman, Arab, Persian and Indian scholars

Total Learning Hours: 6 Hours

Activity 1:Teacher's Demonstration (1 hour):

- The teacher will explain the anatomical contributions of Greek, Roman, Arab, Persian, and Indian scholars in the Unani system of medicine.
- The experiential learning activity method will be discussed.
- Topics will be assigned to students.

Activity 2:Project Making (1 hour): Students will create projects on anatomical discoveries and descriptions made by Greek, Roman, Arab, Persian, and Indian scholars.

Activity 3:Presentation (1 hour): Students will present on the anatomical contributions of these scholars in the Unani system of medicine.

Activity 4:Drawings/Models (1 hour): Students will produce drawings or illustrations showcasing anatomical discoveries or build a model of the human skeleton based on Greek anatomical knowledge.

Activity 5:Research Paper (1.5 hours): Students will write a research paper detailing the anatomical contributions of Greek, Roman, Arab, Persian, and Indian scholars in the Unani system of medicine.

Activity 6:Review and Reflection (0.5 hours):

- Students will share the outcomes of their experiential learning activities with the teacher.
- The teacher will discuss and summarize the activities with the students.

Experiential-Learning 1.4 : Importance of *Anasir-e-Arba'a* and *Akhlat Arba'a*

Total Learning Hours: 8 Hours

Activity 1:Demonstration by the Teacher (1 hour):

- The teacher will explain the role and significance of *Anasir-e-Arba'a* (earth, air, fire, water) and *Akhlat Arba'a* (four humors) in human body formation and their applied aspects.
- Teaching methods will be discussed.
- Topics will be assigned to students.

Activity 2: Presentation (1 hour): Students will prepare and present on the role and importance of *Anasir-e-Arba'a* and *Akhlat Arba'a*, using 3D/4D models or multimedia tools.

Activity 3: Model/Drawing Creation (1.5 hours): Students will create models or diagrams illustrating *Anasir-e-Arba'a* and *Akhlat Arba'a*, showcasing their relationships and applied aspects.

Activity 4: Comparative Analysis (1 hour): Students will compare the concept of *Anasir-e-Arba'a* with modern scientific theories about the elements.

Activity 5: Organ Analysis (1.5 hours): Students will analyze the role of *Akhlat-e Arba'a* in organ formation and dominance, comparing it with modern scientific concepts.

Activity 6: Research Paper (1.5 hours): Students will write a research paper on *Anasir-e-Arba'a* and *Akhlat Arba'a*, highlighting their significance in body formation and applied aspects.

Activity 7: Review and Reflection (0.5 hours):

- Students will present their learning outcomes to the teacher.
- The teacher will provide feedback and summarize key points

Modular Assessment	
Assessment method	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks for this module. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C Total Marks for this module: 50 1. Short Answer Questions (SAQs) (10 Marks) (2 questions carrying 5 marks each from Unit 3 and Unit 4) 2. Viva Voce (10 Marks) 3. Practical Performance (20 Marks) practical performance will be conducted from all units of this module.	4

4. Compilation or Poster Making or Presentation (10 Marks) Or Any practical in converted form can be taken for assessment. (25 marks) and Any of the experiential as Portfolio/ Refelections / Presentations can be taken as assessment. (25 marks)	

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical/experiential) learning session, the students should be able to)	3C Notional Learning Hours	3D Lecture/ Practical/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/ Shows how/ Knows how/ Know)	3G Teaching Learning Methods
Module 2 : وجہ تسمیہ : (Unani Terminology and their Etymology related to human Anatomy)						
Module Learning Objectives (At the end of the module, the students should be able to)						
1 Describe the Unani Terminology and their Etymology related to human anatomy. 2 Conduct group discussion on understanding of Unani Tibbi Istelahat related to human anatomy. 3 Interpret and analyse Unani Terminology and their Etymology related to human anatomy.						
Unit 1 تشریح ظاہری سے متعلق یونانی اصطلاحات اور ان کی وجہ تسمیہ 2.1.1 (Unani terminology and its etymology related to gross anatomy) تشریح ظاہری سے متعلق یونانی اصطلاحات اور ان کی وجہ تسمیہ References: 4,5,15,16,17,44,45,46						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,C0 6,C0 7	Explore the Unani Terminology and its etymology related to gross human anatomy.	2	Lecture	CAN	Knows-how	L&GD,L&PPT
CO 2,C0 6,C0 7	Demonstrate and interpret the Unani Terminology and its etymology related to gross human anatomy.	6	Practical2.1	PSY-GUD	Shows-how	DIS,SDL
CO 2,CO 4,C0 6,C0 7	Interpret and analyze the Unani Terminology and its etymology related to gross human anatomy.	7	Experiential - Learning2.1	AFT-RES	Does	C_L,DIS,SDL
Unit 2 بدن انسان کی خوردبینی ساختوں سے متعلق یونانی اصطلاحات اور ان کی وجہ تسمیہ						

2.2.1 بدن انسان کی خوردبینی ساختوں سے متعلق یونانی اصطلاحات اور اُنی وجہ تسمیہ (Unani terminology and its etymology related to microscopic structures of human body)

References: 5,15,16,17,44,45,46

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 4	Evaluate the Unani terminology of microscopic structures and their etymology.	3	Lecture	CE	Knows-how	L&GD,L&PPT
CO 2,CO 4,C0 6	Demonstrate and interpret the Unani terminology of microscopic structures of the human body and their etymology.	4	Practical2.2	PSY-GUD	Shows-how	D,DIS,SD L
CO 2,CO 4,C0 6,C0 7	Interpret and analyze the Unani terminology of microscopic structures of the human bodies and their etymology.	6	Experiential - Learning2.2	AFT-SET	Does	D,DIS,PL, PER

Practical Training Activity

Practical 2.1 : Unani Terminology of gross anatomy.

Total Learning Hours: 6 Hours

Activity 1: Teacher's Demonstration and Discussion (1 Hour):

- The teacher will demonstrate the Unani terminology of macroscopic structures of the human body and their etymology to the students.
- Methods for practical activities will be discussed, and topics will be assigned to students.

Activity 2:Timeline Creation (1 Hour): Create a timeline illustrating the evolution of Unani Terminology highlighting key milestones and influences related to macroscopic structures of the human body their etymology.

Activity 3:Root Word Analysis (1.5 Hour): Assign students a set of Unani terminology of macroscopic structures of the human body and ask them to identify the root words, prefixes, and suffixes.

Activity 4:Creating the etymology Map (1 Hour) : Students will illustrate the etymology of the Unani terminology of macroscopic structures of the human body.

Activity 5:Presentation (1 Hour): Students will organize a presentation on the etymology of the Unani medical terms of macroscopic structures of the human body.

Activity 6 :Reporting and Summary (30 Minutes):

- Students will present their findings from the practical activities.
- The teacher will summarize and provide feedback on the practical activities.

Practical 2.2 : Unani terminology of microscopic structures

Total Learning Hours: 4 Hours

Activity 1:Teacher's Demonstration (1 hour):

- The teacher will demonstrate the Unani terminology of microscopic structures of the human body and their etymology to the students
- Teacher will also discuss method of practical activity. The teacher will assign the topic(s) to the students.

Activity 2:Creating timeline (1 hour): Students will create timeline that illustrate the evolution of Unani Terminology highlighting key milestones and influences related to anatomy of the human body and their etymology.

Activity 3:Creating etymology Map (45 Minutes): Students will create etymology map that shows the etymology of the Unani terminology of microscopic structures of the human body.

Activity 4:Group discussion (45 Minutes): Students will participate in group discussions related to the etymology of the Unani medical terms of microscopic structures of the human body.

Activity 5:Reporting and Summary (0.5 hours):

- Students will present their findings from the practical activities.
- The teacher will summarize and provide feedback on the practical activities.

Experiential learning Activity

Experiential-Learning 2.1 : Unani Terminology and its Etymology

Total Learning Hours: 7 Hours

Activity 1:Teacher's Demonstration and Discussion (1 hour):

- The teacher will demonstrate the Unani Terminology and its etymology related to gross human (macroscopic structure) anatomy to the students.

- Teaching and learning methods will be discussed, and topics will be assigned to students.

Activity 2:Infographics Designing (1.5 Hour): Students will Designing the infographics visualizing the etymology and relationships between Unani medical terms of gross human anatomy.

Activity 3:Composing of Dictionary (1 hour): Students will Compose anatomical medical dictionary related to any one system of the body incorporating terms definition, phonetics, etymology, illustration(if required),reference.

Activity 4:Timeline Creation (1 hour): Students will Create a timeline illustrating the evolution of Unani Terminology highlighting key milestones and influences related to gross human anatomy.

Activity 5:Presentation (1 hour): Students will organize a presentation on the etymology of Unani medical terms or concept.

Activity 6:Etymology Map Creation (1 hour): Students will Create the etymology Map illustrating the etymology of the Unani Terminology related to gross human anatomy.

Activity 7:Reporting and Summary (30 minutes):

- Students will present their experiential learning activities to the teacher.
- The teacher will provide feedback and summarize the activities for the class.

Experiential-Learning 2.2 : Unani terminology of microscopic structures

Total Learning Hours: 6 Hours

Activity 1: Teacher's Demonstration and Discussion (1 hour):

- The teacher will demonstrate the Unani Terminology and its etymology related to gross human anatomy to the students.
- Teaching and learning methods will be discussed, and topics will be assigned to students.

Activity 2: Infographics Designing (1 hour): Students will Design the infographics that visualizing the etymology and relationships between Unani medical terms of gross human anatomy.

Activity3:Dictionary composition (1.5 hour): Students Will compose anatomical medical dictionary related to any one system of the body incorporating terms definition, phonetics, etymology, illustration(if required),reference.

Activity 4:Presentation (1 hour): Students will organize a presentation on the etymology of a specific Unani medical terms or concept.

Activity 5:Root Word Analysis (1 hour): Assign students a set of Unani terminology of microscopic structures of the human body and ask them to identify the root words, prefixes, and suffixes. (60 Minutes)

Activity 6: Reporting and Summary (30 minutes):

- Students will present their experiential learning activities to the teacher.
- The teacher will provide feedback and summarize the activities for the class.

Modular Assessment

Assessment method

Hour

Instructions - Conduct a structured Modular assessment. Assessment will be for 25 marks for this module. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C

Total Marks for this module: 25

1. Viva Voce (10 Marks)

2. Compilation of Dictionary of Unani Terminology related to human anatomy or Poster Making or Chart Making (15 Marks)

Compilation of Dictionary of Unani Terminology related to human anatomy will be done from all systems of human body relates to macroscopic or microscopic structure. Unani terminology related to one system will be given to each students.

Or
Any practical in converted form can be taken for assessment. (25 marks)
Or
Any of the experiential as portfolio/ refelections / presentations can be taken as assessment. (25 marks)

2

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical/experiential) learning session, the students should be able to)	3C Notional Learning Hours	3D Lecture/ Practical/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/ Shows how/ Knows how/ Know)	3G Teaching Learning Methods
Module 3 : کلب یونانی کے مطابق تخلیق اعضا و تخلیق جنین کا نظریہ (Concepts of formation of organs and embryogenesis according to Unani system of medicine)						
Module Learning Objectives (At the end of the module, the students should be able to)						
1. Assess Unani concept of organ formation, their composition, classification and the concept of Takhleeq-e Janeen according Unani system of medicine. 2. Analyse composition of organs according to Anasir-e Arba'a. 3. Compare Unani concepts of Takhleeq-e Janeen with Modern human embryology.						
Unit 1 عناصر اربعہ کے لحاظ سے اعضاء کی ترکیب اور ان کا اطلاقی پہلو Composition of organs according to Anasir-e-Arba'a and its applied aspects.						
3.1.1 اعضاء کی تعبیر میں عناصر اربعہ اور مزاج کی اہمیت (Role of Anasir Arba & Temperament in composition of organs.) 3.1.2 عناصر اربعہ کے حوالے سے پیریڈک ٹیبل (Anasir Arba in the light of Periodic Table)						
References: 1,2,5,13						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 6	Explore the composition of organs according to Anasir-e-Arba and Temperament.	3	Lecture	CAN	Knows-how	L&GD,L_V C
CO 1,CO 2,CO 6	Compare compositions of organs according to Anasir-e-Arba and Modern biochemistry .	5	Practical3.1	PSY-GUD	Shows-how	D,DIS
CO 1,CO 2,CO 6	Appraise Concept of Anasir-e-Arba with respect to present scenario with creation of authentic questionnaire for assessing temperament of organs.	7	Experiential - Learning3.1	AFT-SET	Does	D,DIS,LS

Unit 2 طب یونانی کے حوالے سے اعضاء کی تعریف و صمیم Classification of organs according to Unani System of Medicine)

3.2.1 طب یونانی میں اعضاء مفردہ و اعضاء مرکبہ کی تعریف (Definition of simple and compound organ in Unani Medicine)

3.2.2 (Concepts of organs in Unani Medicine.) طب یونانی میں اعضاء کا نظریہ

3.2.3 (Concepts of organs in contemporary Medicine) طب دور حاضر میں اعضاء کا نظریہ

References: 1,2,4,5,7

3A	3B	3C	3D	3E	3F	3G
CO 1, CO 2, CO 6, CO 7	Discuss specific Unani definitions and classification of simple and compound organs	2	Lecture	CC	Knows-how	FC, L, L&G D, L&PPT, L_VC
CO 1, CO 2, CO 6	Analyze the Definition and Classification of organs according to Unani Medicine.	5	Practical 3.2	PSY-MEC	Shows-how	D, DIS, SD L, TPW, X-Ray
CO 1, CO 2, CO 6, CO 7	Compare and interpret Unani concepts of simple and compound organs with contemporary medicine.	6	Experiential - Learning 3.2	AFT-RES	Does	D, DIS, IBL, JC, KL, LS, ML, PER, SDL

Unit 3 طب یونانی کے حوالے سے نظریہ تخلیق جنین (Concepts of Takhleeq-e Janeen in Unani system of Medicine.)

3.3.1 (Unani Concepts of Takhleeq Janeen) طب یونانی میں نظریہ تخلیق جنین

References: 2,5,6,7,10

3A	3B	3C	3D	3E	3F	3G
CO 1, CO 2, CO 6	Appraise the Unani Concept of <i>Takhleeq-e Janeen</i> (Embryogenesis).	2	Lecture	CE	Knows-how	DIS, L&PPT, L_VC
CO 2, CO 4, CO 7	Illustrate and demonstrate the Unani Concept of <i>Takhleeq-e Janeen</i> (Embryogenesis).	5	Practical 3.3	PSY-MEC	Shows-how	DIS, PER
CO 2, CO 6, CO 7	Analyse the Unani Concept of <i>Takhleeq-e Janeen</i> (Embryogenesis).	6	Experiential -	AFT-SET	Does	C_L, D, DIS, PAL

			Learning3.3			
Unit 4 (Comparison of Unani Concepts of Takhleeq-e Janeen with Modern human Embryology.) طب یونانی کے حوالے سے نظریہ تخلیق جتین کا جدید علم جنین کے ساتھ موازنہ (Concepts of Embryogenesis in Modern Medicine)						
3.4.1 جتین جنین (Concepts of Embryogenesis in Modern Medicine)						
References: 1,2,3,4,31,42,47,49						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,C06	Justify the concepts of Takhleeq-e Janeen (Embryogenesis) according to unani system of medicine	3	Lecture	CC	Knows-how	L,L_VC,Mnt,PER
CO 1,CO 2,C06	Illustrate and compare Unani Concepts of Takhleeq-e Janeen (Embryogenesis) with Modern Embryology.	5	Practical3.4	PSY-MEC	Shows-how	D,DIS,PAL
CO 1,CO 2,C06	Explore the comparative analysis of Unani Concepts of Takhleeq-e Janeen (Embryogenesis) with Modern Embryology.	7	Experiential - Learning3.4	AFT-SET	Does	D,DIS,JC,PER

Practical Training Activity
Practical 3.1 : Anasir-e-Arba and Modern biochemistry
Total Learning hours- 5 Hours Activity 1: Teacher Demonstration (2 hours) The teacher will demonstrate the composition of organs based on <i>Anasir-e-Arba'a</i> and modern biochemistry. This includes showcasing techniques for assessing bioelements using 3D/4D models, artificial cadavers, or virtual reality tools, while explaining their applied aspects. Activity 2: Students' Assessment and Correlation (30 Minutes) Students will assess the major and minor bioelements within cells and correlate them with <i>Anasir-e-Arba'a</i> (earth, air, fire, water), deepening their understanding of organ composition. Activity 3: Students' Analysis and Categorization (30 Minutes)

Students will analyze the periodic table and categorize bioelements according to *Anasir-e-Arba'a*, linking classical Unani principles with modern scientific understanding.

Activity 4: Students' Creation (90 Minutes)

Students will create projects or diagrams illustrating the composition of organs based on *Anasir-e-Arba'a* and its applied aspects, showcasing their knowledge creatively.

Activity 5: Students' Presentation and Reflection (30 Minutes)

Students will present their comparative analysis of *Anasir-e-Arba'a* and modern scientific elements, reflecting on their practical activities. The teacher will provide a summary and constructive feedback to consolidate their learning.

Practical 3.2 : Definition and classification of Organ

Total Learning Hours: 5 Hours

Activity 1: Teacher Demonstration (1.5 hours)

The teacher will demonstrate the Unani concept of *Takhleeq-e Janeen* (Embryogenesis) and discuss the methodology of practical activities. Following the demonstration, the teacher will assign specific topics for students to explore and engage in practical activities related to *Takhleeq-e Janeen*.

Activity 2: Dissection & Demonstration (1 hour)

Students will observe a demonstration of the Unani concept of *Nutfah* (the initial drop of semen) to understand the initial stages and progression of *Takhleeq-e Janeen* (Embryogenesis). This will be carried out using methods such as dissection, e-dissection, virtual dissection, or 3D/4D embryological models. Virtual reality tools may also be used to explore the stages of *Takhleeq-e Janeen*.

Activity 3: Developmental Defects Demonstration (30 Minutes)

This session will focus on showcasing developmental defects associated with the Unani concept of *Takhleeq-e Janeen* as documented in classical Unani medical texts.

Activity 4: Poster Making (45 Minutes)

Students will create illustrations, posters, or models depicting the Unani concept of *Takhleeq-e Janeen* (Embryogenesis) to visually represent their understanding.

Activity 5: Group Discussion (45 Minutes)

A group discussion will be conducted to facilitate a deeper understanding of the Unani concept of *Takhleeq-e Janeen* (Embryogenesis) through collaborative engagement.

Activity 6: Feedback Session (30 Minutes)

Students will present their insights and findings from practical activities on assigned topics. The teacher will summarize the outcomes and provide constructive feedback to reinforce learning.

Practical 3.3 : Unani Concept of Takhleeq-e Janeen

Total Learning Hours: 5 Hours

Activity 1: Teacher Demonstration (1.5 hours)

The teacher will demonstrate the Unani concept of *Takhleeq-e Janeen* (Embryogenesis) and discuss the methodology of practical activities. Following the demonstration, the teacher will assign specific topics for students to explore and engage in practical activities related to *Takhleeq-e Janeen*.

Activity 2: Dissection Demonstration (1 hour)

Students will observe a demonstration of the Unani concept of *Nutfah* (the initial drop of semen) to understand the initial stages and progression of *Takhleeq-e Janeen* (Embryogenesis). This will be carried out using methods such as dissection, e-dissection, virtual dissection, or 3D/4D embryological models. Virtual reality tools may also be used to explore the stages of *Takhleeq-e Janeen*.

Activity 3: Developmental Defects Demonstration (30 Minutes)

This session will focus on showcasing developmental defects associated with the Unani concept of *Takhleeq-e Janeen* as documented in classical Unani medical texts.

Activity 4: Poster Making (45 Minutes)

Students will create illustrations, posters, or models depicting the Unani concept of *Takhleeq-e Janeen* (Embryogenesis) to visually represent their understanding.

Activity 5: Group Discussion (45 Minutes)

A group discussion will be conducted to facilitate a deeper understanding of the Unani concept of *Takhleeq-e Janeen* (Embryogenesis) through collaborative engagement.

Activity 6: Feedback Session (30 Minutes)

Students will present their insights and findings from practical activities on assigned topics. The teacher will summarize the outcomes and provide constructive feedback to reinforce learning.

Practical 3.4 : Takhleeq-e Janeen and Modern human Embryology**Total Learning Hours: 5 Hours****Activity 1: Teacher Demonstration (1.5 hours)**

The teacher will demonstrate a comparison of the Unani concept of *Takhleeq-e Janeen* (Embryogenesis) with modern human embryology and discuss the methodology for practical activities. Specific topics will then be assigned to students.

Activity 2: Hands-on Practice (0.5 hours)

Students will perform practical activities comparing the Unani concept of *Takhleeq-e Janeen* with modern embryology using methods like cadaveric dissection, e-dissection, virtual dissection, artificial cadavers, or 3D/4D models.

Activity 3: Image Analysis & Interpretation (0.5 hours)

Students will observe a demonstration of color Doppler ultrasonography to correlate Unani concepts of *Ilmul Janeen* with modern embryology.

Activity 4: Compare and Contrast (0.5 hours)

Students will explore the similarities and differences between the Unani concept of *Takhleeq-e Janeen* and modern embryology through a hands-on or virtual reality-based activity.

Activity 5: Analyze (0.5 hours)

This session will showcase developmental defects described in classical Unani texts and compare them with those reported in modern embryology.

Activity 6: Comparative Charting & Group Discussion (1 hour)

Students will create charts and diagrams comparing embryogenesis stages in classical Unani texts and modern embryology, followed by a group discussion to consolidate

findings.

Activity 7: Feedback Session (0.5 hours)

Students will present their findings from the practical activities, with the teacher summarizing key outcomes and providing feedback to strengthen learning.

Experiential learning Activity

Experiential-Learning 3.1 : Anasir-e-Arba'a and Temperament

Total Learning hours- 7 Hours

Activity 1: Teacher Demonstration (45 Minutes)

The teacher will demonstrate the composition of organs according to *Anasir-e-Arba'a* and its applied aspects. The session will include a discussion on the experiential learning method, and the teacher will assign specific topics to students for further exploration.

Activity 2: Reflective Journaling (75 Minutes)

Students will engage in experiential learning by creating reflective journals on their experiences with the composition of organs based on *Anasir-e-Arba'a* and its applied aspects. They will also provide commentary on Unani texts, explaining *Arkan Arba'* and the interpretations provided by Unani physicians in chronological order, using their own words.

Activity 3: Exploration (1 hour)

Students will conduct anatomical exploration of human organs based on their composition according to *Anasir-e-Arba'a* and its applied aspects. This exploration will culminate in the creation of a video explaining the concept of *Asbab-e-Wajood* (Cause of Being).

Activity 4: Compare and Contrast (1 hour)

Students will create sequential diagrams, flowcharts, or models of organs, referencing *Anasir-e-Arba'a* alongside biochemistry and its applied aspects, to highlight key similarities and differences.

Activity 5: Assessment and Analysis (1 hour)

Students will assess the basal metabolic rate (BMR) of healthy individuals to understand the role of *Mizaj* (temperament) in the composition of organs and their function.

Activity 6: Apply Knowledge (2 hours)

Students will design authentic questionnaires to assess the temperament of organs and explore the relationship between their composition and temperament. Following this, students will present their findings, and the teacher will summarize and discuss the experiential learning outcomes.

Experiential-Learning 3.2 : Concepts of simple and compound organs

Total Learning Hours: 6 Hours

Activity 1. Teacher Demonstration (80 Minutes)

The teacher will discuss the Definition of organs and demonstrate Classification of organs in unani system of medicine to the students and will discuss experiential learning method. The teacher will assign the topic(s) to the students.

Students experiential learning activity

Activity 2. Reflective journalling

Making Reflective journalling on their learning experience related the the Definition of organs and demonstrate the Classification of organs in unani system of medicine or commentary on Unani texts by nterpretating the basic Unani Concepts of simple and compound organs with present Anatomy in their own words. (70 minutes)

Activity 3. Creation

Create flow charts/Illustration and Listing of simple and compound organs through understanding of Unani and present concepts of organs. (60 minutes)

Activity 4. Compilation

Compilation of all Unani Concepts of organs and their inferences in chronological order and built a critical new authentic literature on Unani Concepts of Aza. (60 minutes)

Activity 5. Presentation

- Presentation on the Definition of organs and Classification of organs in unani system of medicine and exploration of the Simple and Compound organs in Unani system of medicine in the light of present anatomy of organs (60 minutes)
- Students will share the experiential learning activity of their assigned topic(s) to the teacher and teacher will discuss and summarise the experiential learning activity to

the students. (30 minutes)

Experiential-Learning 3.3 : Unani Concept of *Takhleeq-e Janeen*

Total Learning Hours: 6 Hours

Activity 1: Teacher Demonstration (30 Minutes)

The teacher will demonstrate the Unani concept of *Takhleeq-e Janeen* (Embryogenesis) and discuss the experiential learning method. Topics will be assigned to students for further exploration.

Activity 2: Reflective Journaling (1 hour)

Students will engage in experiential learning by creating reflective journals on their experiences with the Unani concept of *Takhleeq-e Janeen*. This includes commentary on Unani texts, explaining concepts and principles in their own words to deepen understanding.

Activity 3: Dissection & Demonstration (1 hour)

Students will observe a demonstration of the Unani concept of *Nutfah* (the initial drop of semen) to understand the beginning stages of *Takhleeq-e Janeen* (Embryogenesis) and its progression. This will be facilitated through dissection, e-dissection, virtual dissection, or similar methods.

Activity 4: Exploration (1 hour)

Students will explore the Unani concept of *Nutfah* and the stages of *Takhleeq-e Janeen* using virtual reality, 3D embryological anatomy software, or augmented reality tools for immersive learning.

Activity 5: Presentation (1 hour)

Students will present their findings on developmental defects associated with the Unani concept of *Takhleeq-e Janeen* as described in classical Unani medical texts.

Activity 6: Creation (45 Minutes)

Students will create sequential models illustrating the stages of embryogenesis based on the Unani concept of *Takhleeq-e Janeen*.

Activity 7: Discussion (45 Minutes)

Students will share their experiential learning outcomes on assigned topics with the teacher, who will then summarize and discuss the key insights with the class.

Experiential-Learning 3.4 : Takhleeq-e Janeen & Modern Human Embryology**Total Learning Hours: 7 Hours****Activity 1: Teacher's Instruction (30 minutes)**

The teacher will demonstrate a comparison between the Unani concept of *Takhleeq-e Janeen* (Embryogenesis) and modern human embryology. This will include an introduction to the experiential learning method, encouraging active engagement. The teacher will conclude by assigning specific topics to students for further exploration.

Activity 2: Reflective Journaling (1.5 hours)

Students will participate in an experiential learning activity, focusing on the comparison between the Unani concept of *Takhleeq-e Janeen* (Embryogenesis) and modern human embryology. They will document their reflections in a journal, detailing their insights, learning experiences, or commentary on Unani texts. This exercise will involve explaining core concepts and principles in their own words to deepen their understanding of the subject.

Activity 3: Compare and Create (1 hour)

Students will engage in a comparative study of *Takhleeq-e Janeen* and modern embryology. Based on their findings, they will create original literature or written work that synthesizes these concepts and reflects a comprehensive understanding.

Activity 4: Virtual Demonstration (1 hour)

Students will explore embryological anatomy by utilizing virtual reality tools to visualize the Unani concept of *Takhleeq-e Janeen* and modern embryology. This immersive activity aims to enhance their comprehension of these frameworks.

Activity 5: Analyze the Modalities (1 hour)

This activity will involve an in-depth analysis of developmental anomalies described in classical Unani medical texts. These will be compared and discussed alongside developmental defects documented in modern human embryology. The session will encourage critical thinking and analysis.

Activity 6: Presentation (1 hour)

Students will present their comparative analysis of the Unani concept of *Takhleeq-e Janeen* and modern human embryology. Their presentations will highlight similarities and

differences while incorporating diagrams, illustrations, and 3D/4D models to enhance understanding.

Activity 7: Q&A Session (1 hour)

Students will share their experiential learning outcomes on their assigned topics with the teacher and peers. This session will include a discussion and summary by the teacher, consolidating key insights and encouraging active participation.

Modular Assessment	
Assessment method	Hour
Formative Assessment 4 hours Conduct a structured Modular assessment. Assessment will be for 50 marks for this module. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C Total Marks for this module: 50 1.Viva Voce(Marks: 10) 2. Practical Performance /Objective Structured Practical Examination, Marks: 10 practical performance will be conducted from all units of this module. 3. Poster Making/Chart Making/Presentation , Marks: 20 4. Group Discussion Marks: 10 Or Any practical in converted form can be taken for assessment. (25 marks) and Any of the experiential as Portfolio/ Refelections / Presentations can be taken as assessment. (25 marks)	4

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical/experiential) learning session, the students should be able to)	3C Notional Learning Hours	3D Lecture/ Practical/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/ Shows how/ Knows how/ Know)	3G Teaching Learning Methods
Module 4 : طب یونانی کے مطابق اعضاء مفردہ کی تعریف ، صمیم مع اطلاقی پہلو : (Definition, classification, Anatomy of simple organs according to Unani system of medicine and its applied aspects)						
Module Learning Objectives (At the end of the module, the students should be able to)						
1. Describe the Anatomy of Simple organs according to Unani system of Medicine. 2. Conduct discussion on different types of simple organs of human body according to Unani system of Medicine. 3. Identify the simple organs of human body according to Unani system of Medicine.						
Unit 1 طب یونانی کے مطابق عظم کی تعریف ، صمیم اور ان کا اطلاقی پہلو 4.1.1 (Definition of bone according to Unani system of medicine) طب یونانی کے مطابق عظم کی تعریف 4.1.2 (Classification and Applied Aspects of Bone according to Unani System of Medicine) طب یونانی کے مطابق عظم کی تقسیم اور ان کا اطلاقی پہلو References: 2,4,5,7,11,13,15,30						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 6	Appraise the definition and classification of bone according to Unani system of medicine and its applied aspects.	3	Lecture	CAN	Knows-how	L,L&PPT ,L_VC
CO 2,CO 6	Demonstrate and explain the definition and classification of the Bone according to Unani system of medicine and its applied aspects.	5	Practical4.1	PSY-MEC	Shows-how	CBL,D,D-M,IBL,KL,SDL,SIM
CO 1,CO 2,CO 5,CO 6	Analyze the definition and classification of Bone according to Unani system of medicine and its applied aspects.	7	Experiential - Learning4.1	AFT-SET	Does	CBL,D-M,L&PPT

Unit 2 طب یونانی کے مطابق غضروف کی تعریف ، سیم اور ان کا اطلاقی پہلو 4.2.1 (Definition of cartilage according to Unani system of medicine) طب یونانی کے مطابق غضروف کی تعریف 4.2.2 (Classification and Applied Aspects of Cartilage in the Unani System of Medicine) طب یونانی کے مطابق غضروف کی تقسیم اور اس کا اطلاقی پہلو References: 2,4,5,7,13,17,20,30						
3A	3B	3C	3D	3E	3F	3G
CO 2,CO 6,CO 7	Evaluate the definition and classification of membranes according to Unani system of medicine and its applied aspects.	5	Practical4.2	PSY-GUD	Shows-how	CBL,D,D-M,IBL,SIM
CO 1,CO 2,CO 6	Analyse the definition and classification of membranes according to Unani system of medicine and its applied aspects	6	Experiential - Learning4.2	AFT-RES	Does	D,D-M,IBL,KL,PER,PrBL,SDL,SIM
CO 1,CO 2,CO 6	Evaluate and classify the membranes according to Unani system of medicine with its applied aspects.	2	Lecture	CE	Knows-how	L&PPT
Unit 3 طب یونانی کے مطابق حم کی تعریف ، سیم اور ان کا اطلاقی پہلو 4.3.1 (Definition of Muscles according to Unani System of Medicine) طب یونانی کے مطابق عضلات کی تعریف 4.3.2 (Classification and Applied Aspects of Muscles according to Unani System of Medicine) طب یونانی کے مطابق عضلات کی تقسیم اور ان کا اطلاقی پہلو References: 4,7,11,16,17,20,30						
3A	3B	3C	3D	3E	3F	3G
CO 2,CO 6,CO 7	Evaluate the definition and classification of muscles according to Unani system of medicine with its applied aspects.	5	Practical4.3	PSY-ADT	Shows-how	D-M,L&GD,L&PPT,SIM
CO 1,CO 2,CO 6,CO 7	Explain and analyse the definition and classification of muscles according to Unani system of medicine and its applied aspects.	7	Experiential - Learning4.3	AFT-SET	Does	CBL,D,D-M,DIS,PL

CO 1,CO 2,CO 6	Define and classify the muscles according to Unani system of medicine and its applied aspects.	3	Lecture	CC	Knows-how	FC,L,L&G D,L&PPT ,L_VC
Unit 4 طب یونانی کے مطابق اوتار اور رباط کی تعریف ، صمیم اور ان کا اطلاقی پہلو 4.4.1 (Definition of Tendon according to Unani System of Medicine) طب یونانی کے مطابق وتر کی تعریف 4.4.2 (Definition of Ligaments according to Unani System of Medicine) طب یونانی کے مطابق رباط کی تعریف 4.4.3 (Classification and Applied Aspects of Tendon according to Unani System of Medicine) طب یونانی کے مطابق وتر کی تقسیم اور اس کا اطلاقی پہلو 4.4.4 (Classification and Applied Aspects of Ligament according to Unani System of Medicine) طب یونانی کے مطابق رباط کی تقسیم اور اس کا اطلاقی پہلو References: 2,4,5,6,7,17,18,20,30						
3A	3B	3C	3D	3E	3F	3G
CO 2,CO 6	Explore the definition and classification of blood vessels according to Unani system of medicine and its applied aspects.	5	Practical4.4	AFT-RES	Shows-how	D-M,L&GD, PL
CO 2,CO 6,CO 7	Analyse the definition and classification of blood vessels according to Unani system of medicine and its applied aspects	6	Experiential - Learning4.4	AFT-SET	Does	CBL,D-M,DIS,Pr BL
CO 2,CO 6,CO 7	Assess and classify the blood vessels according to Unani system of medicine and its applied aspects.	3	Lecture	CE	Knows-how	DIS,L,L&PPT
Unit 5 طب یونانی کے مطابق اغشیہ کی تعریف ، صمیم اور ان کا اطلاقی پہلو 4.5.1 (Definition of Membranes according to Unani System of Medicine) طب یونانی کے مطابق غشاء کی تعریف 4.5.2 (Classification and Applied Aspects of Membranes according to Unani System of Medicine) طب یونانی کے مطابق غشاء کی تقسیم اور اس کا اطلاقی پہلو References: 2,4,5,7,17,20,32						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 6	Demonstrate the definition and classification of cartilage according to Unani system of	5	Practical4.5	AFT-REC	Shows-	CBL,D,D-

6,C0 7	medicine and its applied aspects.				how	M,L&PPT
CO 1,CO 2,C0 6,C0 7	Explore the definition and classification of cartilage according to Unani system of medicine and its applied aspects.	6	Experiential - Learning4.5	AFT-SET	Does	CBL,D-M,DIS,PE R,X-Ray
CO 1,CO 2,C0 6,C0 7	Explore and classify the cartilage according to Unani system of medicine and its applied aspects.	2	Lecture	CAN	Knows-how	L&GD,L& PPT

Unit 6 طب یونانی کے مطابق عَم اور اعصاب کی تعریف، نسیم اور ان کا اطلاقی پہلو

4.6.1 طب یونانی کے مطابق شحم کی تعریف (Definition of Fat according to Unani System of Medicine)

4.6.2 طب یونانی کے مطابق عصب کی تعریف (Definition of Nerve according to Unani System of Medicine)

4.6.3 طب یونانی کے مطابق شحم کی تقسیم اور اس کا اطلاقی پہلو (Classification and Applied Aspects of Fat according to Unani System of Medicine)

4.6.4 طب یونانی کے مطابق عصب کی تقسیم اور اس کا اطلاقی پہلو (Classification and Applied Aspects of Nerve according to Unani System of Medicine)

References:

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,C0 6,C0 7	Analyse the definition and classification of Tendon and Ligament according to Unani system of medicine and its applied aspects	7	Experiential - Learning4.6	AFT-SET	Does	CBL,D-M,DIS,PE R,PrBL
CO 1,CO 2,C0 6,C0 7	Demonstrate the definition and classification of Tendon and Ligament according to Unani system of medicine and its applied aspects	5	Practical4.6	AFT-SET	Shows-how	D-M,L&GD, L&PPT
CO 2,C0 6,C0 7	Evaluate and classify the Tendon and Ligament according to Unani system of medicine and its applied aspects.	2	Lecture	CE	Knows-how	FC,L&GD, L&PPT

Unit 7 طب یونانی کے مطابق عروق دمویہ کی تعریف، نسیم اور ان کا اطلاقی پہلو

4.7.1 طب یونانی کے مطابق عروق دمویہ کی تعریف (Definition of Blood Vessels according to Unani System of Medicine)

4.7.2 طب یونانی کے مطابق عروق دموہ کی تقسیم اور ان کا اطلاقی پہلو (Classification and Applied Aspects of Blood Vessels according to Unani System of Medicine)						
References: 2,4,5,7,20,30						

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 6,CO 7	Analyse the definition and classification of fats and nerves according to Unani system of medicine and its applied aspects.	7	Experiential - Learning4.7	AFT-SET	Does	CBL,D-M,DIS,PE R,SIM
CO 2,CO 6,CO 7	Assess and classify the fats and nerves according to Unani system of medicine and its applied aspects.	3	Lecture	CE	Knows-how	L&GD,L&PPT
CO 1,CO 2,CO 6,CO 7	Evaluate the definition and classification of fats and nerves according to Unani system of medicine and its applied aspects.	5	Practical4.7	AFT-SET	Does	CBL,D-M,L&PPT ,SIM

Unit 8 طب یونانی کے مطابق مخ، ظفر اور شعر کی تعریف، تقسیم اور ان کا اطلاقی پہلو

4.8.1 طب یونانی کے مطابق مخ کی تعریف (Definition of Bone marrow according to Unani System of Medicine)

4.8.2 طب یونانی کے مطابق ظفر کی تعریف (Definition of Nail according to Unani System of Medicine)

4.8.3 طب یونانی کے مطابق شعر کی تعریف (Definition of Hair according to Unani System of Medicine)

4.8.4 طب یونانی کے مطابق مخ کی تقسیم اور اس کا اطلاقی پہلو (Classification and Applied Aspects of Bone marrow according to Unani System of Medicine)

4.8.5 طب یونانی کے مطابق ظفر کی تقسیم اور اس کا اطلاقی پہلو (Classification and Applied Aspects of Nail according to Unani System of Medicine)

4.8.6 طب یونانی کے مطابق شعر کی تقسیم اور اس کا اطلاقی پہلو (Classification and Applied Aspects of Hair according to Unani System of Medicine)

References: 1,2,3,5,7

3A	3B	3C	3D	3E	3F	3G
CO 2,CO 6,CO 7	Examine and classify the Bone marrow, nails and hair according to Unani system of medicine and its applied aspects	2	Lecture	CAN	Knows-how	L&GD,L&PPT
CO 1,CO 2,CO 6,CO 7	Investigate the definition and classification of Bone marrow, nails and hair according to Unani system of medicine and its applied aspects.	5	Practical4.8	PSY-GUD	Shows-how	CBL,D-M,L&PPT

						,SIM
CO 1,CO 2,CO 6,CO 7	Analyse the definition and classification of Bone marrow, nails and hair according to Unani system of medicine and its applied aspects.	6	Experiential - Learning4.8	AFT-SET	Does	CBL,D-M,L&PPT ,SIM

Practical Training Activity

Practical 4.1 : Bone and its applied aspects.

Total Learning hours- 5 Hours

Activity 1: Teacher Demonstration (1 hour)

- The teacher will demonstrate the Definition and classification of Bone according to Unani system of medicine and its applied aspects to the students.
- Methods for practical activities will be discussed, and topics will be assigned to students.

Student Practical Activities:

Activity 2 :Demonstration (2 hour): Students will observe demonstration of the applied aspects of Bone according to Unani system of medicine through cadaveric dissection/e-dissection/virtual dissection using 3D/4D models/ real bones/artificial bones/artificial cadaver/Radiographs.

Activity 3 :Bones Identification and sorting (1.5 hour): Students will identify and categorize different bones as described in classical Unani texts and do comparative analysis of bones as mentioned in classical Unani texts with Modern medical texts, highlighting similarities and dissimilarities with real or artificial bones of the human.

Activity 4: Reporting and Summary (30 Minutes):

- Students will present their findings from the practical activities.
- The teacher will summarize and provide feedback on the practical activities.

Practical 4.2 : Membranes and its applied aspects.

Total Learning Hours: 5 Hours

Activity 1: Teacher's Demonstration and Discussion (45 Minutes):

- The teacher will demonstrate the Definition and classification of membranes according to Unani system of medicine and its applied aspects to the students.

- Teacher will discuss Method of practical activity.
- The teacher will assign the topic(s) of practical activity to the students.

Activity 2: Discussion (1 Hour): Students will discuss about definition and classification of membrane as mentioned in the classical Unani texts.

Activity 3: Demonstration (1 Hour): Demonstration of the applied aspects of Membrane according to Unani system of medicine through cadaveric dissection/e-dissection/virtual dissection/ Radiographs/ CT/MRI.

Activity 4: Comparative analysis (1 Hour): Students will Comparatively analyse the Membranes as mentioned in classical Unani texts with Modern medical texts, highlighting similarities and dissimilarities.

Activity 5: Case study (45 Minutes): Students will be divided in to 2-3 groups and they will present a case study about Membrane-Related Diseases/conditions as mentioned in classical unani medical text.

Activity 6: Reporting and Summary (30 Minutes):

- Students will present their findings from the practical activities.
- The teacher will summarize and provide feedback on the practical activities.

Practical 4.3 : Muscles and its applied aspects.

Total Learning Hours: 5 Hours

Activity 1: Teacher's Demonstration and Discussion (1 hour):

- The teacher will demonstrate the Definition and classification of muscles according to Unani system of medicine and its applied aspects to the students.
- Teacher will discuss Method of practical activity.
- The teacher will assign the topic(s) to the students.

Activity 2: Demonstration and Discussion(1 Hour): Demonstration and discussion on applied aspects of muscle according to Unani system of medicine through cadaveric dissection/e-dissection/virtual dissection.

Activity 3: Muscles Sorting (1.5 Hour): Students will sort Muscles from a set of muscles diagrams/ list and categorise the muscles as mentioned in classical unani texts.

Activity 4: Demonstration (1 Hour): Demonstration of the applied aspects of muscle according to Unani system of medicine using 3D/4D models /artificial cadaver/Radiographs.

Activity 5: Reporting and Summary (30 minutes):

- Students will present the outcomes of their practical activities to the teacher.
- The teacher will provide feedback and summarize key learnings for the students.

Practical 4.4 : Blood vessels and its applied aspects

Total Learning Hours: 5 Hours

Activity 1: Teacher's Demonstration and Discussion (1 Hour):

- The teacher will demonstrate the Definition and classification of blood vessels according to Unani system of medicine and its applied aspects to the students.
- Teacher will discuss Method of practical activity.
- The teacher will assign the topic(s) of practical activity to the students.

Activity 2: Demonstration (1.5 Hour): Demonstration of the different types of blood vessel according to Unani system of medicine through cadaveric dissection/e-dissection/virtual dissection.

Activity 3: Identification and sorting (1 Hour): Students will identifying and label different types of blood vessels, understanding their functions, and examining their structure with diagrams or models or real or artificial Blood vessels of the human body as described in classical Unani texts.

Activity 4: Discussion and Exploration (1 Hour): Students will participate in discussions and presentations about the definition and classification of blood vessels in the Unani system or explore these topics through virtual reality for enhanced understanding.

Activity 5: Reporting and Summary (30 Minutes):

- Students will present their findings from the practical activities.
- The teacher will summarize and provide feedback on the practical activities.

Practical 4.5 : Cartilage

Total Learning Hours: 5 Hours

Activity 1: Teacher's Demonstration and Discussion (1 Hour):

- The teacher will explain the definition and classification of cartilage according to the Unani system of medicine, focusing on its applied aspects.

- The method for practical activities will be discussed, and topics will be assigned to the students.

Activity 2: Dissection or Virtual Exploration (1.5 Hours): Students will analyze the applied aspects of cartilage through cadaveric dissection, e-dissection, or virtual dissection.

Activity 3: Sorting and Classification (1 Hour): Students will categorize cartilage diagrams and create a list based on descriptions in classical Unani texts.

Activity 4: Discussion and Demonstration (1 Hour): Students will engage in discussions and demonstrations on the definition and classification of cartilage, emphasizing its applied aspects in the Unani system of medicine.

Activity 5: Reporting and Summary (30 Minutes):

- Students will present their findings and practical activity outcomes to the teacher.
- The teacher will summarize the activities and provide feedback to the students.

Practical 4.6 : Tendon and Ligament

Total Learning Hours: 5 Hours

Activity 1. Teacher Demonstration (1 Hour)

- The teacher will explain the definition and classification of tendons and ligaments as per the Unani system of medicine and their applied aspects.
- The method for practical activities will be discussed, and topics will be assigned to students.

Student Practical Activities:

Activity 2: Dissection or Virtual Exploration (1.5 Hours): Students will observe the applied aspects of tendons and ligaments through cadaveric dissection, e-dissection, or virtual dissection.

Activity 3: Discussion and Demonstration (1 Hour): Students will engage in discussions and demonstrations on the definition and classification of tendons and ligaments, emphasizing their applied aspects.

Activity 4: Sorting and Classification (1 Hour): Students will sort tendons and ligaments and categorizing them based on classical Unani texts, or prepare a classification list following Unani principles.

Reporting and Summary (30 Minutes):

- Students will present the outcomes of their practical activities to the teacher.
- The teacher will provide feedback and summarize the key learnings for the class.

Practical 4.7 : Fats and Nerves

Total Learning Hours: 5 Hours

Activity 1. Teacher Demonstration (1 Hour)

- The teacher will explain the definition and classification of fats and nerves according to the Unani system of medicine and their applied aspects.
- The method for practical activities will be discussed, and topics will be assigned to students.

Student Practical Activities:

Activity 2: Dissection Demonstration or Virtual Exploration (1.5 hours): Students will analyse the applied aspects of fats and nerves through cadaveric dissection, e-dissection, or virtual dissection.

Activity 3: Sorting and Classification (1 Hour): Students will categorize diagrams of fats and nerves as per classical Unani texts or prepare a list for classification based on Unani principles

Activity 4: Discussion and Demonstration (1 hour): Students will engage in discussions and demonstrations about the definition and classification of fats and nerves, with a focus on applied aspects.

Activity 5: Reporting and Summary (30 Minutes):

- Students will present the outcomes of their practical activities to the teacher.
- The teacher will provide feedback and summarize the key learning for the class.

Practical 4.8 : Bone marrow, Nails and hair

Total Learning Hours: 5 Hours

Activity 1: Teacher's Discussion (1 Hour):

- The teacher will explain the definition and classification of bone marrow, nails, and hair in the Unani system of medicine and their applied aspects.

- The method for practical activities will be discussed, and topics will be assigned to students.

Student Practical Activities:

Activity 2: Demonstration or Exploration (1.5 hours): Students will observe a demonstration or explore the definition and classification of bone marrow, nails, and hair, along with their applied aspects, using virtual reality.

Activity 3: Sorting and Classification(1 Hour): Students will categorize diagrams of bone marrow, nails, and hair as per classical Unani texts or prepare a list for classification based on Unani principles.

Activity 4: 3D/4D Models and Radiographs(1 Hour): Students will examine bone marrow, nails, and hair using 3D/4D models, artificial cadavers, or radiographs for a better understanding of their applied aspects.

Activity 5: Reporting and Summary (30 minutes):

- Students will present the outcomes of their practical activities to the teacher.
- The teacher will provide feedback and summarize key learning for the students.

Experiential learning Activity

Experiential-Learning 4.1 : Bone and its applied aspects.

Total Learning Hours: 7 Hours

Activity 1:Teacher's Demonstration and Discussion (1 hour):

- The teacher will discuss the Definition and classification of Bone according to Unani system of medicine and its applied aspects to the students
- Teaching and learning methods will be discussed, and topics will be assigned to students.

Activity 2:Dissection or Virtual Exploration (1.5 Hours): Students will analyze the applied aspects of bone through cadaveric dissection, e-dissection, or virtual dissection.

Activity 3: 3D/4D Models and Radiographs (1 Hours): Students will examine bone using advanced tools such as 3D/4D models, artificial cadavers, or radiographs for better understanding of applied aspects.

Activity 4: Sorting and Comparative Analysis (1 Hours): Students will identify and classify the bone and create a list based on descriptions in classical Unani texts. They will also

do comparative analyses between classical Unani texts and modern medical texts, highlighting similarities and differences.

Activity5 :Discussion and Demonstration (1 Hour): Students will engage in discussions and demonstrations on the definition and classification of bone, emphasizing its applied aspects in the Unani system of medicine.

Activity 6:Case-Based Study (1 Hour): Students will conduct case studies on diseases or conditions related to bone, as described in classical Unani medical texts.

Activity 7:Reporting and Summary (30 minutes):

- Students will present their experiential learning activities to the teacher.
- The teacher will provide feedback and summarize the activities for the class.

Experiential-Learning 4.2 : Membranes

Total Learning Hours: 6 Hours

Activity 1: Teacher's Discussion and Guidance (1 Hour):

- The teacher will explain the definition and classification of membranes in the Unani system of medicine, emphasizing their applied aspects.
- The experiential learning method will be discussed, and topics will be assigned to students.

Activity 2: Sorting and Classification (1 Hour): Students will sort diagrams of membranes, categorizing them as mentioned in classical Unani texts, or prepare a classification list based on these texts.

Activity 3: Reflective Journaling or Commentary (1 Hour): Students will write reflective journals on their learning experiences or create commentaries on Unani texts, explaining the concepts and principles in their own words.

Activity 4: Discussion and Exploration (1 Hour): Students will participate in discussions and presentations on the definition and classification of membranes or explore the topic further using virtual reality for enhanced understanding.

Activity 5: Case Studies (1.5 Hour): Students will measure membranes for length, width, and thickness to understand their variations and relationships and they will conduct case studies on diseases or conditions related to membranes, as detailed in classical Unani medical texts.

Activity 6: Reporting and Summary (30 Minutes):

- Students will present the outcomes of their experiential learning activities to the teacher.

- The teacher will summarize the activities and provide constructive feedback to the class.

Experiential-Learning 4.3 : Muscles and its applied aspects.

Total Learning Hours: 7 Hours

Activity 1: Teacher's Demonstration and Discussion (1 Hour):

- The teacher will discuss the Definition and classification of muscles according to Unani system of medicine and its applied aspects to the students
- Teacher will discuss Method of practical activity.
- The teacher will assign the topic(s) of practical activity to the students

Activity 2: Muscle Sorting (1 Hour): Muscle Sorting from a set of Muscles diagrams and categorise the Muscles as mentioned in classical unani texts or Classification of Muscles from making a list of Muscles as mentioned classical Unani texts.

Activity 3: Reflective journalling (1 Hour): Making Reflective journalling on their learning experience related the Definition and classification of muscles according to Unani system of medicine and its applied aspects or commentary on Unani texts, explaining the concepts and principles in their own words related to the Definition and classification of muscles according to Unani system of medicine and its applied aspects.

Activity 4: Demonstration (1 Hours): Demonstration of definition and classification of Muscles according to Unani system of medicine and its applied aspects. or Exploration of Definition and classification of Muscles according to Unani system of medicine and its applied aspects through virtual reality.

Activity 5: Debate & Discussion (1 Hour): Students will be divided in 2- 3 groups. Students will arrange debate and discussion on definition and classification of muscles as described in classical Unani texts.

Activity 6: Case Study (1.5Hour): Students will be divided in to 3-4 groups and each group of students present a Case study related to muscular diseases/conditions as mentioned in classical unani medical text.

Activity 7: Reporting and Summary (30 Minutes):

- Students will present their findings from the Experiential activities.
- The teacher will summarize and provide feedback on the practical activities.

Experiential-Learning 4.4 : Blood Vessels

Total Learning Hours: 6 Hours

Activity 1: Teacher's Guidance (1 Hour):

- The teacher will explain the definition and classification of blood vessels according to the Unani system of medicine, emphasizing their applied aspects.
- The experiential learning method will be discussed, and topics will be assigned to students.

Student Experiential Learning Activities:

Activity 2: Identification and Comparative Analysis (1.5 Hours): Students will identify and label blood vessels using diagrams, models, or real/artificial samples, as described in classical Unani texts. They will also perform comparative analyses with modern medical texts to highlight similarities and differences.

Activity 3: Reflective Journaling or Commentary (1 Hour): Students will write reflective journals on their learning experiences or compose commentaries on Unani texts, explaining the concepts and principles in their own words.

Activity 4: Debates, Projects, or Assignments (1 Hour): Students will engage in debates, projects, or assignments focusing on the classification of blood vessels as described in classical Unani texts.

Activity 5: Case Study (1 Hour): Students will conduct case studies on blood vessel-related diseases or conditions as detailed in classical Unani medical texts.

Activity 6: Reporting and Summary (30 Minutes):

- Students will present their experiential learning activities and findings to the teacher.
- The teacher will summarize the activities and provide constructive feedback to the class.

Experiential-Learning 4.5 : Cartilage

Total learning Hours: 6 Hours

Activity 1: Teacher's Discussion (1 Hour):

- The teacher will explain the definition and classification of cartilage according to the Unani system of medicine, emphasizing its applied aspects.
- The experiential learning method will be discussed, and topics will be assigned to students.

Student Experiential Learning Activities:

Activity 2: Identification and Comparative Analysis (1.5 Hours): Students will identify and label cartilage using diagrams, models, or real/artificial samples of the human body. They will also perform a comparative analysis between descriptions in classical Unani texts and modern medical texts, highlighting similarities and differences.

Activity 3: 3D/4D Models and Radiographs (1 Hour): Students will examine cartilage using advanced tools such as 3D/4D models, artificial cadavers, or radiographs for better understanding of applied aspects.

Activity 4: Reflective Journaling or Commentary (1 Hour): Students will reflect on their learning experience or write a commentary on Unani texts, explaining the concepts and principles in their own words regarding the definition and classification of cartilage.

Activity 5: Case-Based Study (1 Hour): Students will conduct case studies on diseases or conditions related to cartilage, as described in classical Unani medical texts.

Activity 6: Reporting and Summary (30 Minutes):

- Students will present their experiential learning activities to the teacher.
- The teacher will summarize the activities and provide feedback on key learning.

Experiential-Learning 4.6 : Tendon and Ligament

Total Learning Hours: 7 Hours

Activity 1: Teacher Demonstration (1Hour)

- The teacher will explain the definition and classification of tendons and ligaments according to the Unani system of medicine, focusing on their applied aspects.
- The experiential learning method will be discussed, and topics will be assigned to students.

Student Experiential Learning Activities:

Activity 2: Identification and Comparative Analysis (1.5 Hours): Students will identify and label tendons and ligaments using models, or real/artificial samples. They will also conduct comparative analyses between classical Unani texts and modern medical texts, highlighting similarities and differences.

Activity 3: Reflective Journaling or Commentary (1 Hour): Students will reflect on their learning experiences or write commentaries on Unani texts, explaining concepts and principles in their own words.

Activity 4: Case Studies (1 Hour): Students will conduct case studies on tendon- and ligament-related diseases or conditions described in classical Unani medical texts.

Activity 5: Debate, Projects, or Assignments (1 Hour): Students will participate in classification-based debates, projects, or assignments related to tendons and ligaments as

mentioned in classical Unani texts.

Activity 6: Discussion and Presentation (1 Hour): Students will engage in discussions and presentations on the definition and classification of tendons and ligaments in the Unani system and explore these topics through virtual reality for a deeper understanding.

Reporting and Summary (30 Minutes):

- Students will present their experiential learning activities to the teacher.
- The teacher will summarize the activities and provide feedback on key findings

Experiential-Learning 4.7 : Fats and Nerves

Total Learning Hours: 7 Hours

Activity 1: Teacher Demonstration (1Hour):

- The teacher will explain the definition and classification of fats and nerves as per the Unani system of medicine, emphasizing their applied aspects.
- The experiential learning method will be discussed, and topics will be assigned to students.

Student Experiential Learning Activities:

Activity 2: Identification and Comparative Analysis (1 hour): Students will identify and label different fats and nerves using diagrams, models, or real/artificial samples. They will also perform a comparative analysis between classical Unani texts and modern medical texts, highlighting similarities and differences.

Activity 3: Reflective Journaling or Commentary (1 hour): Students will write reflective journals on their learning experiences related to the classification of fats and nerves or create commentaries on Unani texts, explaining their concepts in their own words.

Activity 4: Sorting and Classification (1 hour): Students will sort diagrams of fats and nerves and categorize them based on descriptions in classical Unani texts or compile a classification list as mentioned in these texts.

Activity 5: Discussion and Presentation (1 hour): Students will discuss and present on the definition and classification of fats and nerves in the Unani system or explore these topics using virtual reality for an immersive experience.

Activity 6: Case Study (1.5 hours): Students will conduct case studies on diseases/conditions related to fats and nerves as described in classical Unani medical texts.

Activity 7: Reporting and Summary (30 Minutes):

- Students will present their experiential learning activities to the teacher.
- The teacher will summarize the activities and provide feedback on key findings.

Experiential-Learning 4.8 : Bone marrow, Nails and Hair**Total Learning Hours: 6 Hours****Activity 1: Teacher's Discussion and Guidance (1 hour):**

- The teacher will explain the definition and classification of bone marrow, nails, and hair in the Unani system of medicine and its applied aspects.
- The experiential learning method will be discussed, and topics will be assigned to students.

Student Experiential Learning Activities:

Activity 2: Dissection Demonstration (1.5 hours): Students will observe and analyze the applied aspects of bone marrow, nails, and hair through cadaveric dissection, e-dissection, or virtual dissection.

Activity 3: Identification and Comparative Analysis (1.5 hour): Students will identify and label bone marrow, nails, and hair using diagrams, models, or real/artificial samples, and perform a comparative analysis between classical Unani texts and modern medical concepts, highlighting similarities and differences.

Activity 4: Case-Based Study (1.5 hour): Students will study diseases or conditions related to bone marrow, nails, and hair as described in classical Unani medical texts.

Activity 5: Reporting and Summary (30 minutes):

- Students will present their experiential learning activities to the teacher.
- The teacher will provide feedback and summarize the key learnings.

Modular Assessment**Assessment method**

Instructions - Conduct a structured Modular assessment. Assessment will be for 100 marks for this module. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C

Hour

8

Total Marks for this module: 100 1. Short Answer Questions (SAQs) or MCQs (Marks: 20) (4 questions carrying 5 marks each from any 4 Unit) 2. Case Based Assessment (15 Marks) (Case Base assesment will be done realted to the clinical cases or applied aspects of the bones, cartilages, muscles, ligaments, tendons, membranes, fat, nerves, blood vessels, bone marrow, nails, and hair.) 3. Viva Voce (30 Marks) 4. Making Model or Poster Making or Presentation (15 Marks) 5. Debate (20 Marks) and 6. Any practical in converted form can be taken for assessment. (50 marks) and Any of the experiential as portfolio/ refelections / presentations can be taken as assessment. (50 marks)	

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical/experiential) learning session, the students should be able to)	3C Notional Learning Hours	3D Lecture/ Practical/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/ Shows how/ Knows how/ Know)	3G Teaching Learning Methods
Module 5 : طب یونانی کے مطابق اعضاء مرکبہ کی تعریف و تقسیم اور تشریح مع اطلاقی پہلو : (Definition, Classification, Anatomy and Applied aspects of compound organs according to Unani system of Medicine)						
Module Learning Objectives (At the end of the module, the students should be able to)						
1. Appraise the Definition, Classification and Anatomy of Compound organs of human body according to Unani system of Medicine. 2. Analyze the concept of compound organs of human body and its classification and anatomy according to Unani system of Medicine. 3. Identify the Principal organs and accessory organs of <i>A'aza-e- Nafsaniya</i> , <i>A'aza-e- Haiwaniyah</i> , <i>A'aza-e- Tabaiya</i> and <i>A'aza-e- Tanasuliyah</i> according to Unani system of Medicine.						
Unit 1 اعضاء مرکبہ کا تعارف و تقسیم بلحاظ اعضاء رئیسہ و غیر رئیسہ (Introduction of compound organs and Its classification according to A'aza-e- Ra'eesa (Principal organs) and A'aza-e- Ghair Ra'eesa (Accessory organs))						
5.1.1 اعضاء مرکبہ کا تعارف (Introduction of compound organs) 5.1.2 اعضاء مرکبہ کی تقسیم بلحاظ اعضاء رئیسہ و غیر رئیسہ (Classification of compound organs according to Principal and Accessory organs)						
References: 1,2,3						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 6	Describe compound organs and Its classification according to A'aza-e- Ra'eesa (Principal organs) and A'aza-e- Ghair Ra'eesa (Accessory organs).	2	Lecture	CC	Knows-how	L,L&GD,L &PPT ,L_VC
CO 1,CO 2,CO 6	Illustrate and categorized compound organs according to A'aza-e- Ra'eesa (Principal organs) and A'aza-e- Ghair Ra'eesa (Accessory organs).	4	Practical5.1	PSY-MEC	Shows-how	D,D-BED,D-M,FC,LRI,

						PER,X-Ray
CO 1,CO 2,CO 6	Analyze the introduction of compound organs and Its classification according to A'aza-e-Ra'eesa (Principal organs) and A'aza-e- Ghair Ra'eesa (Accessory organs).	6	Experiential - Learning5.1	AFT-SET	Does	BS,C_L,J C,KL,PER
Unit 2 اعضاء حیوانیہ کا تعارف، صمیم و تشریح (Introduction, Classification and Anatomy of A'aza-e- Haiwaniyah (Organs for circulation and respiration). 5.2.1 اعضاء حیوانیہ کا تعارف Introduction of <i>A'aza-e- Haiwaniyah</i> (Organs for circulation and respiration). 5.2.2 اعضاء حیوانیہ کی تقسیم و تشریح Classification and Anatomy of <i>A'aza-e- Haiwaniyah</i> (Organs for circulation and respiration). References: 1,2,3,7,11,12,13						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 6	Describe Classification and Anatomy of A'aza-e- Haiwaniyah (organs of blood circulation and respiration).	3	Lecture	CC	Knows-how	L&GD,L&PPT ,L_VC
CO 1,CO 2,CO 6	Illustrate and demonstrate the Introduction, Classification and Anatomy of A'aza-e- Haiwaniyah (organs of blood circulation and respiration) .	4	Practical5.2	PSY-MEC	Shows-how	D,D-M,DIS,L_VC,PT
CO 1,CO 2,CO 6	Analyze the Anatomy of A'aza-e- Haiwaniyah (organs of blood circulation and respiration) according to Unani System of Medicine.	6	Experiential - Learning5.2	AFT-SET	Does	BS,DIS,IB L,JC,KL,L S,Mnt
Unit 3 اعضاء نفسانیہ کا تعارف، صمیم و تشریح (Introduction, Classification and Anatomy of A'aza-e- Nafsaniya (organs for psychic functions) 5.3.1 اعضاء نفسانیہ کا تعارف (Introduction of <i>A'aza-e- Nafsaniya</i> (organs for psychic functions)) 5.3.2 اعضاء نفسانیہ کی تقسیم و تشریح						

(Classification and Anatomy of <i>A'aza-e- Nafsaniya</i> (organs for psychic functions))						
References: 1,2,5,7,13,16						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 6	Describe the Introduction, Classification and Anatomy of A'aza-e- Nafsaniya (organs of psychic functions).	3	Lecture	CC	Shows-how	L,L&GD,L &PPT ,L_VC
CO 1,CO 2,CO 6	Demonstrate the A'aza-e- Nafsaniya (organs of psychic functions) according to Unani System of medicine	4	Practical5.3	AFT-REC	Shows-how	D,D-M,FC,L&P PT ,PT
CO 1,CO 2,CO 6	Analyze the Introduction, Classification and Anatomy of A'aza-e- Nafsaniya (organs of psychic functions).	6	Experiential - Learning5.3	AFT-SET	Does	BS,DIS,IB L,JC,KL,L S,Mnt,PE R,SIM
Unit 4 اعضاء طبیعیہ کا تعارف، صمیم و تشریح (Introduction, classification and Anatomy of A'aza-e- Tabaiya (organs for nutrition and growth)) 5.4.1 اعضاء طبیعیہ کا تعارف (Introduction of <i>A'aza-e- Tabaiya</i> (organs for nutrition and growth)) 5.4.2 اعضاء طبیعیہ کی تقسیم و تشریح (Classification and Anatomy of <i>A'aza-e- Tabaiya</i> (organs for nutrition and growth)) References: 1,2,3,5,7,8						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 6	Describe the Introduction, classification and Anatomy of A'aza-e- Tabaiya (organs of nutrition and growth).	2	Lecture	CC	Knows-how	L,L&GD,L &PPT ,L_VC
CO 1,CO 2,CO 6	Demonstrate and discuss the Introduction, classification and Anatomy of <i>A'aza-e- Tabaiya</i> (organs of nutrition and growth).	4	Practical5.4	PSY-GUD	Shows-how	D,DL,D-M,DIS,Pr BL,SIM,T UT

CO 1,CO 2,CO 6	Analyze the Introduction, classification and Anatomy of A'aza-e- Tabaiya (organs of nutrition and growth).	6	Experiential - Learning5.4	AFT-SET	Does	BS,C_L,D IS,JC,LS, Mnt,PER, PrBL
Unit 5 اعضاء تناسلیہ کا تعارف، تقسیم و تشریح (Introduction, Classification and Anatomy of A'aza-e- Tanasuliyah (organs for Reproduction) 5.5.1 اعضاء تناسلیہ کا تعارف Introduction of A'aza-e- Tanasuliyah (organs for Reproduction) 5.5.2 اعضاء تناسلیہ کی تقسیم و تشریح Classification and Anatomy of A'aza-e- Tanasuliyah (organs for Reproduction) References: 1,3,4,5,6,10,11						
3A	3B	3C	3D	3E	3F	3G
1,2,6,7	Describe the Introduction, classification and Anatomy of A'aza-e- Tanasuliyah (organs of Reproduction).	2	Lecture	CC	Knows-how	FC,L,L&G D,L&PPT ,L_VC
CO 1,CO 2,CO 6	Demonstrate and discuss the Introduction, classification and Anatomy of A'aza-e- Tanasuliyah (organs of Reproduction).	4	Practical5.5	PSY-ADT	Shows-how	D,DL,D-M,FC,PT, TBL,TUT
CO 1,CO 2,CO 6	Expalin and analyze the Introduction, classification and Anatomy of A'aza-e- Tanasuliyah (organs for reproduction).	6	Experiential - Learning5.5	AFT-SET	Does	BS,DIS,IB L,KL,LS, Mnt,PER, PrBL,SDL
Unit 6 اعضاء حیوانیہ کے اعضا مہیہ و مودیہ کا یونانی نظریہ (Unani Concepts of Pre-serving and Post- Serving organs of A'aza-e- Haiwaniyah) 5.6.1 اعضاء حیوانیہ کے اعضا مہیہ کا یونانی نظریہ (Unani Concepts of Pre-serving organs of A'aza-e- Haiwaniyah) 5.6.2 اعضاء حیوانیہ کے اعضا مودیہ کا یونانی نظریہ						

(Unani Concepts of Post- Serving organs of A'aza-e- Haiwaniyah)						
References: 1,2,3,4,5,6,7,11						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 6	Describe the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah.	2	Lecture	CC	Knows-how	L,L&GD,L &PPT ,L_VC
CO 1,CO 2,CO 6	Illustrate and Demonstrate the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah.	5	Practical5.6	PSY-MEC	Shows-how	D,D-M,DIS,IB L,SIM
CO 1,CO 2,CO 6	Analyze the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah.	6	Experiential - Learning5.6	AFT-RES	Does	D-M,DIS,IB L,JC,LS, Mnt
Unit 7 اعضاء نفسانیہ کے اعضاء میںہ و مودیہ کا یونانی نظریہ (Unani Concepts of Pre-serving and Post- Serving organs of A'aza-e- Nafsaniya) 5.7.1 اعضاء نفسانیہ کے اعضاء میںہ کا یونانی نظریہ (Unani Concepts of Pre-serving organs of A'aza-e- Nafsaniya) 5.7.2 اعضاء نفسانیہ کے اعضاء مودیہ کا یونانی نظریہ (Unani Concepts of Post- Serving organs of A'aza-e- Nafsaniya) References: 1,2,3,4,5,7,8						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 6	Describe the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyah.	2	Lecture	CC	Knows-how	L,L&GD,L &PPT ,L_VC
CO 1,CO 2,CO 6	Illustrate and Demonstrate the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyah.	5	Practical5.7	PSY-GUD	Shows-how	D,D-M,PT
CO 1,CO 2,CO 6	Analyze the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e-	5	Experiential	AFT-SET	Does	D,DIS,JC,

6	Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyah.		- Learning5.7			LS,Mnt
Unit 8 اعضا طبعیہ کے اعضا مہیہ و مودیہ کا یونانی نظریہ (Unani Concepts of Pre-serving and Post- Serving organs of A'aza-e- Tabaiya)						
5.8.1 اعضا طبعیہ کے اعضا مہیہ کا یونانی نظریہ (Unani Concepts of Pre-serving organs of A'aza-e- Tabaiya)						
5.8.2 اعضا طبعیہ کے اعضا مودیہ کا یونانی نظریہ (Unani Concepts of Post- Serving organs of A'aza-e- Tabaiya)						
References: 1,2,3,4						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 6	Describe the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah.	2	Lecture	CC	Knows-how	L,L&GD,L &PPT ,L_VC
CO 1,CO 2,CO 6	Illustrate and Demonstrate the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah.	5	Practical5.8	PSY-GUD	Shows-how	D-M,DIS,PT ,PER,SIM ,TUT
CO 1,CO 2,CO 6	Analyze the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah.	6	Experiential - Learning5.8	AFT-SET	Does	D,D-M,DIS,IB L,LS,Mnt, PER,PrBL
Unit 9 اعضا تناسلیہ کے اعضا مہیہ و مودیہ کا یونانی نظریہ (Unani Concepts of Pre-serving and Post- Serving organs of A'aza-e- Tanasuliyah)						
5.9.1 اعضا تناسلیہ کے اعضا مہیہ کا یونانی نظریہ (Unani Concepts of Pre-serving organs of A'aza-e- Tanasuliyah)						

5.9.2 اعضاء تناسلیہ کے اعضاء مودیہ کا یونانی نظریہ

(Unani Concepts of Post- Serving organs of A'aza-e- Tanasuliyah)

References: 1,2,3,4,5

3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 6	Describe the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah.	2	Lecture	CC	Knows-how	L,L&GD,L &PPT ,L_VC
CO 1,CO 2,CO 6	Illustrate and Demonstrate the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah.	5	Practical5.9	PSY-GUD	Shows-how	D-M,DIS,PT ,SIM
CO 1,CO 2,CO 6	Analyze the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah.	5	Experiential - Learning5.9	AFT-SET	Does	D,D-M,DIS,LS, TBL

Practical Training Activity

Practical 5.1 : Compound organs according to A'aza-e- Ra'eesa (Principal organs) and Ā'aza-e- Ghair Ra'eesa (Accessory organs).

Total Learning Hours: 4 Hours

Activity 1:Teacher Demonstration (30 minutes)

The teacher will discuss the introduction of compound organs and Its classification according to A'aza-e- Ra'eesa (Principal organs) and Ā'aza-e- Ghair Ra'eesa (Accessory organs) to the students and will discuss Method of practical activity. The teacher will assign the topic(s) to the students.

Students practical activity

Activity 2:Sorting (35 minutes)

Sorting of compound organs from a set of organs's diagrams and categorise the compound organs as A'aza-e- Ra'eesa (Principal organs) or Ā'aza-e- Ghair Ra'eesa (Accessory organs),mentioned in classical unani texts or Classification of compound organs as A'aza-e- Ra'eesa (Principal organs) or Ā'aza-e- Ghair

Ra'eesa (Accessory organs) from making a list of compound organs as mentioned in classical Unani texts.

Activity 3: Identification and labelling (35 minutes)

Identification and labelling of A'aza-e- Ra'eesa (Principal organs) and Ā'aza-e- Ghair Ra'eesa (Accessory organs) from diagrams or models or organs of the human cadaver as described in classical Unani texts.

Activity 4: Examination (35 minutes)

Clinical Examinations of compound organs on Living subjects.

Activity 5: Cadaver and radiographs Demonstration (35 minutes)

Demonstration on A'aza-e- Ra'eesa (Principal organs) and Ā'aza-e- Ghair Ra'eesa (Accessory organs) as mentioned in unani medical texts through 3D/4D models/Artificial cadaver and radiographs.

Activity 6: Exploration

- Anatomical exploration of compound organs and its classification according to A'aza-e- Ra'eesa (Principal organs) and Ā'aza-e- Ghair Ra'eesa (Accessory organs) as mentioned in unani medical texts through virtual reality. (35 minutes)
- Students will report the practical activity of their assigned topic(s) and teacher will summarize the practical activity to the students. (35 minutes)

Practical 5.2 : A'aza-e- Haiwaniyah (organs of blood circulation and respiration)

Total Learning Hours; 4 Hours

Activity 1: Teacher Demonstration (60 minutes)

The teacher will discuss the Introduction, Classification and Anatomy of *A'aza-e- Haiwaniyah* (organs of blood circulation and respiration) to the students and will discuss Method of practical activity. The teacher will assign the topic(s) to the students.

Students practical activity

Activity 2: *Sorting* (60 minutes)

A'aza-e- Haiwaniyah (organs for blood circulation and respiration) Sorting from a set of organs's diagrams and categorise the *A'aza-e- Haiwaniyah* as mentioned in classical unani texts or Classification of *A'aza-e- Haiwaniyah* (organs for blood circulation and respiration) from making a list of organs as mentioned in classical Unani texts.

Activity 3:Exploration (60 minutes)

Exploration of the Anatomy of *A'aza-e- Haiwaniyah* (organs of blood circulation and respiration) from dissection/e-dissection/ virtual dissection of cadaver as mentioned in unani medical texts or exploration of anatomy of *A'aza-e- Haiwaniyah* (organs of blood circulation and respiration) as mentioned in unani medical texts through virtual reality.

Activity 4: Examinations

- Demonstration and examinations of anatomy of *A'aza-e- Haiwaniyah* as mentioned in unani medical texts through 3D/4D models/Artificial cadaver or Living subjects. (30 minutes)
- Students will report the practical activity of their assigned topic(s) and teacher will summarize the practical activity to the students. (30 minutes)

Practical 5.3 : A'aza-e- Nafsaniya (organs of psychic functions)

Total Learning Hours: 4 Hours

Activity 1.Teacher Demonstration (30 minutes)

The teacher will discuss the Introduction, Classification and Anatomy of A'aza-e- Nafsaniya (organs of psychic functions) to the students and will discuss Method of practical activity. The teacher will assign the topic(s) to the students.

Activity 2. Sorting (45 minutes)

The students will perform practical activity related to the Introduction, Classification and Anatomy of A'aza-e- Nafsaniya through, A'aza-e- Nafsaniya (organs of psychic functions)Sorting from a set of organs's diagrams and categorise the A'aza-e- Nafsaniya as mentioned in classical unani texts or Classification of A'aza-e- Nafsaniya (organs of psychic functions)from making a list of organs as mentioned in classical Unani texts.

Activity 3.Practical Performance (45 minutes)

Identify and label different A'aza-e- Nafsaniya (organs for psychic functions)from diagrams or models of organs of the human body to as described in classical Unani texts.

Activity 4.Exploration (45 minutes)

Exploration of the Anatomy of A'aza-e- Nafsaniya (organs of psychic functions) from dissection/e-dissection/ virtual dissection of cadaver as mentioned in unani medical texts or exploration of anatomy of A'aza-e- Nafsaniya (organs of psychic functions)as mentioned in unani medical texts through virtual reality.

Activity 5. Cadaver/ Radiograph Demonstration

- Demonstration of anatomy of A'aza-e- Nafsaniya as mentioned in unani medical texts through 3D/4D models/Artificial cadaver, radiograph and living subjects. (45 minutes)
- Students will report the practical activity of their assigned topic(s) and teacher will summarize the practical activity to the students.(30 minutes)

Practical 5.4 : A'aza-e- Tabaiya (organs of nutrition and growth)**Total Learning Hours: 4****Activity 1.Teacher Demonstration (30 minutes)**

The teacher will discuss the Introduction, Classification and Anatomy of A'aza-e- Tabaiya (organs of nutrition and growth) to the students and will discuss Method of practical activity. The teacher will assign the topic(s) to the students.

Students Practical activity**Activity 2.Sorting (45 minutes)**

A'aza-e- Tabaiya (organs of nutrition and growth)Sorting from a set of organs's diagrams and categorise the A'aza-e- Tabaiya as mentioned in classical unani texts or Classification of A'aza-e- Tabaiya (organs of nutrition and growth)from making a list of organs as mentioned in classical Unani texts.

Activity 3.Identification and Labelling (45 minutes)

A'aza-e- Tabaiya (organs of nutrition and growth)from diagrams or models of organs of the human body to identify and label different A'aza-e- Tabaiya as described in classical Unani texts.

Activity 4.Exploration (30 minutes)

Exploration of the Anatomy of A'aza-e- Tabaiya (organs of nutrition and growth)from dissection/e-dissection/ virtual dissection of cadaver as mentioned in unani medical texts

or exploration of anatomy of A'aza-e- Tabaiya (organs of nutrition and growth) as mentioned in unani medical texts through virtual reality.

Activity 5. Illustration Making (30 minutes)

Making illustrations, posters/charts/Models of anatomy of A'aza-e- Tabaiya mentioned in classical unani medical texts.

Activity 6. Cadaver/Radiograph Demonstration

- Demonstration of anatomy of A'aza-e- Tabaiya as mentioned in unani medical texts through 3D/4D models/Artificial cadaver, Radiograph and Living subjects. (30 minutes)
- Students will report the practical activity of their assigned topic(s) and teacher will summarize the practical activity to the students. (30 minutes)

Practical 5.5 : A'aza-e- Tanasuliyah (organs of Reproduction).

Total Learning Hours: 4 Hours

Activity 1. Teacher Demonstration (30 minutes)

The teacher will discuss the Introduction, Classification and Anatomy of A'aza-e- Tanasuliyah (organs of reproduction) to the students and will discuss Method of practical activity. The teacher will assign the topic(s) to the students.

Activity 2. Sorting (45 minutes)

The students will perform practical activity related to the Introduction, Classification and Anatomy of A'aza-e- Tanasuliyah through, A'aza-e- Tanasuliyah (organs of reproduction) Sorting from a set of organs's diagrams and categorise the A'aza-e- Tanasuliyah as mentioned in classical unani texts or Classification of A'aza-e- Tanasuliyah (organs of reproduction) from making a list of organs as mentioned in classical Unani texts.

Activity 3. Identification and Labelling (45 minutes)

A'aza-e- Tanasuliyah (organs of reproduction) from diagrams or models of organs of the human body to identify and label different A'aza-e- Tanasuliyah as described in classical Unani texts.

Activity 4. Exploration (45 minutes)

Exploration of the Anatomy of A'aza-e- Tanasuliyah (organs of reproduction) from dissection/e-dissection/ virtual dissection of cadaver as mentioned in unani medical texts or

exploration of anatomy of A'aza-e- Tanasuliyah (organs of reproduction) as mentioned in unani medical texts through virtual reality.

Activity 5.Discussion

- Demonstration of anatomy of A'aza-e- Tanasuliyah as mentioned in unani medical texts through 3D/4D models/Artificial cadaver. (45 minutes)
- Students will report the practical activity of their assigned topic(s) and teacher will summarize the practical activity to the students.(30 minutes)

Practical 5.6 : A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah.

Total Learning Hours: 5 Hours

Activity 1.Teacher Demonstration

The teacher will demonstrate the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah to the students and will discuss Method of practical activity. The teacher will assign the topic(s) to the students. (60 minutes)

Student Practical activity

Activity 2.Sorting

Sorting of compound organs from a set of organs's diagrams and categorise the A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah ,mentioned in classical unani texts.(60 minutes)

Activity 3. Identification and labelling

Identification and labelling of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah from diagrams or models or organs of the human cadaver as described in classical Unani texts(60 minutes)

Activity 4. Anatomical exploration

Demonstration of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah as mentioned in unani medical texts through 3D/4D models/Cadaver/Artificial cadaver/radiographs or Anatomical exploration of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah as mentioned in unani medical texts through virtual reality.

Activity 5.Feedback and Reporting

Students will report the practical activity of their assigned topic(s) and teacher will summarize the practical activity to the students. (60 minutes)
Practical 5.7 : A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyah.
Total Learning Hours (5 Hours) Activity 1. Teacher Demonstration (30 minutes) The teacher will demonstrate the Unani Concepts of A'aza-e- Nafsaniya (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyah to the students and will discuss Method of practical activity. The teacher will assign the topic(s) to the students. Students Practical activity Activity 2. Sorting (60 minutes) Sorting of compound organs from a set of organs's diagrams and categorise the A'aza-e- Nafsaniyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyah, mentioned in classical unani texts. Activity 3. Identification and Labelling (60 minutes) Identification and labelling of A'aza-e- Nafsaniyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyah from diagrams or models or organs of the human cadaver as described in classical Unani texts. Activity 4. Illustration Making (60 minutes) Making illustrations, posters/charts/Models of the anatomy A'aza-e- Nafsaniyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyah mentioned in classical unani medical texts. Activity 5. Anatomical exploration - Demonstration of A'aza-e- Nafsaniyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyah as mentioned in unani medical texts through 3D/4D models/Cadaver/Artificial cadaver/radiographs or Anatomical exploration of A'aza-e- Nafsaniyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyah as mentioned in unani medical texts through virtual reality. (60 minutes) - Students will report the practical activity of their assigned topic(s) and teacher will summarize the practical activity to the students. (30 minutes)
Practical 5.8 : A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah.

Total Learning Hours: 5 Hours**Activity 1. Teacher Demonstration (60 minutes)**

The teacher will demonstrate the Unani Concepts of A'aza-e- Tabaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah to the students and will discuss Method of practical activity. The teacher will assign the topic(s) to the students.

Activity 2. Identification and labelling (60 minutes)

The students will perform practical activity related to the role of the Unani Concepts of A'aza-e- Tabaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah through, Identification and labelling of A'aza-e- Tabaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah from diagrams or models or organs of the human cadaver as described in classical Unani texts.

Activity 3. Presentation (60 minutes)

Presentation on A'aza-e- Tabaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah as mentioned in unani medical texts through 3D/4D models/Cadaver/Artificial cadaver/radiographs or Anatomical exploration of A'aza-e- Tabaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah as mentioned in unani medical texts through virtual reality.

Activity 4. Illustrations Making

- Making illustrations, posters/charts/Models of the anatomy A'aza-e- Tabaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah mentioned in classical unani medical texts. (60 minutes)
- Students will report the practical activity of their assigned topic(s) and teacher will summarize the practical activity to the students. (60 minutes)

Practical 5.9 : A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah.

Total learning Hours: 5 Hours**Activity 1: Teacher Demonstration (90 minutes)**

The teacher will demonstrate the Unani Concepts of A'aza-e- Tanasuliyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah to the students and will discuss Method of practical activity. The teacher will assign the topic(s) to the students.

Students practical activity**Activity 2: Sorting (30 minutes)**

Sorting of compound organs from a set of organs's diagrams and categorise the A'aza-e- Tanasuliyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah,mentioned in classical unani texts.

Activity 3: Cadaver discussion (30 minutes)

Identification and labelling of Pre-serving organs and Post- Serving organs of A'aza-e- Tanasuliyah from diagrams or models or organs of the human cadaver as described in classical Unani texts.

Activity 4: Demonstration (60 minutes)

Demonstration of A'aza-e- Tanasuliyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah as mentioned in unani medical texts through 3D/4D models/Cadaver/Artificial cadaver/radiographs or Anatomical exploration of A'aza-e- Tanasuliyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah as mentioned in unani medical texts through virtual reality.

Activity 5: Illustrations Making

- Illustrations, posters/charts/Models of the anatomy A'aza-e- Tanasuliyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah mentioned in classical unani medical texts. (60 minutes)
- Students will report the practical activity of their assigned topic(s) and teacher will summarize the practical activity to the students.(30 minutes)

Experiential learning Activity

Experiential-Learning 5.1 : Compound organs: classification according to A'aza-e- Ra'eesa (Principal organs) and Ā'aza-e- Ghair Ra'eesa (Accessory organs).

Total Learning Hours: 6 Hours

Activity 1: Teacher Demonstration (30 minutes)

The teacher will discuss the introduction of compound organs and Its classification according to A'aza-e- Ra'eesa (Principal organs) and Ā'aza-e- Ghair Ra'eesa (Accessory organs) to the students and will experiential learning method. The teacher will assign the topic(s) to the students.

Students experiential learning activity

Activity 2: Identification and labelling (60 minutes)

Identification and labelling of A'aza-e- Ra'eesa (Principal organs) and Ā'aza-e- Ghair Ra'eesa (Accessory organs) from diagrams or models or organs of the human cadaver as

described in classical Unani texts.

Activity 3: Reflective journalling (60 minutes)

Making Reflective journalling on their learning experience related the introduction of compound organs and Its classification according to A'aza-e- Ra'eesa (Principal organs) and Ā'aza-e- Ghair Ra'eesa (Accessory organs) or commentary on Unani texts, explaining the concepts and principles in their own words related to the introduction of compound organs and Its classification according to A'aza-e- Ra'eesa (Principal organs) and Ā'aza-e- Ghair Ra'eesa (Accessory organs).

Activity 4: Presentation (45 minutes)

Presentation on A'aza-e- Ra'eesa (Principal organs) and Ā'aza-e- Ghair Ra'eesa (Accessory organs) as mentioned in unani medical texts through 3D/4D models/Artificial cadaver/radiographs.

Activity 5: Illustrations Making (60 minutes)

Making illustrations, posters/charts/Models of anatomy of anatomy and classification of A'aza-e- Ra'eesa (Principal organs) and Ā'aza-e- Ghair Ra'eesa (Accessory organs) mentioned in classical unani medical texts.

Activity 6: Debate

- Debate or group discussion and Projects or assignments on the introduction of compound organs and Its classification according to A'aza-e- Ra'eesa (Principal organs) and Ā'aza-e- Ghair Ra'eesa (Accessory organs) as described in classical Unani medical texts.(60 minutes)
- Students will share the experiential learning activity of their assigned topic(s) and teacher will summarise the experiential learning activity to the students. (45 minutes)

Experiential-Learning 5.2 : A'aza-e- Haiwaniyah (organs of blood circulation and respiration)

Total Learning Hours: 6 Hours

Activity 1. Teacher Demonstration (30 minutes)

The teacher will discuss the Introduction, Classification and Anatomy of A'aza-e- Haiwaniyah (organs of blood circulation and respiration) to the students and will experiential learning method. The teacher will assign the topic(s) to the students.

Activity 2. Identification & Labelling (60 minutes)

The students will engage in experiential learning activity related to the Introduction, Classification and Anatomy of A'aza-e- Haiwaniyah through. A'aza-e- Haiwaniyah (organs

of blood circulation and respiration) from diagrams or models of organs of the human body to identify and label different A'aza-e- Haiwaniyah as described in classical Unani texts.

Activity 3.Reflective journalling (60 minutes)

Making Reflective journalling on their learning experience related the Introduction, Classification and Anatomy of A'aza-e- Haiwaniyah (organs of blood circulation and respiration) or commentary on Unani texts, explaining the concepts and principles in their own words related to the Introduction, Classification and Anatomy of A'aza-e- Haiwaniyah (organs of blood circulation and respiration).

Activity 4.Exploration (60 minutes)

Exploration of the Anatomy of A'aza-e- Haiwaniyah (organs of blood circulation and respiration) from dissection/e-dissection/ virtual dissection of cadaver as mentioned in unani medical texts or exploration of anatomy of A'aza-e- Haiwaniyah (organs of blood circulation and respiration) as mentioned in unani medical texts through virtual reality.

Activity 5.Illustration Making (60 minutes)

Making illustrations, posters/charts/Models of anatomy of A'aza-e- Haiwaniyah mentioned in classical unani medical texts.

Activity 6.Debate/Group Discussion

- Debate or group discussion and Projects or assignments on the Introduction, Classification and Anatomy of A'aza-e- Haiwaniyah (organs of blood circulation and respiration) as described in classical Unani medical texts. (60 minutes)
- Students will share the experiential learning activity of their assigned topic(s) and teacher will summarise the experiential learning activity to the students.(30 minutes)

Experiential-Learning 5.3 : A'aza-e- Nafsaniya (organs of psychic functions).

Totla Learning Hours (6 Hours)

Activity 1.Teacher Demonstration (30 minutes)

The teacher will discuss the Introduction, Classification and Anatomy of A'aza-e- Nafsaniya (organs of psychic functions) to the students and will experiential learning method. The teacher will assign the topic(s) to the students.

Students experiential learning activity

Activity 2.Exploration (60 minutes)

Exploration of the Anatomy of A'aza-e- Nafsaniya (organs of psychic functions)from dissection/e-dissection/ virtual dissection of cadaver as mentioned in unani medical texts or exploration of anatomy of A'aza-e- Nafsaniya (organs of psychic functions)as mentioned in unani medical texts through virtual reality.

Activity 3.Reflective journalling (60 minutes)

Making Reflective journalling on their learning experience related the Introduction, Classification and Anatomy of A'aza-e- Nafsaniya (organs of psychic functions) or commentary on Unani texts, explaining the concepts and principles in their own words related to the Introduction, Classification and Anatomy of A'aza-e- Nafsaniya (organs of psychic functions).

Activity 4.Identification and Labelling (60 minutes)

A'aza-e- Nafsaniya (organs of psychic functions)from diagrams or models of organs of the human body to identify and label different A'aza-e- Nafsaniya as described in classical Unani texts.

Activity 5.Illustration Making (60 minutes)

Making illustrations, posters/charts/Models of anatomy of A'aza-e- Nafsaniya mentioned in classical unani medical texts.

Activity 6.Debate/Group Discussion

- Debate or group discussion and Projects or assignments on the Introduction, Classification and Anatomy of A'aza-e- Nafsaniya (organs of psychic functions)as described in classical Unani medical texts. (60 minutes)
- Students will share the experiential learning activity of their assigned topic(s) and teacher will summarise the experiential learning activity to the students.(30 minutes)

Experiential-Learning 5.4 : A'aza-e- Tabaiya (organs of nutrition and growth).

Total Learning Hours: 6 Hours

Activity 1.Teacher Demonstration (60 minutes)

The teacher will discuss the Introduction, Classification and Anatomy of A'aza-e- Tabaiya (organs of nutrition and growth) to the students and will experiential learning method. The teacher will assign the topic(s) to the students.

Students experiential learning activity

Activity 2.Reflective journalling (60 minutes)

Making Reflective journalling on their learning experience related the Introduction, Classification and Anatomy of A'aza-e- Tabaiya (organs of nutrition and growth) or commentary on Unani texts, explaining the concepts and principles in their own words related to the Introduction, Classification and Anatomy of A'aza-e- Tabaiya (organs of nutrition and growth).

Activity 3.Sorting (60 minutes)

A'aza-e- Tabaiya (organs of nutrition and growth)Sorting from a set of organs's diagrams and categorise the A'aza-e- Tabaiya as mentioned in classical unani texts or Classification of A'aza-e- Tabaiya (organs of nutrition and growth)from making a list of organs as mentioned in classical Unani texts.

Activity 4.Identification (60 minutes)

A'aza-e- Tabaiya (organs of nutrition and growth)from diagrams or models of organs of the human body to identify and label different A'aza-e- Tabaiya as described in classical Unani texts.

Activity 5.Group Discussion

- Debate or group discussion and Projects or assignments on the Introduction, Classification and Anatomy of A'aza-e- Tabaiya (organs of nutrition and growth)as described in classical Unani medical texts. (60 minutes)
- Students will share the experiential learning activity of their assigned topic(s) and teacher will summarise the experiential learning activity to the students. (60 minutes)

Experiential-Learning 5.5 : A'aza-e- Tanasuliyah (organs for reproduction):

Total Learning Hours: 6 Hours

Activity 1 Teacher Demonstration (30 minutes)

The teacher will discuss the Introduction, Classification and Anatomy of A'aza-e- Tanasuliyah (organs of reproduction) to the students and will discuss experiential learning method. The teacher will assign the topic(s) to the students.

Students experiential learning activity

Activity 2.Reflective journalling (60 minutes)

Making Reflective journalling on their learning experience related the Introduction, Classification and Anatomy of A'aza-e- Tanasuliyah (organs of reproduction) or commentary on Unani texts, explaining the concepts and principles in their own words related to the Introduction, Classification and Anatomy of A'aza-e- Tanasuliyah (organs of reproduction).

Activity 3.Sorting (60 minutes)

A'aza-e- Tanasuliyah (organs of reproduction)Sorting from a set of organs's diagrams and categorise the A'aza-e- Tanasuliyah as mentioned in classical unani texts or Classification of A'aza-e- Tanasuliyah (organs of reproduction)from making a list of organs as mentioned in classical Unani texts.

Activity 4.Identification and Labelling (60 minutes)

A'aza-e- Tanasuliyah (organs of reproduction) from diagrams or models of organs of the human body to identify and label different A'aza-e- Tanasuliyah as described in classical Unani texts.

Activity 5.Illustration Making (60 minutes)

Making illustrations, posters/charts/Models of anatomy of A'aza-e- Tanasuliyah mentioned in classical unani medical texts.

Activity 6.Debate/Group Discussion

- Debate or group discussion and Projects or assignments on the Introduction, Classification and Anatomy of A'aza-e- Tanasuliyah (organs of reproduction) as described in classical Unani medical texts. (60 minutes)
- Students will share the experiential learning activity of their assigned topic(s) and teacher will summarise the experiential learning activity to the students. (30 minutes)

Experiential-Learning 5.6 : A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah.

Total Learning Hours: 6 Hours

Activity 1.Teacher Demonstration (60 minutes)

The teacher will discuss the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah to the students and will discuss experiential learning method. The teacher will assign the topic(s) to the students.

Students experiential learning activity

Activity 2.Reflective journalling (60 minutes)

Making Reflective journalling on their learning experience related the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah or commentary on Unani texts, explaining the concepts and principles in their own words related to the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah.

Activity 3.Sorting (60 minutes)

Sorting of compound organs from a set of organs's diagrams and categorise the A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah ,mentioned in classical unani texts.

Activity 4.Identification and labelling (60 minutes)

Identification and labelling of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah from diagrams or models or organs of the human cadaver as described in classical Unani texts.

Activity 5.Debate

- Debate or group discussion and Projects or assignments on A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah as described in classical Unani medical texts.(60 minutes)
- Students will share the experiential learning activity of their assigned topic(s) and teacher will summarise the experiential learning activity to the students. (60 minutes)

Experiential-Learning 5.7 : A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyah.

Total Learning Hours: 5 Hours

1.Teacher Demonstration (60 minutes)

The teacher will demonstrate the Unani Concepts of A'aza-e- Nafsaniya (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyah to the students and will discuss experiential learning method. The teacher will assign the topic(s) to the students.

Students experiential learning activity

2.Reflective journalling (60 minutes)

Making Reflective journalling on their learning experience related the Unani Concepts of A'aza-e- Nafsaniya (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyah or commentary on Unani texts, explaining the concepts and principles in their own words related to the Unani Concepts of A'aza-e- Nafsaniya (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyah.

3.Illustrations Making (60 minutes)

Making illustrations, posters/charts/Models of the anatomy A'aza-e- Nafsaniyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyahmentioned in classical unani medical texts.

4.Debate / group discussion

- Debate or group discussion and Projects or assignments on A'aza-e- Nafsaniyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyah as described in classical Unani medical texts.(60 minutes)
- Students will share the experiential learning activity of their assigned topic(s) and teacher will summarise the experiential learning activity to the students. (60 minutes)

Experiential-Learning 5.8 : A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah.

Total Learning Hours: 6 Hours

Activity 1:Teacher Demonstration (60 minutes)

The teacher will demonstrate the Unani Concepts of A'aza-e- Tabaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah to the students and will experiential learning method. The teacher will assign the topic(s) to the students.

Students experiential learning activity

Activity 2.Reflective journalling (60 minutes)

Making Reflective journalling on their learning experience related the Unani Concepts of A'aza-e- Tabaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah or commentary on Unani texts, explaining the concepts and principles in their own words related to the Unani Concepts of A'aza-e- Tabaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah.

Activity 3.Sorting (60 minutes)

Sorting of compound organs from a set of organs's diagrams and categorise the A'aza-e- Tabaiyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs)

of A'aza-e- Tabaiyah, mentioned in classical unani texts.

Activity 4.Modal/Poster making (60 minutes)

Making illustrations, posters/charts/Models of the anatomy A'aza-e- Tabaiyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah mentioned in classical unani medical texts.

Activity 5. Debate/group discussion

- Debate or group discussion and Projects or assignments on A'aza-e- Tabaiyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah as described in classical Unani medical texts. (60 minutes)
- Students will share the experiential learning activity of their assigned topic(s) and teacher will summarise the experiential learning activity to the students. (60 minutes)

Experiential-Learning 5.9 : A'aza-e- Muhaiyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah.

Total Learning Hours: 5 Hours

1.Teacher Demonstration (30 minutes)

The teacher will demonstrate the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah to the students and will discuss experiential learning method. The teacher will assign the topic(s) to the students .

2. Anatomical exploration (60 minutes)

Demonstration of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah as mentioned in unani medical texts through 3D/4D models/Cadaver/Artificial cadaver/radiographs or Anatomical exploration of A'aza-e- Tanasuliyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah as mentioned in unani medical texts through virtual reality.

3.Reflective journalling (60 minutes)

Making Reflective journalling on their learning experience related the Unani Concepts of A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah or commentary on Unani texts, explaining the concepts and principles in their own words related to the Unani Concepts of A'aza-e- Tanasuliyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah.

4. Identification and labelling (60 minutes)

Identification and labelling of A'aza-e- Muhaiyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah from diagrams or models or

organs of the human cadaver as described in classical Unani texts.

5. Debate / group discussion

- Debate / group discussion and Projects or assignments on A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah as described in classical Unani medical texts.(60 minutes)
- Students will share the experiential learning activity of their assigned topic(s) and teacher will summarise the experiential learning activity to the students.(30 minutes)

Modular Assessment	
Assessment method	Hour
Instructions – Formative Assessment 8 hours Conduct a structured Modular assessment. Assessment will be for 100 marks for this module. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C Total Marks for this module: 100 1.Short Answer Questions (SAQs) Marks: 25 (5 questions carrying 5 marks each) 2. Practical Performance (Making Models) Marks: 25 practical performance will be conducted from all units of this module. 3.Practical Identification:/Practical Role Play Marks: 25	8

4. Creativity Writing:

Marks: 25

Or

Any practical in converted form can be taken for assessment. (50 marks)

and

Any of the experiential as Portfolio/ Refelections / Presentations can be taken as assessment. (50 marks)

3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical/experiential) learning session, the students should be able to)	3C Notional Learning Hours	3D Lecture/ Practical/ Experiential Learning	3E Domain/ Sub Domain	3F Level (Does/ Shows how/ Knows how/ Know)	3G Teaching Learning Methods
Module 6 : طب یونانی کے مطابق مفاصل کی تعریف، صمیم و تشریح مع اطلاقی پہلو (Definition, Classification and Anatomy of Joints with its applied aspects according to Unani system of Medicine)						
Module Learning Objectives (At the end of the module, the students should be able to)						
1. Appraise Definition, Classification and Anatomy of Joints with its applied aspects according to Unani system of Medicine 2. Analyze examination of joints and relate it with classical literatures.. 3. Identify and Create authentic Unani concepts of joints with validations.						
Unit 1 طب یونانی کے مطابق مفاصل کا تعارف اور صمیم (Introduction and classification of Joints in Unani system of medicine) 6.1.1 طب یونانی کے مطابق مفاصل کا تعارف (Introduction of Joints in Unani system of medicine) 6.1.2 طب یونانی کے مطابق مفاصل کی تقسیم (Classification of Joints in Unani system of medicine) References: 1,2,3,5,7,13,15						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 6	Describe and classify the Joints according to Unani Medicine.	4	Lecture	CC	Knows-how	L,PER
CO 1,CO 2,CO 6	Demonstrate classification of Joints according Unani Medicine.	8	Practical6.1	PSY-GUD	Shows-how	D,DL,D-M,DIS,L&PPT,PT,PER,TPW
CO 1,CO 2,CO 6	Complie and Illustrate Unani Literatures on classification of Joints.	5	Experiential	AFT-SET	Does	D,DIS,IBL

6			- Learning6.1			,JC,KL,L_ VC,LS,PL ,PER
CO 2,CO 3,CO 6	Analyze Unani classification of Joint with special reference to Modern Arthology	5	Experiential - Learning6.2	AFT-SET	Does	BS,C_L,D ,DIS,IBL,J C,L&GD,L S,PL,PER
Unit 2 طب یونانی کے مطابق مفصل ہیکل محوری کی تشریح (Anatomy of Joints of axial skeleton according to Unani system of medicine) 6.2.1 طب یونانی میں مفصل ہیکل محوری کی تشریح (Anatomy of Joints of axial skeleton in Unani medicine) References: 2,4,5,6,8,10,13,16						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 6	Analyse anatomy of axial skeleton Joints according to Unani system of medicine.	5	Experiential - Learning6.3	AFT-CHR	Does	BS,C_L,D IS,IBL,JC, KL,PER
CO 1,CO 2,CO 6	Describe the anatomy of Joints of axial skeleton according to Unani system of medicine.	4	Lecture	CC	Knows-how	L,L&GD,L &PPT ,L_VC
CO 1,CO 2,CO 6	Demonstrate functional anatomy of axial Joints according to Unani system of medicine.	7	Practical6.2	PSY-MEC	Shows-how	D,D-BED,DL,L RI,PT,TU T
CO 1,CO 2,CO 6	Design a comprehensive illustrations of Axial skeleton joints anatomy based on Unani Concepts..	5	Experiential - Learning6.4	AFT-RES	Does	BS,D-M,DIS,LS, Mnt,PrBL
Unit 3 طب یونانی کے مطابق مفصل ہیکل طرفی کی تشریح (Anatomy of Joints of appendicular skeleton according to Unani system of medicine) 6.3.1 طب یونانی میں مفصل ہیکل طرفی کی تشریح						

(Anatomy of Joints of appendicular skeleton in Unani medicine)						
References: 1,2,10,11						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 6	Conduct examination of movements of appendicular Joint and relate it with Unani Concepts..	7	Practical6.3	PSY-MEC	Shows-how	CBL,D-BED,DIS,PrBL
CO 1,CO 2,CO 6	Illustrates structures of appendicular Joints according to Unani medicine.	5	Experiential - Learning6.5	AFT-SET	Does	BS,C_L,FV,JC,KL,LS,PrBL,RP
CO 1,CO 2,CO 6	Describe the anatomy of Joints of appendicular skeleton according to Unani system of medicine.	4	Lecture	CC	Knows-how	L,L&GD,L&PPT,L_VC
CO 1,CO 2,CO 6	Design a comprehensive illustrations of Appendicular Joints Anatomy based on Unani Concepts.	5	Experiential - Learning6.6	AFT-SET	Does	D,D-M,DIS,IBL,JC,LS,Mnt,PL,PT,PER,PrBL
Unit 4 طب یونانی کے مطابق مفاصل کی اطلاقی تشریح (Applied anatomy of joints according to Unani system of Medicine) 6.4.1 مفاصل کی اطلاقی تشریح (Applied anatomy of joints) References: 1,2,3						
3A	3B	3C	3D	3E	3F	3G
CO 1,CO 2,CO 6	Illustrate and Appraise Unani Pathogenesis of Amraz-e-Mafasil (Diseases of Joints)	4	Experiential - Learning6.7	AFT-RES	Does	CBL,DIS,JC,KL,LS,PER,SDL
CO 1,CO 2,CO 6	Understand and apply Unani concepts of Joint in diagnosis of diseases.	4	Practical6.4	PSY-GUD	Shows-	D,D-

6					how	M,DIS,FC ,IBL,L&P PT ,PER,TUT
CO 1,CO 2,CO 6	Describe the Applied anatomy of joints according to Unani system of Medicine.	3	Lecture	CC	Knows- how	L,L&GD,L &PPT ,L_VC
CO 1,CO 2,CO 6,CO 7	Demonstrate clinical examination techniques relevant to Joint and recognize the anatomical features in different imaging techniques.	4	Practical6.5	PSY-GUD	Shows- how	CD,CBL, D- BED,ECE ,LRI,PT,X -Ray
CO 1,CO 2,CO 6	Interpret real-life case scenarios by application of Unani Concepts of joints.	5	Experiential - Learning6.8	AFT-RES	Does	CD,CBL, D- M,FV,LRI, PL,RLE

Practical Training Activity

Practical 6.1 : Classification of Joints in Unani medicine.

Total Learning Hours: 8 Hours

Activity 1. Teacher Demonstration (60 Minutes)

Teacher will use visual aids, including physical joints models, detailed 3D animations, and histological microscope slides, to guide students about different types of joint mentioned in classical Unani Literatures. The presentation will also demonstrate structural, functional and regional classifications of Joints. The teacher will assign the topic(s) to the students.

Students practical activity

Activity 2. Presentation and exploration (60 minutes)

Presentation on the description and classification of joints in Unani system of medicine or exploration of anatomical description and classification of joints in Unani system of medicine through virtual reality.

Activity 3. Construction (90 Minutes)

Students will work individually or in small groups to construct physical models of different types of Fibrous joints, Cartilaginous joints and synovial joints using creative materials like clay, recycled materials, or 3D printing. Each group will create detailed representations of classification such as Syndesmosis, Gomphosis, Synchrondrosis, Symphysis, Synarthrosis, Amphiarthrosis and Diarthrosis etc.

Activity 4. Drawing Making (90 minutes)

Making Drawing of different types of synovial joints such as plane synovial joint, Hinge, Pivot, Condylar, Ellipsoid, Saddle, Bal and socket mentioned in classical Unani texts.

Activity 5. Identification (60 minutes)

Joint Identification with diagrams or models of joints of the human Body to identify and label different joints as described in classical Unani texts.

Activity 6. Analysis and Creation (60 minutes)

Making illustrations, flow charts of joints mentioned in classical Unani texts.

Activity 7. Discussion (60 minutes)

Students will report the practical activity of their assigned topic(s) and teacher will summarize the practical activity to the students.

Practical 6.2 : Functional Anatomy of Axial Joints**Totat Learning Hours: 7 Hours****Activity 1. Teacher Demonstration (60 Minutes)**

The teacher will demonstrate the anatomy of Joints of axial skeleton according to Unani system of medicine to the students and will discuss Method of practical activity. The teacher will assign the topic(s) to the students.

Students Practical Activity**Activity 2. Dissection (60 Minutes)**

Dissection/e-dissection/ virtual dissection of cadaver to explore the anatomy of Joints of axial skeleton as mentioned in Unani medical texts or exploration of anatomy of Joints of axial skeleton through virtual reality.

Activity 3.Examination (60 Minutes)

Practical activity on range of movement, (Range of Motion), Active ROM, Passive ROM on living subjects in OPD, IPD or Assessment of wide range of movements of axial skeleton, including head and neck movements, spinal movements, and breathing movements on Living subjects.

Activity 4. Analysis and palpation (60 Minutes)

Analysis and palpation of attachment points of Axial skeleton for muscles that move the head, neck, and trunk, and for muscles that act across the shoulder and hip joints to move their corresponding limbs.

Activity 5.Test Demonstration (60 Minutes)

Demonstration of functional test of joints like Geniomotor, Disease activity Score 28 (DAS28).

Activity 6.Group Discussion (120 Minutes)

Group discussion on craniovertebral joints which allow head movement, intervertebral joints which permit flexion, extension, and rotation of the spine and sternocostal joints which connect ribs to the sternum, facilitating breathing as described in classical Unani medical texts.Students will report the practical activity of their assigned topic(s) and teacher will summarize the practical activity to the students.

Practical 6.3 : Appendicular Joints: Movements Examination.

Total Learning Hours: 7 Hours

Activity 1.Teacher Demonstration (60 Minutes)

The teacher will demonstrate examination of axial Joints with special reference of Unani system of medicine to the students and will discuss Method of practical activity. The teacher will assign the topic(s) to the students.

Students Practical activity

Activity 2.Examination (60 minutes)

Examination of Joints through Inspection palpation Percussion and Auscultation on Living subjects.

Activity 3. Test Assessment

- Assessment of different test related to joints like sit and reach test, shoulder lift test, fingertip to floor test on living subjects and relate it with classical literatures.(60 Minutes)
- Assessment of different test related to joints like ,Apley scratch test.,Lumber stability test on living subjects relate it with classical literatures.(60 Minutes)

Activity 4. Illustrations Making (60 Minutes)

Making illustrations, Charts on findings of above examinations .

Activity 5. Project Learning

- Projects on examinations methods of joint as mentioned in classical unani medical texts as well as in modern arthrology.(60 Minutes)
- Students will report the practical activity of their assigned topic(s) and teacher will summarize the practical activity to the students.(60 Minutes)

Practical 6.4 : Applied anatomy of joints

Total Learning Hours: 4 Hours

Activity 1. Teacher Demonstration (50 minutes)

The teacher will demonstrate the applied anatomy of joints according to Unani system of Medicine to the students and will discuss Method of practical activity. The teacher will assign the topic(s) to the students.

Students practical activity

Activity 2. Dissection (60 minutes)

Dissection/e-dissection/ virtual dissection of cadaver to explore the applied anatomy of joints as mentioned in Unani medical texts or exploration of applied anatomy of joints as mentioned in Unani medical texts through virtual reality.

Activity 3. Presentation (40 minutes)

Presentation on the applied anatomy of Axial joints as mentioned in Unani medical texts through 3D/4D models/Artificial cadaver.

Activity 4.Group Discussion (30 minutes)

Group Discussion on applied anatomy of joints of Upper Limb such as Shoulder Joint, Elbow Joint, Wrist Joint etc and other minor joints, as mentioned in classical Unani medical texts.

Activity 5.Assignment

- Assignment on applied anatomy of joints of Lower Limb such as Hip Joint, Knee Joint, Ankle Joint and other minor Joints, as mentioned in classical Unani medical texts such.(30 minutes)
- Students will report the practical activity of their assigned topic(s) and teacher will summarize the practical activity to the students.(30 minutes)

Practical 6.5 : Clinical Examination of Joints.

Total Learning Hours: 4 Hours

Activity 1.Teacher Demonstration

- The teacher will demonstrate the applied anatomy of joints according to Unani system of Medicine to the students and will discuss Method of practical activity. The teacher will assign the topic(s) to the students.(30 Minutes).
- The teacher will begin by demonstrating articular surfaces involved in formations of Joints, , including palpation of key bony landmarks, muscles, and vascular structures. The teacher will emphasize the correct technique for assessing muscle tone, joint mobility, and vascularity, explaining their clinical relevance.(60 Minutes)

Activity 2. Examination of Patients (60 Minutes)

Students will apply their findings from the palpation and joint assessments to diagnose potential conditions like different type of fractures, muscle imbalances, nerve compression, or vascular abnormalities and any abnormalities in movement of Joint through examination patients of OPD and IPD .

Activity 3.Imaging Technique Interpretation (60 Minutes)

Teacher will demonstrate different types of fractures of bones with the help of different Imaging Technologies. Student will recognize Normal and Abnormal Anatomical structures in case of fracture through Plain X-Ray and other imaging technologies.

Activity 4. Feedback Session (30 Minutes)

Students will report the practical activity of their assigned topic(s) and teacher will summarize the practical activity to the students.

Experiential learning Activity

Experiential-Learning 6.1 : Compilation on Unani Concepts of Classification of Joints.

Total Learning Hours: 5 Hours

Activity 1. Teacher Demonstration (30 minutes)

The teacher will demonstrate the description and classification of Joints in Unani system of medicine to the students and will discuss experiential learning method.

Activity 2. Commentary (60 minutes)

Commentary on Unani medical texts related to the description and classification of Joints, explaining the concepts and principles in their own words.

Activity 3. Visual Aids Peer Learning (60 minutes)

Students will work in groups to research individual joints. They will prepare interactive lessons using visual aids like diagrams, animations, or digital models to teach their peers about their assigned work related to classification of joint based on Unani Medicine.

Activity 4. Debate (60 minutes)

Joint Classification Debate or Discussion as described in classical Unani texts.

Activity 5. Literature Review & Compilation (60 minutes)

Students will critically read assigned research articles on classification of joint based on Unani system of medicine. They will analyze experimental methodologies and results, discuss findings in small groups, and evaluate how the research impacts understanding of Unani Concepts of classification of joint.

Activity 6. Feedback & Reporting (30 minutes)

Students will share the experiential learning activity of their assigned topic(s) to the teacher and teacher will discuss and summarise the experiential learning activity to the students.

Experiential-Learning 6.2 : Arthology: Unani and Modern Classification

Total Learning Hours: 5 Hours

Activity 1. Teacher Demonstration

The teacher will demonstrate the description and classification of Joints in Unani system of medicine to the students and will discuss experiential learning method. The teacher will assign the topic(s) to the students. (60 minutes)

Activity 2. Visual Output Creation (60 minutes)

Students will develop creative visual outputs like posters, charts, or infographics to represent Unani classification of Joint. This activity combines creativity with scientific accuracy to enhance their understanding and communication of complex concepts.

Activity 3. Peer Learning (60 minutes)

Students will teach specific classification of joint to their peers, using diagrams, illustrations, or presentations on Unani as well as modern classification of Joint. This collaborative activity helps reinforce their understanding while building effective communication skills.

Activity 4. literature review (60 minutes)

Students will conduct a literature review focusing on classical discoveries related to classification of joints, such as Types of fibrous joint or types of synovial joint and compare it with Modern arthology.

Activity 5. Reporting (60 minutes)

Students will share the experiential learning activity of their assigned topic(s) to the teacher and teacher will discuss and summarise the experiential learning activity to the students.

Experiential-Learning 6.3 : Axial skeleton Joint

Total Learning Hours: 5 Hours

Activity 1. Teacher Demonstration (45 minutes)

The teacher will demonstrate the anatomy of Joints of axial skeleton according to Unani system of medicine to the students and will discuss experiential learning method. The

teacher will assign the topic(s) to the students.

Activity 2. Analysis (60 minutes)

Students will analyse the anatomy of axial skeleton joints, focusing on key landmarks and review how these landmarks may vary across different stages of life. (Infant, Children, Adult) as mentioned in Unani Classical Texts.

Activity 3. Literatures Review (45 minutes)

Students will go for thorough review of Unani Literatures of axial skeleton and compare it with modern arthrology.

Activity 4. Commentary (45 minutes)

Commentary on Unani medical texts related to anatomy of Joints of axial skeleton, explaining the concepts and principles in their own words.

Activity 5. Knowledge Application

Students will apply this understanding to clinical assessments, recognizing how variations in Joint anatomy can influence diagnostic decisions, treatment approaches and overall patient care. (45 minutes)

Activity 6. Presentation (60 minutes)

Presentation on the anatomy of axial skeleton joints as mentioned in Unani medical texts through 3D/4D models/Artificial Cadaver. Students will share the experiential learning activity of their assigned topic(s) to the teacher and teacher will discuss and summarise the experiential learning activity to the students.

Experiential-Learning 6.4 : Axial skeleton joints

Total Learning Hours: 5 Hours

Activity 1. Teacher Demonstration (30 minutes)

The teacher will demonstrate the anatomy of Joints of axial skeleton according to Unani system of medicine to the students and will discuss experiential learning method. The teacher will assign the topic(s) to the students.

Students experiential learning activity

Activity 2. Identification (60 minutes)

Identification and labelling of joints of axial skeleton like Vertebral joints, Rib and Vertebrae Joints, Skull Joints and Atlantoaxial Joint based on classical Unani medical texts.

Activity 3. Illustration (45 minutes)

Making illustrations, posters/charts/Models of anatomy of Joints of axial skeleton as mentioned in classical Unani medical texts.

Activity 4. Project work (45 minutes)

Projects or assignments on anatomy of Joints of axial skeleton as mentioned in classical Unani medical texts.

Activity 5. Debate

- Debate or group discussion on the anatomy of Joints of axial skeleton as described in classical Unani medical texts. (45 minutes)
- Student will engage in discussions, ask questions, and clarify doubts about their hypotheses, refining their understanding through peer and instructor feedback. (45 minutes)
- Students will report the Experiential activity of their assigned topic(s) and teacher will summarize the activity to the students. (30 Minutes)

Experiential-Learning 6.5 : Appendicular joint**Total Learning Hours: 5 Hours****Activity 1. Teacher Demonstration (30 minutes)**

The teacher will demonstrate the anatomy of Joints of appendicular skeleton according to Unani system of medicine to the students and will discuss experiential learning method. The teacher will assign the topic(s) to the students.

Activity 2. Analysis (60 minutes)

Students will analyse the anatomy of appendicular skeleton joints, focusing on key landmarks and review how these landmarks may vary across different stage of life. (Infant, Children, Adult) as mentioned in Unani Classical Texts.

Activity 3. Literatures Review (45 minutes)

Students will go for thorough review of Unani Literatures of appendicular skeleton and compare it with modern arthrology.

Activity 4.Commentary (45 minutes)

Commentary on Unani medical texts related to anatomy of Joints of appendicular skeleton, explaining the concepts and principles in their own words.

Activity 5.Apply Knowledge

Students will apply this understanding to clinical assessments, recognizing how variations in Joint anatomy can influence diagnostic decisions, treatment approaches and overall patient care.(45 minutes)

Activity 6.Presentation

- Presentation on the anatomy of appendicular skeleton joints as mentioned in Unani medical texts through 3D/4D models/Artificial Cadaver. (45 minutes)
- Students will share the experiential learning activity of their assigned topic(s) to the teacher and teacher will discuss and summarise the experiential learning activity to the students.(30 minutes)

Experiential-Learning 6.6 : Appendicular Joints

Total Learning Hours: 5 Hours

1.Teacher Demonstration (30 minutes)

The teacher will demonstrate the anatomy of Joints of appendicular skeleton according to Unani system of medicine to the students and will discuss experiential learning method. The teacher will assign the topic(s) to the students.

Students Experiential Activities:

The students will engage in experiential learning activity related to the anatomy and demonstrate the anatomy of Joints of axial skeleton according to Unani system of medicine through:

2.Field Visit:

Learn experiential learning through Visit of Ilaj bil Tadbeer and orthopaedics department, for analysis of applications of Unani concepts of Joint. (60 minutes)

3. Identification and labelling

Identification and labelling of joints of appendicular skeleton based on classical Unani medical texts. (60 minutes)

4. Illustration Making

Making illustrations, posters and flow charts of anatomy of Joints of appendicular skeleton mentioned in classical unani medical texts. (45 minutes)

5. Debate:

Debate on the anatomy of Joints of appendicular skeleton as described in classical Unani medical texts. (60 minutes)

6. Project work

Project work on Unani concepts of appendicular joint anatomy. Students will report the experiential activity of their assigned topic(s) and teacher will summarize the experiential activity to the students. (45 minutes)

Experiential-Learning 6.7 : Pathogenesis of Amraz-e-Mafasil (Diseases of Joints)

Total Learning Hours: 4 Hours

Activity 1. Teacher Demonstration (30 minutes)

The teacher will demonstrate the applied anatomy of joints according to Unani system of Medicine to the students and will discuss experiential learning method. The teacher will assign the topic(s) to the students.

Activity 2. Literatures Review (60 minutes)

Students will review all classical Unani Texts related to applied anatomy of Joint and will make assignment on Unani Pathogenesis of Amraz-e-Mafasil (Diseases of Joints) or Commentary on Unani medical texts related to applied anatomy of joints, explaining the concepts and principles in their own words.

Activity 3. Group Discussion (60 minutes)

Group Discussion on structural changes in case of osteoarthritis, Gout, Temporomandibular joint disorders, fibromyalgia, Amyloidosis and Paget's diseases etc as mentioned in Unani Literatures.

Activity 4. Case Presentations

- Case Presentations with joint diseases or injuries as mentioned in the classical Unani medical texts or clinical correlation.(60 minutes)
- Students will share the experiential learning activity of their assigned topic(s) to the teacher and teacher will discuss and summarise the experiential learning activity to the students.(30 minutes)

Experiential-Learning 6.8 : Real Life Case Presentation of Joint Disorders.

Total Learning Hours: 5 Hours

Activity 1. Teacher Demonstration (30 minutes)

The teacher will demonstrate the applied anatomy of joints according to Unani system of Medicine to the students and will discuss Method of Experiential activity.

Students Experiential Activity:

Activity 2. Identification (60 minutes)

Students will perform palpation on peers or anatomical models to identify Joint surface landmarks, They will assess the accuracy and effectiveness of their technique in locating key structures such as Glenoid labrum, rotator cuff around the shoulder joint etc.

Activity 3. Analysis and Observation (60 minutes)

Students will reflect on their palpation experience, evaluating their success in identifying landmarks, feedback provide by students on technique and students will discuss challenges and improvements in small groups.

Activity 4. Field Visit (60 minutes)

Different group of students assign for visit in Ilaj Bil Tadbeer (Regimenal Therapy) and orthopaedic department for assessment of external changes in case of Joint disorders.

Activity 5. Report Making (60 minutes)

Student will construct Report on Case based learning, students will draft structured radiology reports, Reports will include a clear description of findings, mapping of Unani Concepts, clinical significance and recommendations for further action or follow-up.

Activity 6. Feedback Session (30 minutes)

Students will share the experiential learning activity of their assigned topic(s) to the teacher and teacher will discuss and summarise the experiential learning activity to the

students.

Modular Assessment	
Assessment method	Hour
Instructions – Formative Assessment 6 hours Conduct a structured Modular assessment. Assessment will be for 75 marks for this module. Keep structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C Total Marks for this module: 75 1.Long Answer Questions (LAQs) Marks: 20 (2 questions from unit 2 and unit 3 carrying 10 marks each) 2. Multiple choice Questions (MCQs) Marks: 10 3.Real Life Case Presentation Marks: 20 4. Compilation: Marks: 25 Or Any practical in converted form can be taken for assessment. (30 marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (45 marks)	6

Table 4 : Practical Training Activity

(*Refer table 3 of similar activity number)

Practical No*	Practical name	Hours
1.1	History of Anatomy in Ancient period	4
1.2	Dissection and preservation of Cadaver	4
1.3	Anatomical contributions of Greek, Roman, Arab, Persian and Indian scholars	6
1.4	Anasir-e-Arba'a and Akhlat Arba'a	6
2.1	Unani Terminology of gross natomy.	6
2.2	Unani terminology of microscopic structures	4
3.1	Anasir-e-Arba and Modern biochemistry	5
3.2	Definition and classification of Organ	5
3.3	Unani Concept of Takhleeq-e Janeen	5
3.4	Takhleeq-e Janeen and Modern human Embryology	5
4.1	Bone and its applied aspects.	5
4.2	Membranes and its applied aspects.	5
4.3	Muscles and its applied aspects.	5
4.4	Blood vessels and its applied aspects	5
4.5	Cartilage	5
4.6	Tendon and Ligament	5
4.7	Fats and Nerves	5
4.8	Bone marrow, Nails and hair	5
5.1	Compound organs according to A'aza-e- Ra'eesa (Principal organs) and Ā'aza-e- Ghair Ra'eesa (Accessory organs).	4
5.2	A'aza-e- Haiwaniyah (organs of blood circulation and respiration)	4

5.3	A'aza-e- Nafsaniya (organs of psychic functions)	4
5.4	A'aza-e- Tabaiya (organs of nutrition and growth)	4
5.5	A'aza-e- Tanasuliyah (organs of Reproduction).	4
5.6	A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah.	5
5.7	A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyah.	5
5.8	A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah.	5
5.9	A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah.	5
6.1	Classification of Joints in Unani medicine.	8
6.2	Functional Anatomy of Axial Joints	7
6.3	Appendicular Joints: Movements Examination.	7
6.4	Applied anatomy of joints	4
6.5	Clinical Examination of Joints.	4

Table 5 : Experiential learning Activity

(*Refer table 3 of similar activity number)

Experiential learning No*	Experiential name	Hours
1.1	History of Anatomy in Ancient period	5
1.2	Preservation of Cadaver	7
1.3	Anatomical Contributions of Greek, Roman, Arab, Persian and Indian scholars	6
1.4	Importance of Anasir-e-Arba'a and Akhlat Arba'a	8
2.1	Unani Terminology and its Etymology	7
2.2	Unani terminology of microscopic structures	6
3.1	Anasir-e-Arba'a and Temperament	7
3.2	Concepts of simple and compound organs	6
3.3	Unani Concept of Takhleeq-e Janeen	6
3.4	Takhleeq-e Janeen & Modern Human Embryology	7
4.1	Bone and its applied aspects.	7
4.2	Membranes	6
4.3	Muscles and its applied aspects.	7
4.4	Blood Vessels	6
4.5	Cartilage	6
4.6	Tendon and Ligament	7
4.7	Fats and Nerves	7
4.8	Bone marrow, Nails and Hair	6
5.1	Compound organs: classification according to A'aza-e- Ra'eesa (Principal organs) and Ā'aza-e- Ghair Ra'eesa (Accessory organs).	6

5.2	A'aza-e- Haiwaniyah (organs of blood circulation and respiration)	6
5.3	A'aza-e- Nafsaniya (organs of psychic functions).	6
5.4	A'aza-e- Tabaiya (organs of nutrition and growth).	6
5.5	A'aza-e- Tanasuliyah (organs for reproduction):	6
5.6	A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Haiwaniyah.	6
5.7	A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Nafsaniyah.	5
5.8	A'aza-e- Muhaiyah (Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tabaiyah.	6
5.9	A'aza-e- Muhaiyah(Pre-serving organs) and A'aza-e- Mo'adiyah (Post- Serving organs) of A'aza-e- Tanasuliyah.	5
6.1	Compilation on Unani Concepts of Classification of Joints.	5
6.2	Arthology: Unani and Modern Classification	5
6.3	Axial skeleton Joint	5
6.4	Axial skeleton joints	5
6.5	Appendicular joint	5
6.6	Appendicular Joints	5
6.7	Pathogenesis of Amraz-e-Mafasil (Diseases of Joints)	4
6.8	Real Life Case Presentation of Joint Disorders.	5

Table 6 : Assessment Summary: Assessment is subdivided in A to H points
6 A : Number of Papers and Marks Distribution

Subject Code	Paper	Theory	Practical	Total
UNIPG-AB-TB	1	100	200	300

6 B : Scheme of Assessment (Formative and Summative Assessment)

Credit frame work

UNIPG-AB-TB consists of 6 modules totaling 16 credits, which correspond to 480 Notional Learning Hours. Each credit comprises 30 Hours of learner engagement, distributed across teaching, practical, and experiential learning in the ratio of 1:2:3. Accordingly, one credit includes 5 hours of teaching, 10 hours of practical training, 13 hours of experiential learning, and 2 hours allocated for modular assessment, which carries 25 marks.

Formative Assessment : Module wise Assessment: will be done at the end of each module. Evaluation includes learners active participation to get Credits and Marks. Each Module may contain one or more credits.

Summative Assessment: Summative Assessment (University examination) will be carried out at the end of Semester II.

6 C : Calculation Method for Modular Grade Points (MGP)

Module Number & Name (a)	Credits (b)	Actual No. of Notional Learning Hours (c)	Attend ed Numb er of notional Learning hours (d)	Maximu m Marks of assessm ent of modules (e)	Obtain ed Marks per modul e (f)	MGP = $d \times f / c \times e \times 100$
M1. تاریخ تشریح البدن و جسم انسان کی تشکیل کے متعلق یونانی نظریہ (History of Anatomy & Unani concepts of Human Body formation)	2	60		50		
M2. تشریح البدن کے متعلق یونانی اصطلاحات اور اعلیٰ وجہ تسمیہ (Unani Terminology and their Etymology related to human Anatomy)	1	30		25		
M3. طب یونانی کے مطابق تخلیق اعضاء و تکوین کا نظریہ (Concepts of formation of organs and embryogenesis according to Unani system of medicine)	2	60		50		
M4. طب یونانی کے مطابق اعضاء مفردہ کی تعریف، تصسیم مع اطلاقی پہلو (Definition, classification, Anatomy of simple organs according to Unani system of medicine and its applied aspects)	4	120		100		
M5. طب یونانی کے مطابق اعضاء مرکبہ کی تعریف، تصسیم مع اطلاقی پہلو (Definition, Classification, Anatomy and Applied aspects of compound organs according to Unani system of Medicine)	4	120		100		
M6. طب یونانی کے مطابق مفاصل کی تعریف، تصسیم مع اطلاقی پہلو (Definition, Classification and Anatomy of Joints with its applied aspects according to Unani system of Medicine)	3	90		75		
MGP = ((Number of Notional learning hours attended in a module) X (Marks obtained in the modular assessment)) / (Total number of Notional learning hours in the module) X (Maximum marks of the module)) X 100						

6 D : Semester Evaluation Methods for Semester Grade Point Average (SGPA)

SGPA will be calculated at the end of the semester as an average of all Module MGPs. Average of MGPs of the Semester For becoming eligible for Summative assessment of the semester, student should get minimum of 60% of SGPA

SGPA = Average of MGP of all modules of all papers = add all MGPs in the semester/ no. of modules in the semester Evaluation Methods for Modular Assessment

A S.No	B Module number and Name	C MGP
1	M1. تاریخ تشریح البدن و جسم انسان کی تشکیل کے متعلق یونانی نظریہ۔ (History of Anatomy & Unani concepts of Human Body formation)	C 1
2	M2. تشریح البدن کے متعلق یونانی اصطلاحات اور اٹی وجہ تسمیہ۔ (Unani Terminology and their Etymology related to human Anatomy)	C 2
3	M3. لمب یونانی کے مطابق تخلیق اعضا و خلق جنین کا نظریہ۔ (Concepts of formation of organs and embryogenesis according to Unani system of medicine)	C 3
4	M4. طب یونانی کے مطابق اعضاء مفردہ کی تعریف، تقسیم مع اطلاقی پہلو۔ (Definition, classification, Anatomy of simple organs according to Unani system of medicine and its applied aspects)	C 4
5	M5. طب یونانی کے مطابق اعضاء مرکبہ کی تعریف، تقسیم اور تشریح مع اطلاقی پہلو۔ (Definition, Classification, Anatomy and Applied aspects of compound organs according to Unani system of Medicine)	C 5
6	M6. طب یونانی کے مطابق مفاصل کی تعریف، تقسیم و تشریح مع اطلاقی پہلو۔ (Definition, Classification and Anatomy of Joints with its applied aspects according to Unani system of Medicine)	C 6
	Semester Grade point Average (SGPA)	(C1+C2+C3+C4+C5+C6) / Number of modules(6)

S. No	Evaluation Methods
1.	Method explained in the Assessment of the module or similar to the objectives of the module.

6 E : Question Paper Pattern

MD/MS Unani Examination
UNIPG-AB-TB
Sem II
Time: 3 Hours ,Maximum Marks: 100
INSTRUCTIONS: All questions compulsory

		Number of Questions	Marks per question	Total Marks
Q 1	Application-based Questions (ABQ)	1	20	20
Q 2	Short answer questions (SAQ)	8	5	40
Q 3	Analytical based structured Long answer question (LAQ)	4	10	40
				100

6 F : Distribution for summative assessment (University examination)

S.No	List of Module/Unit	ABQ	SAQ	LAQ
(M- 1) (History of Anatomy & Unani concepts of Human Body formation) (Marks: Range 5-20)				
1	(U-1) عہد عتیق میں طب یونانی سے متعلق تاریخ تشریح البدن	No	Yes	Yes
2	(U-2) طب یونانی میں بطن معش اور تحفظ معش کی تاریخ	No	Yes	Yes
3	(U-3) تشریح البدن میں یونانی، رومی، عربی، فارسی و ہندستانی اطباء کی خدمات	No	Yes	Yes
4	(U-4) (Role and importance of Anasir-e-Arba'a and Akhlat Arba'a in the formation of Human body and its applied aspects)	Yes	Yes	Yes
(M- 2) (Unani Terminology and their Etymology related to human Anatomy) (Marks: Range 5-10)				
1	(U-1) تشریح ظاہری سے متعلق یونانی اصطلاحات اور ان کی وجہ تسمیہ	No	Yes	No
2	(U-2) بدن انسان کی خوردبینی ساختوں سے متعلق یونانی اصطلاحات اور ان کی وجہ تسمیہ	No	Yes	No
(M- 3) (Concepts of formation of organs and embryogenesis according to Unani system of medicine) (Marks: Range 5-20)				
1	(U-1) Composition of organs according to Anasir-e-Arba'a and its applied aspects.	Yes	Yes	Yes
2	(U-2) Classification of organs according to Unani System of Medicine)	Yes	Yes	No
3	(U-3) Concepts of Takhleeq-e Janeen in Unani system of Medicine.)	No	Yes	No
4	(U-4) (Comparison of Unani Concepts of Takhleeq-e Janeen with Modern human Embryology.)	Yes	Yes	Yes
(M- 4) (Definition, classification, Anatomy of simple organs according to Unani system of medicine and its applied aspects) (Marks: Range 5-20)				
1	(U-1) طب یونانی کے مطابق عظم کی تعریف ، تقسیم اور ان کا اطلاقی پہلو	Yes	Yes	Yes
2	(U-2) طب یونانی کے مطابق غضروف کی تعریف ، تقسیم اور ان کا اطلاقی پہلو	Yes	Yes	Yes
3	(U-3) طب یونانی کے مطابق مخ کی تعریف ، تقسیم اور ان کا اطلاقی پہلو	Yes	Yes	Yes
4	(U-4) طب یونانی کے مطابق اوتار اور رباط کی تعریف ، تقسیم اور ان کا اطلاقی پہلو	Yes	Yes	Yes
5	(U-5) طب یونانی کے مطابق اغشیہ کی تعریف ، تقسیم اور ان کا اطلاقی پہلو	Yes	Yes	Yes
6	(U-6) طب یونانی کے مطابق عظم اور اعصاب کی تعریف ، تقسیم اور ان کا اطلاقی پہلو	Yes	Yes	Yes
7	(U-7) طب یونانی کے مطابق عروق دمیویہ کی تعریف ، تقسیم اور ان کا اطلاقی پہلو	Yes	Yes	Yes
8	(U-8) طب یونانی کے مطابق مخ، ظفر اور شعر کی تعریف ، تقسیم اور ان کا اطلاقی پہلو	Yes	Yes	Yes
(M- 5) (Definition, Classification, Anatomy and Applied aspects of compound organs according to Unani system of Medicine) (Marks: Range 5-20)				
1	(U-1) (Introduction of compound organs and Its classification according to A'aza-e- Ra'eesa (Principal organs) and A'aza-e- Ghair Ra'eesa (Accessory organs))	Yes	Yes	Yes
2	(U-2) (Introduction, Classification and Anatomy of compound organs)	Yes	Yes	Yes

	of A'aza-e- Haiwaniyah (Organs for circulation and respiration).			
3	(U-3) اعضاء نفسانيہ کا تعارف، تصیم و تشریح (Introduction, Classification and Anatomy of A'aza-e- Nafsaniya (organs for psychic functions)	Yes	Yes	Yes
4	(U-4) اعضاء طبیعیہ کا تعارف، تصیم و تشریح (Introduction, classification and Anatomy of A'aza-e- Tabaiya (organs for nutrition and growth))	Yes	Yes	No
5	(U-5) اعضاء تناسلیہ کا تعارف، تصیم و تشریح (Introduction, Classification and Anatomy of A'aza-e- Tanasuliyah (organs for Reproduction)	Yes	Yes	Yes
6	(U-6) اعضاء حیوانیہ کے اعضاء مہیہ و مودیہ کا یونانی نظریہ (Unani Concepts of Pre-serving and Post- Serving organs of A'aza-e- Haiwaniyah)	Yes	Yes	Yes
7	(U-7) اعضاء نفسانیہ کے اعضاء مہیہ و مودیہ کا یونانی نظریہ (Unani Concepts of Pre-serving and Post- Serving organs of A'aza-e- Nafsaniya)	Yes	Yes	Yes
8	(U-8) اعضاء طبیعیہ کے اعضاء مہیہ و مودیہ کا یونانی نظریہ (Unani Concepts of Pre-serving and Post- Serving organs of A'aza-e- Tabaiya)	Yes	Yes	Yes
9	(U-9) اعضاء تناسلیہ کے اعضاء مہیہ و مودیہ کا یونانی نظریہ (Unani Concepts of Pre-serving and Post- Serving organs of A'aza-e- Tanasuliyah)	Yes	Yes	Yes
(M- 6) طب یونانی کے مطابق مفاصل کی تعریف، تصیم و تشریح مع اطلاقی پہلو (Definition, Classification and Anatomy of Joints with its applied aspects according to Unani system of Medicine) (Marks: Range 5-20)				
1	(U-1) طب یونانی کے مطابق مفاصل کا تعارف اور تصیم (Introduction and classification of Joints in Unani system of medicine)	No	Yes	Yes
2	(U-2) اعضاء یونانی کے مطابق مفاصل ہیکل محوری کی تشریح (Anatomy of Joints of axial skeleton according to Unani system of medicine)	Yes	Yes	Yes
3	(U-3) اعضاء یونانی کے مطابق مفاصل ہیکل طرفی کی تشریح (Anatomy of Joints of appendicular skeleton according to Unani system of medicine)	Yes	Yes	Yes
4	(U-4) طب یونانی کے مطابق مفاصل کی اطلاقی تشریح (Applied anatomy of joints according to Unani system of Medicine)	Yes	Yes	Yes

6 G : Instruction for the paper setting & Blue Print for Summative assessment (University Examination)

Instructions for the paper setting.

1. 100 marks question paper shall contain:-

- Application Based Question: 1 No (carries 20 marks)
- Short Answer Questions: 8 Nos (each question carries 05 marks)
- Long Answer Questions: 4 Nos (each question carries 10 marks)

2. Questions should be drawn based on the table 6F.

3. Marks assigned for the module in 6F should be considered as the maximum marks. No question shall be asked beyond the maximum marks.

4. Refer table 6F before setting the questions. Questions should not be framed on the particular unit if indicated "NO".

5. There will be a single application-based question (ABQ) worth 20 marks. No other questions should be asked from the same module where the ABQ is framed.

6. Except the module on which ABQ is framed, at least one Short Answer Question should be framed from each module.

7. Long Answer Question should be analytical based structured questions assessing the higher cognitive ability.

8. Use the Blueprint provided in 6G or similar Blueprint created based on instructions 1 to 7

Blueprint		
Question No	Type of Question	Question Paper Format
Q1	Application based Questions 1 Question 20 marks All compulsory	M1.U4 Or M3.U1 Or M3.U2 Or M3.U4 Or M4.U1 Or M4.U2 Or M4.U3 Or M4.U4 Or M4.U5 Or M4.U6 Or M4.U7 Or M4.U8 Or M5.U1 Or M5.U2 Or M5.U3 Or M5.U4 Or M5.U5 Or M5.U6 Or M5.U7 Or M5.U8 Or M5.U9 Or M6.U2 Or M6.U3 Or M6.U4 Or
Q2	Short answer Questions Eight Questions 5 Marks Each All compulsory	1. M1.U1 Or . M1.U2 Or . M1.U3 Or . M1.U4 Or . M2.U1 Or . M2.U2 Or . M3.U1 Or . M3.U2 Or . M3.U3 Or . M3.U4 Or . M4.U1 Or . M4.U2 Or . M4.U3 Or . M4.U4 Or . M4.U5 Or . M4.U6 Or . M4.U7 Or . M4.U8 Or . M5.U1 Or . M5.U2 Or . M5.U3 Or . M5.U4 Or . M5.U5 Or . M5.U6 Or . M5.U7 Or . M5.U8 Or . M5.U9 Or . M6.U1 Or . M6.U2 Or . M6.U3 Or . M6.U4 2. M1.U1 Or . M1.U2 Or . M1.U3 Or . M1.U4 Or . M2.U1 Or . M2.U2 Or . M3.U1 Or . M3.U2 Or . M3.U3 Or . M3.U4 Or . M4.U1 Or . M4.U2 Or . M4.U3 Or . M4.U4 Or . M4.U5 Or . M4.U6 Or . M4.U7 Or . M4.U8 Or . M5.U1 Or . M5.U2 Or . M5.U3 Or . M5.U4 Or . M5.U5 Or . M5.U6 Or . M5.U7 Or . M5.U8 Or . M5.U9 Or . M6.U1 Or . M6.U2 Or . M6.U3 Or . M6.U4 3. M1.U1 Or . M1.U2 Or . M1.U3 Or . M1.U3 Or . M1.U4 Or . M2.U1 Or . M2.U2 Or . M3.U1 Or . M3.U2 Or . M3.U3 Or . M3.U4 Or . M4.U1 Or . M4.U2 Or . M4.U3 Or . M4.U4 Or . M4.U5 Or . M4.U6 Or . M4.U7 Or . M4.U8 Or . M5.U1 Or . M5.U2 Or . M5.U3 Or . M5.U4 Or . M5.U5 Or . M5.U6 Or . M5.U7 Or . M5.U8 Or . M5.U9 Or . M6.U1 Or . M6.U2 Or . M6.U3 Or . M6.U4 4. M1.U1 Or . M1.U2 Or . M1.U3 Or . M1.U4 Or . M2.U1 Or . M2.U2 Or . M3.U1 Or . M3.U2 Or . M3.U3 Or . M3.U4 Or . M4.U1 Or . M4.U2 Or . M4.U3 Or . M4.U4 Or . M4.U5 Or . M4.U6 Or . M4.U7 Or . M4.U8 Or . M5.U1 Or . M5.U2 Or . M5.U3 Or . M5.U4 Or . M5.U5 Or . M5.U6 Or . M5.U7 Or . M5.U8 Or . M5.U9 Or . M6.U1 Or . M6.U2 Or . M6.U3 Or

		. M1.U4 5. M1.U1 Or . M1.U2 Or . M1.U3 Or . M1.U4 Or . M2.U1 Or . M2.U2 Or . M3.U1 Or . M3.U2 Or . M3.U3 Or . M3.U4 Or . M4.U1 Or . M4.U2 Or . M4.U3 Or . M4.U4 Or . M4.U5 Or . M4.U6 Or . M4.U7 Or . M4.U8 Or . M5.U1 Or . M5.U2 Or . M5.U3 Or . M5.U4 Or . M5.U5 Or . M1.U6 Or . M5.U7 Or . M5.U8 Or . M5.U9 Or . M6.U1 Or . M6.U2 Or . M6.U3 Or . M6.U4 6. M1.U1 Or . M1.U2 Or . M1.U3 Or . M1.U4 Or . M2.U1 Or . M2.U2 Or . M3.U1 Or . M3.U2 Or . M3.U3 Or . M3.U4 Or . M4.U1 Or . M4.U2 Or . M4.U3 Or . M4.U4 Or . M4.U5 Or . M4.U6 Or . M4.U7 Or . M4.U8 Or . M5.U1 Or . M5.U2 Or . M5.U3 Or . M5.U4 Or . M5.U5 Or . M5.U6 Or . M5.U7 Or . M5.U8 Or . M5.U9 Or . M6.U1 Or . M6.U2 Or . M6.U3 Or . M6.U4 7. M1.U1 Or . M1.U2 Or . M1.U3 Or . M1.U4 Or . M2.U1 Or . M2.U2 Or . M3.U1 Or . M3.U2 Or . M3.U3 Or . M3.U4 Or . M4.U1 Or . M4.U2 Or . M4.U3 Or . M4.U4 Or . M4.U5 Or . M4.U6 Or . M4.U7 Or . M4.U8 Or . M5.U1 Or . M5.U2 Or . M5.U3 Or . M5.U4 Or . M5.U5 Or . M5.U6 Or . M5.U7 Or . M5.U8 Or . M5.U9 Or . M6.U1 Or . M6.U2 Or . M6.U3 Or . M6.U4 8. M1.U1 Or . M1.U2 Or . M1.U3 Or . M1.U4 Or . M2.U1 Or . M2.U2 Or . M3.U1 Or . M3.U2 Or . M3.U3 Or . M3.U4 Or . M4.U1 Or . M4.U2 Or . M4.U3 Or . M4.U4 Or . M4.U5 Or . M4.U6 Or . M4.U7 Or . M4.U8 Or . M5.U1 Or . M5.U2 Or . M5.U3 Or . M5.U4 Or . M5.U5 Or . M5.U6 Or . M5.U7 Or . M5.U8 Or . M5.U9 Or . M6.U1 Or . M6.U2 Or . M6.U3 Or . M6.U4
Q3	Analytical Based Structured Long answer Questions Four Questions 10 marks each All compulsory	1. M1.U1 Or . M1.U2 Or . M3.U1 Or . M4.U1 Or . M4.U2 Or . M4.U4 Or . M5.U1 Or . M6.U1 2. M3.U4 Or . M4.U6 Or . M5.U6 Or . M6.U2 3. M1.U4 Or . M4.U7 Or . M4.U7 Or . M5.U3 Or . M5.U5 Or . M5.U9 Or . M6.U3 4. M4.U8 Or . M5.U7 Or . M5.U9 Or . M6.U4

6 H : Distribution of Practical Exam (University Examination)

S.No	Heads	Marks
1	1. long case or Procedure/Major practical as applicable (30 Marks) 1.Demonstration of Portraits of Anotmist/Model/Specimen Two Portraits or models or specimens may be selected from any unit across all six modules for detailed demonstration, each carrying 20 marks. 2. Demonstration of Radiographs Four Radiographs may be selected from any unit across modules 3, 4, 5 & 6 for detailed demonstration, each carrying 10 marks.	80
2	2.short Case Spotter Examination 6×5=30 marks Six spotters may be selected from any unit across the 6 Modules. Each spotter will include two questions: (i) Identification and (ii) Relevant Features.	30
3	3. Procedural Procedure 1.Perform a detailed dissection on Cadaver/Artificial Cadaver/Online e-Dissection/Virtual dissection of the specified region to identify and examine key anatomical structures, analyse their spatial relationships and functional connections, while highlighting their clinical relevance in medical practice. (15 Marks) Any of the following topics may be assigned to the student for dissection. The student will be randomly assigned one topic by draw of lots. M4U1, M4 U2, M4 U3, M5U1,M5U2, M5 U3, M5U4, M5U5, M5U6, M5U7, M5U8, M5U9 2.Microscopic study of Simple and Compound Organs Slides preparation of simple and compound organs and analyze the structures of organ through microscope.(15 Marks) Any of the following topics may be assigned to the student for dissection. The student will be randomly assigned one topic by draw of lots. M3U1,M3U2,M4U1,M4U2,M4U3,M4U4,M5U1 M5/ U2 M5 U3, M5U4, M5U5, M5U6, M5U7, M5U8, M5U9	30
4	4. Viva (2 Examiners: 20 marks each)	40
5	5. Logbook (Activity record)	10
6	6. Practical/Clinical record	10
Total Marks		200

Reference Books/ Resources

S.No	References
1	Abul Hasan ali bin sahal Raban Tabri, " Firdausul Hikamt fit Tib" Urdu Translation By Hakeem Rasheed Ashraf Nadvi, Diamond Publication Lahore,
2	Ibne Abbas Majoosi,"Kamil Us Sana", Urdu Translation by Gulam Hussain Kantoori, Idara Kitab-ul-Shifa, New Delhi
3	Zakaria Razi, 'Kitab-ul-Hawi', 13th Volume, Central council for Research in Unani Medicine, New Delhi
4	Ibne Qaf, Kitabul Umda fil Jarahat, Central Council for research in Unani Medicine, New Delhi.
5	Ibne Sina, Al Qanoon Fit Tib, Urdu translation by Gulam Hussain Kantoori,
6	Abu Bakar Mohd Bin Zakariya Razi, Kitabul Mansoori
7	Ibn-e Rushd, Kitabul Kuliyat
8	Ibn-e Jazla, Takweemul Abdan
9	Abdul Latif Bagdadi, . Kitabul Janeen
10	Ismail Jurjani, Zakhira-e- Khawarizm Shahi
11	Hakeem Kabiruddin, Tashreeh-e- Sageer-
12	Hakeem Kabbeeruddin, .Tashreeh-e- Kabeer-
13	-Prof Syed Ishtiaq Ahmad, .Kuliyat-e- Asari
14	Prof Iqtidarul Hasan Zaidi., A Text Book on Kulliya-e- Umoor –e – Taiyah
15	Dr. Shabbir Ahmad..Tashreehul Ezaam -
16	- Dr. Shabbir Ahmad, Tashreehul Azlaat
17	Hakeem Mohd Ahmad Lari,ashreeh-ul-Ahsha-
18	Ibn Sina Abu Ali Husain bin Abdullah, “Al Qanoon fil Tibb, Book-I, English translation of the critical Arabic Text”, Jamia Hamdard, New Delhi
19	Razi Zakariya, “Kitab-Al-Mansoori”, Urdu Translation, CCRUM, New Delhi, 1991
20	Chaurasia B.D., “Churasia’s Human Anatomy”, 6th edition, CBS Publishers & distributors Pvt Ltd, 2013
21	Azmi A. A, “Basic Concepts of Unani Medicine-A Critical Study”, 1st edition, Department of History of Medicine, Jamia Hamdard, New Delhi, 1995
22	Baghdadi I. H., “Kitabul Mukhtarat Fil Tibb”, Urdu translation, CCRUM, New Delhi, 2005
23	Nafees B, Kuliyat e Nafisi (Translation and Elaboration) Sharah by Hkm. Kabiruddin, Idare Kitab-ul- Shifa, New Delhi
24	Ahman S.I, “Al Umoor Al Tabiyah”, 1st Edition, Saini Printers, New Delhi
25	Ibn-e-Rushad M, “Kitab-A1-Kuliyat”, Urdu Translation, CCRUM, New Delhi,
26	Tabri, Rabban, Ali Bin Sahal, “Firdaus-ul-Hikmat”, Urdu translation by Mohd. Adl Shah Sambhali; Faisal Pub., Deoband
27	Ahmad S.I., Kuliyat-e-Asri, New Public Press wa Aala Press New Delhi.
28	Galen, “Kitab-Fil-Mizaj”, edited & translated by Syed Zillurrahman, International printing press, Aligarh
29	Masihi, Aminuddaulah Abu-Faraj Ibnul-Qaf, “Kitab Al-Umdah Fil Jarahat”, Vol 1, Urdu translation by CCRUM

30	Tortora Gerard J., Derrickson Bryan. "Principles of Anatomy & physiology", 13th edition, John Wiley & Sons Inc., Hoboken NJ, 2011
31	Singh Inderbir, "Textbook of Anatomy", 4th Edition, 2006, Jaypee Brothers Medical Publishers (p) Ltd, New Delhi.
32	Hamdani, Syed Kamal Hussain, "Usool-e Tibb", Qaumi Council Braye Frogh-e Urdu, N. Delhi
33	Hassan S. M., "A Rational interpretation of the Four cosmic Elements as Operating in Alchemy", Theories and Philosophy of medicine, IInd Edition, JHMMR, New Delhi
34	Taiyab M, "Philosophy of Greco-Arabian Medicine", A.M.U. Press, Aligarh
35	Latif A. Falsafi, Shifa ul Mulk, "Tajdeed-e- Tibb", Edited by Hkm. Syed Zillur Rehman, Ala Press, Delhi
36	Zulkifle M., Zaidi I. H., and Ansari A. H., "Concept of embryology in Unani medicine", Unimed Kulliyat, A Journal of Unani Medicine, Published by Department of Kulliyat, AKTC, A.M.U, Aligarh, April-September 2005, Volume-I, Issue-I
37	Gruner O.C, "A Treatise on the Cannon of Medicine of Avicenna", Luzac and Company, London, 1930
38	Ibn-e Abi Usaibah, Uyun al-anba' fi Tabaqat al-atibba', Urdu translation by CCRUM, N. Delhi. 1992
39	H. S.M. Hassan Nigrani, Tareekh-e Tibb (Ibtida ta Asr-e Hazir), National Council for Promotion of Urdu Language, N. Delhi 1st Edition 2000
40	Prof Ashhar Qadeer, Taarikh-i-Tib wa Akhlaqiyat, Publication Division, AMU, Aligarh, 8th Edition, 2024
41	Brenna CTA. Post-Mortem Pedagogy: A Brief History of the Practice of Anatomical Dissection. Rambam Maimonides Med J. 2021 Jan 19;12(1):e0008. doi: 10.5041/RMMJ.10423. PMID: 33125320; PMCID: PMC7835115. https://pmc.ncbi.nlm.nih.gov/articles/PMC7835115/
42	U. Satyanarayana & U. Chakrpani, Biochemistry, Elsevier A division of RELX India pvt Ltd. 5th Edition
43	D. M Vasudevan, Shreekumari, Kannan Vaidhyanathan, Textbook Of Biochemistry For Medical Students, Jaypee Brothers Medical Publishers Pvt.Ltd, 10th Edition, 2023
44	Standard Unani Medical Terminology, CCRUM, N. Delhi, 2012 https://ccrum.res.in/writereaddata/UploadFile/Standard%20Unani%20Medical%20Terminology_1430.pdf
45	WHO international standard terminologies on unani medicine, WHO Team, 2023 https://www.who.int/publications/i/item/9789240064959
46	Al-Maani Dictionary https://www.almaany.com/en/dict/ar-en
47	Inderbir Singh' s Textbook of ANATOMY, Volume (1,2,3) Edited by Sudha Seshayyan, 6th Edition 2016 Jaypee brothers medical publishers
48	Practical Manual of Histology, Hina Sharma, Second edition, 2022 CBS Publishers & Distributors, New Delhi
49	Textbook of Human Embryology, Yogesh Sontakke, 2022 second edition, CBS Publishers & Distributors Pvt ltd, New Delhi

Abbreviations

Domain		T L Method		Level	
CK	Cognitive/Knowledge	L	Lecture	K	Know
CC	Cognitive/Comprehension	L&PPT	Lecture with PowerPoint presentation	KH	Knows how
CAP	Cognitive/Application	L&GD	Lecture & Group Discussion	SH	Shows how
CAN	Cognitive/Analysis	L_VC	Lecture with Video clips	D	Does
CS	Cognitive/Synthesis	REC	Recitation		
CE	Cognitive/Evaluation	SY	Symposium		
PSY-SET	Psychomotor/Set	TUT	Tutorial		
PSY-GUD	Psychomotor/Guided response	DIS	Discussions		
PSY-MEC	Psychomotor/Mechanism	BS	Brainstorming		
PSY-ADT	Psychomotor Adaptation	IBL	Inquiry-Based Learning		
PSY-ORG	Psychomotor/Origination	PBL	Problem-Based Learning		
AFT-REC	Affective/ Receiving	CBL	Case-Based Learning		
AFT-RES	Affective/Responding	PrBL	Project-Based Learning		
AFT-VAL	Affective/Valuing	TBL	Team-Based Learning		
AFT-SET	Affective/Organization	TPW	Team Project Work		
AFT-CHR	Affective/ characterization	FC	Flipped Classroom		
		BL	Blended Learning		
		EDU	Edutainment		
		ML	Mobile Learning		
		ECE	Early Clinical Exposure		
		SIM	Simulation		
		RP	Role Plays		
		SDL	Self-directed learning		
		PSM	Problem-Solving Method		
		KL	Kinaesthetic Learning		
		W	Workshops		
		GBL	Game-Based Learning		
		LS	Library Session		
		PL	Peer Learning		
		RLE	Real-Life Experience		

		PER	Presentations		
		D-M	Demonstration on Model		
		PT	Practical		
		X-Ray	X-ray Identification		
		CD	Case Diagnosis		
		LRI	Lab Report Interpretation		
		DA	Drug Analysis		
		D	Demonstration		
		D-BED	Demonstration Bedside		
		DL	Demonstration Lab		
		DG	Demonstration Garden		
		FV	Field Visit		
		JC	Journal Club		
		Mnt	Mentoring		
		PAL	Peer Assisted Learning		
		C_L	Co Learning		

Competency-Based Dynamic Curriculum for MD/ MS Unani

(PRESCRIBED BY NCISM)

Semester III-VI

Tashreehul Badan

(Human Anatomy)

(SUBJECT CODE : UNIPG-TB)

(Applicable from 2024-25 batch, from the academic year 2025-26 onwards until further
notification by NCISM)



॥ आयुषे सर्वलोकानाम् ॥



Preface

The postgraduate education program in Tahreehul Badan is designed to nurture specialists capable of delivering high-quality healthcare and advancing scientific research. By establishing uniform training guidelines nationwide, this curriculum ensures that students develop the necessary expertise to address the evolving needs of the medical community and society. Additionally, it equips them with teaching skills to integrate Tahreehul Badan with related subjects, fostering a holistic educational approach while remaining aware of their limitations.

Prepared by subject-content experts from the National Commission for Indian System of Medicine, the document underscores the foundational importance of Tashreehul Badan in medical sciences. A competency-based dynamic curriculum bridges classical Unani insights with modern advancements, enabling postgraduate students to grasp core aspects like microscopic anatomy, embryology, genetics, gross anatomy, and neuroanatomy. This comprehensive approach cultivates critical thinking, practical expertise, and research skills, preparing students for specialized clinical practices and academic roles.

The curriculum also emphasizes ethical conduct, empathetic interactions, and effective communication with students, colleagues, and donors' families. By promoting work ethics and eliminating personal prejudices, the program shapes well-rounded professionals. It aims to inspire students to contribute meaningfully to the field of Tashreehul Badan blending time-tested Unani principles with contemporary scientific discoveries, ensuring the growth of both individual practitioners and the discipline itself.

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NCISM

(NATIONAL COMMISSION FOR INDIAN SYSTEM OF MEDICINE)

Competency-Based Dynamic Curriculum for MD/ MS Unani

Tashreehul Badan (UNIPG-TB)

Summary & Credit Framework

Semester III-VI

Module Number & Name	Credits	Notional Learning Hours	Maximum Marks of assessment of modules (Formative Assessment)
Semester No : 3			
Paper No : 1 (تشریح جنینی، خوردبینی و علم النسل) (Tashreeh-e-Janeeni, Khurd-Beeni wa Ilmul Nasal) Embryology, Microscopic Anatomy and Genetics)			
M 1 علم الجنین عمومی (Ilmul Janeen Umoomi) General Embryology.	2	60	50
M 2 علم الجنین نظامی (Ilmul Janeen Nizami) Systemic Embryology.	2	60	50
Paper No : 2 (تشریح البدن و تشریح اطلاق) (Tashreeh ul Badan wa Tashreeh-e- Itlaqi) Gross and Applied Anatomy)			
M 9 (Khitt'a-e- Ra's ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Head Region.	2	60	50
M 10 (khitt'a Unq ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Neck Region.	2	60	50
Paper No : 3 (تشریح اعصابی) (Tashreeh-e-A'sabi) Neuroanatomy)			
M 17 (Nizam -e-A'sabi ka ta'aruf) Introduction of Nervous System	2	60	50
M 18 (Nizam-e- A'asab ki Baleedgi) Development of the Nervous System.	2	60	50

Paper No : 4 (تشریح سطحی، شعاعی، قانونی و جدید تشریحی تحقیقات) (Tashreeh-e-Satahi ,Shua'ei wa Qanooni wa Jadeed Tashreehi Tahqeeqat) Surface, Radiological, Forensic Anatomy and Recent Advances)			
M 25 (خطہ راس و عنق کی سطحی تحدید) (Khitta-e-Ra's wa Unq ki satahi Tahdeed) Surface marking of Head and Neck region.	2	60	50
M 26 (تشریح شعاعی) (Tashreeh-e- Shua'ei) Radiological Anatomy.	2	60	50
Semester No : 4			
Paper No : 1 (تشریح جنینی، خوردبینی و علم النسل) (Tashreeh-e-Janeeni, Khurd-Beeni wa Ilmul Nasal) Embryology, Microscopic Anatomy and Genetics)			
M 3 (خوردبینی تشریح) (Tashreeh-e- Khurd-beeni) Microscopic Anatomy. علم حیات خلوی (Ilm-e-Hayat-e-Khalwi) Cell Biology.	2	60	50
M 4 (نواة) (Nawat) Nucleus (دورہ غلیہ) (Daurah-e-Khaliyah) cell cycle. جسم کی خوردبینی ساخت (Jism ki Khurdbeeni Sakhten) Microscopic Structures of the body.	2	60	50
Paper No : 2 (تشریح البدن و تشریح اطباقی) (Tashreeh ul Badan wa Tashreeh-e- Itlaqi) Gross and Applied Anatomy)			
M 11 (طرف اعلیٰ کی ظاہری و اطباقی تشریح) (Taraf-e-A'ala ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Upper limbs.	2	60	50
M 12 (طرف اسفل کی ظاہری و اطباقی تشریح) (Taraf-e-Asfal ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Lower limbs.	2	60	50
Paper No : 3 (تشریح اعصابی) (Tashreeh-e-A'sabi) Neuroanatomy)			
M 19 (طریق حسی مخصوصہ) (Tariq-e- Hissi Makhsoosa) Special Sensory Pathways	2	60	50
M 20 (طرائق عصبی) (Taraiq-e- A'sabi) Neural Pathways	2	60	50
Paper No : 4 (تشریح سطحی، شعاعی، قانونی و جدید تشریحی تحقیقات) (Tashreeh-e-Satahi ,Shua'ei wa Qanooni wa Jadeed Tashreehi Tahqeeqat) Surface, Radiological, Forensic Anatomy and Recent Advances)			
M 27 (تصویروں کی تعبیر) (Tasveeron Ki Ta'abeer) Interpretation of Radiographs.	2	60	50

M 28 سطحی تحدید (Khitte-e-Sadr wa Batan ki Satahi Tahdeed) Surface marking of Thorax and Abdomen region.	2	60	50
Semester No : 5			
Paper No : 1 (تشریح جنینی، خوردبینی و علم النسل) (Tashreeh-e-Janeeni, Khurd-Beeni wa Ilmul Nasal) Embryology, Microscopic Anatomy and Genetics)			
M 5 نسیجی (Ajsam-e-Launiyah wa Kimya-e-Naseeji) Human Chromosomes and Histochemistry	2	60	50
M 6 جنسیہ کے ناقص (Ajsam-e-Launiyah jinsiyah ke naqais) Sex Chromosomal Abnormalities. علم النسل (Ilmul Nasal) Genetics. مختلف نسیجی کیمیائی و مناعی تکنیک (Mukhtalif Naseeji Keemyawi wa Mana'ati Takneek) Various Histological and Immunohistochemical Techniques.	2	60	50
Paper No : 2 (تشریح البدن و تشریح اطلاقی) (Tashreeh ul Badan wa Tashreeh-e- Itlaqi) Gross and Applied Anatomy)			
M 13 صدر کی ظاہری، جراحی و سریری تشریح (Sadr ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Thorax.	2	60	50
M 14 بطن کی ظاہری، جراحی و سریری تشریح (Batan ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Abdomen.	2	60	50
Paper No : 3 (تشریح اعصابی) (Tashreeh-e-A'sabi) Neuroanatomy)			
M 21 نظام تحت السریری، جوفی، قاعدی اور شبکی (Nizam-e-Tahataassareeri, Jaufi, Qa'edi and Shabki) Hypothalamo-Hypophyseal System, Limbic system	2	60	50
M 22 تشریح عصبی اطلاقی (Tashreeh-e- A'sabi Itlaqi) Clinical Neuroanatomy	2	60	50
Paper No : 4 (تشریح سطحی، شعاعی، قانونی و جدید تشریحی تحقیقات) (Tashreeh-e-Satahi , Shua'ei wa Qanooni wa Jadeed Tashreehi Tahqeeqat) Surface, Radiological, Forensic Anatomy and Recent Advances)			
M 29 طرف اعلیٰ و طرف اسفل کی سطحی تحدید (Taraf-e-Aa'la wa Taraf-e-Asfal ki satahi Tahdeed) Surface Marking of Upper And Lower Limbs.	2	60	50

M 30 تشریح قانونی (Tashreeh-e-Qanooni) Forensic Anatomy.	2	60	50
Semester No : 6			
Paper No : 1 (Tashreeh-e-Janeeni, Khurd-Beeni wa Ilmul Nasal) Embryology, Microscopic Anatomy and Genetics)			
M 7 نمط ارث کے متعدد ترتیبی عوامل (Namt-e-Irsi ke muta'addad tarteebi Awamil) Multifactorial Pattern of Inheritance. علم النسل سرطانی و صیدی (Ilmul Nasal Sartani wa sai'dali) cancer and Pharmacogenetics.	2	60	50
M 8 علم النسل تناسلی (Ilmul Nasal Tanasuli) Reproduction genetics. علاج جینی (Ilaj-e-Jeeni wa Ilmul Mana'at) Gene therapy and Immunology.	2	60	50
Paper No : 2 (Tashreeh ul Badan wa Tashreeh-e- Itlaqi) Gross and Applied Anatomy)			
M 15 کمانہ و عجان کی ظاہری، جراحی و سریری تشریح (Aanah wa ujan ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Pelvis, Perineum, خارجی اعضائے تناسلیہ مردانہ و زنانہ کی تشریح (Kharji Aaz'a-e-Tanasuliyah, Mardanah wa zananah ki Tashreeh) Anatomy of Male and female external genitalia.	2	60	50
M 16 عمومی تشریح بدن (Umoomi Tashreeh-e-Badan) General Anatomy of Human Body and cadaver care یونانی تدابیر کے لیے اطلاقی تشریح (Unani Tadabeer ke liye itlaqi tashreeh) Applied Anatomy for Unani Procedural Management.	2	60	50
Paper No : 3 (Tashreeh-e-A'asabi) Neuroanatomy)			
M 23 عصبی الیاف (Asab-e-alyaf) Nerve fibres. عصبی ضغیرات (Asabi Zafiraat) Nerve Plexuses.	2	60	50
M 24 مجموعہ سریری (Majmo'ah-e- Sareeri) Thalamic complex, نظام بطنی و خلاء (Nizam-e-Batani wa khil'a Tahat-e-Ankabutiyah) تحت العکبوت Ventricular system and Sub Arachnoid spaces.	2	60	50

Paper No : 4 (تشریح سطحی، شعاعی، قانونی و جدید تشریحی تحقیقات) (Tashreeh-e-Satahi ,Shua'ei wa Qanooni wa Jadeed Tashreehi Tahqeeqat) Surface, Radiological, Forensic Anatomy and Recent Advances)			
M 31 (تشریح میں جدید تحقیقات) (Tashreeh men Jadeed Tahqeeqaat) Recent Advances in Anatomy	2	60	50
M 32 (قانون تشریح و تشریح اخلاقیات) (Qanoon-e-Tashreeh wa Tashreehi Akhlaqiyat) Anatomy Law & Anatomical Ethics	2	60	50
	64	1920	1600

Credit frame work

UNIPG-TB consists of 32 modules totaling 64 credits, which correspond to 1920 Notional Learning Hours. Each credit comprises 30 hours of learner engagement, distributed across teaching, practical, and experiential learning in the ratio of 1:2:3. Accordingly, one credit includes 5 hours of teaching, 10 hours of practical training, 13 hours of experiential learning, and 2 hours allocated for modular assessment, which carries 25 marks.

Important Note: The User Manual MD/MS Unani is a valuable resource that provides comprehensive details about the curriculum file. It will help you understand and implement the curriculum. Please read the User Manual before reading this curriculum file. The curriculum file has been thoroughly reviewed and verified for accuracy. However, if you find any discrepancies, please note that the contents related to the MSE should be considered authentic. Each paper has 16 credits and each semester covers 16 credits across 4 papers. In case of difficulty and questions regarding the curriculum, write to syllabus24uni@ncismindia.org

Credit Analysis Overview					
Sem/Paper	Paper No 1	Paper No 2	Paper No 3	Paper No 4	Credits
Semester 3	M-1 2 Crs	M-9 2 Crs	M-17 2 Crs	M-25 2 Crs	16
	M-2 2 Crs	M-10 2 Crs	M-18 2 Crs	M-26 2 Crs	
Semester 4	M-3 2 Crs	M-11 2 Crs	M-19 2 Crs	M-27 2 Crs	16
	M-4 2 Crs	M-12 2 Crs	M-20 2 Crs	M-28 2 Crs	
Semester 5	M-5 2 Crs	M-13 2 Crs	M-21 2 Crs	M-29 2 Crs	16
	M-6 2 Crs	M-14 2 Crs	M-22 2 Crs	M-30 2 Crs	

Credit Analysis Overview					
Sem/Paper	Paper No 1	Paper No 2	Paper No 3	Paper No 4	Credits
Semester 6	M-7 2 Crs	M-15 2 Crs	M-23 2 Crs	M-31 2 Crs	16
	M-8 2 Crs	M-16 2 Crs	M-24 2 Crs	M-32 2 Crs	
Credits	16	16	16	16	64

Semester VI University examination					
Theory			Practical*		
Paper	Marks	Total	Practical Heads	Marks	Total
Paper -1	100	400	Long case or procedure/Major practical as applicable	100	400
			Short case or procedure/Minor practical	50	
Paper -2	100		Spotters	50	
			Assessing teaching ability	25	
Paper -3	100		Assessing presentation skills	25	
			Viva (4 examiners: 25 marks/each examiner)#	100	
Paper -4	100		Logbook (Activity record)	25	
			Practical/Clinical Record	25	
Semester VI University examination – 800 Marks					

* Details in 6H table; # No separate marks for dissertation viva.

Course Code and Name of Course

Course code	Name of Course
UNIPG-TB	Tashreehul Badan (Human Anatomy)

Table 1 : Course learning outcomes and mapped Program learning outcomes

CONo	A1 Course learning Outcomes (CO) UNIPG-TB At the end of the course UNIPG-TB, the students should be able to	B1 Course learning Outcomes mapped with program learning outcomes.
CO1	Demonstrate and apply knowledge of human anatomy and procedural management	PO1,PO2,PO8
CO2	Correlate Unani principles to human anatomy	PO3,PO5,PO6
CO3	Demonstrate gross and microscopic anatomy through research and innovations with the help of advanced techniques.	PO3,PO5,PO8
CO4	Illustrate developmental Anatomy (Genetics, Embryology, Surface Anatomy, Surgical anatomy, Neuroanatomy and functional pathways)	PO2,PO5,PO6
CO5	Interprete radiological anatomy and describe clinical application of anatomical knowledge, recent advances and its correlation with forensic anatomy.	PO1,PO5,PO6,PO8
CO 6	Describe the fundamentals of Unani medicine and its Application in the field of research in anatomy.	PO3,PO4,PO6,PO7,PO8
CO 7	Communicate anatomy law, basic Unani anatomical concepts and ethics to the learners and researchers	PO1,PO3,PO4,PO6

Table 2: Course contents (Modules - Credits and Notional Learning Hours)

Paper No : 1 تشریح جنینی، خوردبینی و علم النسل (Tashreeh-e-Janeeni, Khurd-Beeni wa Ilmul Nasal) Embryology, Microscopic Anatomy and Genetics						
Semester No : 3						
2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
	M-1 علم الجنین عمومی (Ilmul Janeen Umoomi) General Embryology. This module provides an in-depth understanding of the fundamental processes of human development from gametogenesis to organogenesis. This module focuses on the cellular and molecular mechanisms governing embryogenesis, the formation of body structures, and the clinical significance of congenital anomalies. This module will explore the dynamic changes occurring during early human development and their applications in medical science, particularly in reproductive biology, developmental genetics, and teratology. The module integrates theoretical knowledge with histological, imaging, and experimental techniques to provide a comprehensive understanding of embryology. As far as research relevance is concerned, this module bridges the gap between theoretical embryology and clinical practice by emphasizing congenital	2	10	20	30	60

malformations, prenatal diagnostics, and advances in reproductive medicine. It also introduces students to research opportunities in developmental biology and regenerative medicine. • M 1U 1 علم الجنين عمومی (Ilmul Janeen Umoomi) General Embryology -1 1.1.1 علم الجنين عمومی (Ilmul Janeen Umoomi) General Embryology. 1.1.2 تكون خلايا جنسية (Takawwun-e-khlaya jinsiyah) Gametogenesis). 1.1.3 تخصيب (Takhseeb) Fertilization. 1.1.4 غرس الجنين (Gharsul-Janeen) Implantation. • M 1U 2 علم الجنين عمومی (Ilmul Janeen Umoomi) General Embryology -II 1.2.1 مشيمة (Mashimah) placenta. 1.2.2 باليدگی جنین اولی (Baleedgi-e-Janeen awwali) Early Embryonic Development.					
M-2 علم الجنين نظامی (Ilmul Janeen Nizami) Systemic Embryology. This module focuses on the detailed study of the development of organ systems in the human body. It covers the sequential development of each system from the embryonic to the fetal stage, highlighting the molecular mechanisms, genetic regulation, and clinical relevance of congenital anomalies. This module integrates embryological knowledge with applied clinical concepts, emphasizing congenital malformations, developmental disorders, and their impact on human health. It provides postgraduate students with a strong foundation in developmental anatomy, essential for careers in anatomy, embryology, pediatrics, obstetrics, and genetic research. This module also bridges embryology with clinical medicine by addressing birth defects,	2	10	20	30	60

	prenatal diagnosis, and regenerative medicine. It also provides insights into the role of stem cells, genetic therapies, and advancements in fetal medicine. • M 2U 1 علم الجنين نظامی (Ilmul Janeen Nizami) Systemic Embryology-I 2.1.1. علم الجنين نظامی (Ilmul Janeen Nizami) Systemic embryology. 2.1.2. تطور نظام اعضاء (Tatawwur -e-Nizm-e-A'aza) Development of Organ systems. 2.1.3. Systemic embryology, Development of Organ systems • M 2U 2 علم الجنين نظامی (Ilmul Janeen Nizami) Systemic Embryology-II 2.2.1. خلقي نقائص مع تكون شذوذ (Khalqi Naqais ma;a takawwun-e-Shuzooz) Congenital abnormalities with Teratogenesis. 2.2.2. خلقي نقائص تشريحي اساس (Khalqi Naqais ki Tashreehi Asas) Anatomical Basis Of Congenital Anomalies.					
		4	20	40	60	120
Semester No : 4						
2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
	M-3 علم حیات خلوی (Tashreeh-e- Khurd-beeni) Microscopic Anatomy. (Ilm-e-Hayat-e-Khalwi) Cell Biology.	2	10	20	30	60

	This module provides an in-depth understanding of the structural and functional organization of cells, tissues, and organs at the microscopic level. This module integrates classical histology with modern cell biology, emphasizing the cellular mechanisms that regulate tissue function, growth, and regeneration. It also explores recent advancements in microscopy techniques, stem cell research, and molecular cell biology, highlighting their clinical and research applications. Students will gain expertise in histological interpretation, tissue organization, and cellular interactions, which are fundamental to understanding disease pathology and therapeutic innovations. This module also bridges histology and cell biology with clinical applications, including disease pathology, regenerative medicine, and molecular diagnostics. It prepares students for careers in medical education, research, and healthcare. • M 3U 1 علم حیات خلوی (Ilm-e-Hayat-e-Khalwi) Cell Biology 3.1.1. علم حیات خلوی (Ilm-e-Hayat-e-Khalwi) Cell Biology. 3.1.2. رطوبت خلیہ (Ratubat-e-Khalya) Cytoplasm. 3.1.3. مصفوفہ خلیہ (Masfufah-e-Khuwiyah) Cytoplasmic Matrix. 3.1.4. غشاء خلیہ (Ghisha-e-khalyah) cell membrane. 3.1.5. عضویات خلیہ (Uzwyat-e- Khalyah) Cell organelles. • M 3U 2 خوردبینی تشریح (Tashreeh-e- Khurd-beeni) Microscopic Anatomy 3.2.1. بیکیل خلیہ (Haikal-e-Khalya) cytoskeleton. 3.2.2. خلوی مشمولات (Khalvi Mashmulat) Cell inclusions. 3.2.3. اهداب (Hudbah) Cilia، عصیہ (Isiyah) flagella.					

	3.2.4. (Khulaya't -e-Asasiyah ka Husul, istehkam aur Iste'mal) Collection, Maintenance and Application of Stem Cells. 3.2.5. (Bankuttabreed).Cryobanking.					
	جسم کی خوردبینی (Daurah-e-Khaliyah) cell cycle. نواۃ (Nawat) Nucleus ساخت (Jism ki Khurdbeeni Sakhten) Microscopic Structures of the body. This module provides an in-depth exploration of the nucleus, cell cycle, and microscopic structures of the human body, emphasizing their significance in growth, development, and disease processes. The course integrates cellular and molecular biology with microscopic anatomy, offering insights into the structural organization of tissues and organs at the microscopic level. Students will develop expertise in histological techniques, microscopy, and cell cycle regulation, gaining a strong foundation in cellular mechanisms underlying normal physiology and pathological conditions such as cancer and tissue degeneration. This module is crucial for understanding cellular and microscopic anatomy about health and disease. It provides the foundation for advanced research in histopathology, cancer biology, regenerative medicine, and molecular diagnostics. • M 4U 1 نواۃ (Nawat) Nucleus 4.1.1. نواۃ (Nawat) Nucleus) . 4.1.2. لفافہ نواۃ (Lifafah-e-Nawat) Nuclear Envelope. 4.1.3. مصفوفہ نواۃ (Masfufah-e- Nawat) Nuclear matrix. 4.1.4. نویہ (Nuwaiyah) Nucleolus. 4.1.5. حمض نواۃ (Himz-e-Nawawi) DNA.	2	10	20	30	60

	4.1.6. اجسام لونیه کے دیگر اجزاء (Ajsam-e- Launiyah ke deegar Ajza) Other Components of Chromatin. 4.1.7. تعمیر لحمین (Ta'ameer-e- Lahmeen) protein synthesis. • M 4U 2 دورہ خلیہ (Daurah-e-Khaliyah) cell cycle 4.2.1. نواۃ کے وہ تغیرات جو موت الخلیہ کی نشاندہی کرتے ہیں (Nawat ke who taghiyurat, jo maut-e-Khalyah ki Nishandahi karti hain) Nuclear changes indicating cell death. 4.2.2. انقسام مساوی (Inqisam-e-musawi) Mitosis. 4.2.3. انقسام تقلیلی (Inqisam -e- Taqleeli) Meiosis. 4.2.4. تجدید خلیہ (Tajdeed-e-khalyah) Cell Renewal 4.2.5. تفرق خلیہ و تکاثر خلیہ (Tafarruq-e-Khalyah wa Takasur-e Khalyah) Cellular Differentiation and Cellular Proliferation. 4.2.6. جسم کی خوردبینی ساخت (Jism ki Khurdbeeni Sakhten) Microscopic Structures of the body. تنظیم خلوی (Tanzeem-e-Khalwi) Cellular organization. 4.2.7. روشنی اور الیکٹران خوردبینی خواص (Raushni aur electron Khurdbeeni Khawas) light and Electron Microscopic features. 4.2.8. ساخت و افعال کے باہمی تعلقات (Sakht-wa-Af'al ke Bahami Ta'alluqat) Structure - function Correlations.					
		4	20	40	60	120
Semester No : 5						
2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning	2G Total

					including Modular Assessment	
	M-5 نسیمی (Ajsam-e-Launiyah wa Kimya-e-Naseeji) Human Chromosomes and Histochemistry The Human Chromosomes and histochemistry module provides an in-depth understanding of chromosomal structure, function, and abnormalities, along with histochemical techniques used to study cellular and tissue components. This module integrates cytogenetic, molecular biology, and histochemistry, emphasizing their applications in clinical diagnostics, pathology, and research. This Module will explore chromosomal organization, karyotyping, and genetic disorders, as well as histochemical staining techniques used to identify cellular components like proteins, carbohydrates, and nucleic acids. The Module is designed to enhance skills in microscopy, molecular genetics, and diagnostic histopathology. This module bridges genetics, histology, and pathology with clinical medicine, emphasizing the role of chromosomal analysis and histochemistry in disease diagnosis and medical research. It prepares students for careers in medical genetics, cytogenetic, pathology, and biomedical research. • M 5U 1 اجسام لونیہ (Ajsam-e-Launiyah) 5.1.1. علم النسل خلوی (Ilmul Nasal khalwi) Cytogenetics , اجسام لونیہ اور ان کی تعداد (Ajsam-e-Launiyah aur un ki Ta'dad) Chromosomes and their Number).	2	10	20	30	60

5.1.2. تقسیم اجسام لونیہ (Ta'qseem Ajsam-e- Launiyah) Chromosomes classification. 5.1.3. اجسام لونیہ: ترکیب و ترتیب (Ajsam-e- Launiyah tarkeeb-wa-tarteeb) Methods of Chromosome Preparation Banding Patterns. 5.1.4. اجسام لونیہ کے نقائص (Ajsam-e-Launiyah ke naqais) Chromosomal Abnormalities. 5.1.5. اجسام لونیہ مستقلہ کے نقائص (Ajsam-e-Launiyah mustaqillah ke naqais) Autosomal Abnormalities. • M 5U 2 نسیجی کیمیائی (Kimya-e-Naseeji) 5.2.1. اجسام لونیہ جنسیہ کے نقائص (Ajsam-e-Launiyah jinsiyah ke naqais) Sex Chromosomal Abnormalities. 5.2.2. علم النسل جزوی (Ilmul Nasal Juzvi) Molecular Genetics. 5.2.3. مختلف نسیجی کیمیائی تکنیک (Mukhtalif Naseeji Keemyawi Takneek) Various histochemimcal Techniques.					
M-6 اجسام لونیہ جنسیہ کے نقائص (Ajsam-e-Launiyah jinsiyah ke naqais) Sex Chromosomal Abnormalities. علم النسل (Ilmul Nasal) Genetics. مختلف نسیجی کیمیائی و مناعی (Mukhtalif Naseeji Keemyawi wa Mana'ati Takneek) Various Histological and Immunohistochemical Techniques. This module provides an integrated approach to the study of sex chromosomal abnormalities, molecular genetics, cytogenetics, and histochemical techniques, highlighting their relevance in clinical diagnostics, medical research, and pathology. This Module will explore the structure and function of sex chromosomes, their abnormalities and associated syndromes, molecular and cytogenetic	2	10	20	30	60

	techniques for chromosomal analysis, and advanced histochemical and immune histochemical staining methods used in diagnostics and biomedical research. This module bridges genetics, histology, and pathology, providing essential knowledge for careers in medical genetics, pathology, forensic sciences, and molecular diagnostics. It is particularly relevant for researchers and clinicians specializing in cytogenetics, histopathology, and personalized medicine. • M 6U 1 (Ilmul Nasal Juzvi) Molecular Genetics درش نمط یک جینی علم النسل 1 6.1.1. (Wirsah Namt-e-yakjeeni) Single gene pattern inheritance. درش نمط یک جینی 6.1.2. (Wirsah Namt-e-Jeeni mustaqillah) Autosomal chromosome pattern of inheritance. درش نمط جینی مستقله 6.1.3. (Wirsah Namt-e-Jeeni Jinsi) Sex chromosomal pattern of inheritance. درش نمط جینی جنسی 6.1.4. (Wirsah Namt-e-mutawassit) Intermediate pattern of Inheritance. درش نمط متوسط • M 6U 2 (Naseeji Keemyawi Mana'ati Takneek) کیماوی تکنیک مناعی 2 Immunohistochemical techniques 6.2.1. (Muta'addad nasbee jorhe) Multiple alleles. متعدد نسبی جوڑے 6.2.2. (Tafrah) Mutations. ظفره 6.2.3. (Wirsah-e-Ghair Mendeli) Non-Mendelian inheritance. غیر مندیلی ورش 6.2.4. (Wirsah-e-Mutaqaddirah) Mitochondrial inheritance. ورش متقدره 6.2.5. (Tab'a -e-majmoo'ah-e- Jeeni) Genome Imprinting. طبعی مجموعہ جینی 6.2.6. (Sunaiyatul Abawain) parental Disomy. ثنیات الابوین					

		4	20	40	60	120
Semester No : 6						
2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
	M-7 نمط ارثی کے متعدد ترتیبی عوامل (Namt-e-Irsi ke muta'addad tarteebi Awamil) Multifactorial Pattern of Inheritance. علم النسل سرطانی و صیدلی (Ilmul Nasal Sartani wa sai'dali) cancer and Pharmacogenetics. This module provides an in-depth understanding of multi factorial inheritance, genetic basis of cancer, and pharmaco genetics, emphasizing their significance in disease prediction, prevention, and personalized medicine. Students will explore how genetic and environmental factors interact in multi factorial diseases, the molecular mechanisms of cancer development, and the impact of genetic variability on drug response. This module integrates genomics, molecular pathology, and clinical pharmacology to provide essential knowledge for research and clinical applications. This module is crucial for understanding the genetic basis of complex diseases, cancer progression, and drug response variability. It prepares students for careers in	2	10	20	30	60

medical genetics, oncology research, personalized medicine, and clinical pharmacology. • M 7U 1 نمط ارثی (Inheritance) 7.1.1. نمط ارثی کے متعدد ترتیبی عوامل (Namt-e-Irsi ke muta'addad tarteebi Awamil) Multifactorial Pattern of Inheritance. 7.1.2. نمط ارثی کے متعدد عوامل کا معیار (Namt-e-Irsi ke muta'addad awamil ka Me'ayar) Criteria for Multifactorial inheritance. 7.1.3. علم التشوهات (Ilmul Tashwwuhat)Teratology. 7.1.4. جینی ساخت (Jeeni saakht) Structure of Gene. • M 7U 2 فحس جزوی (Fa'hs al Juzyi) 7.2.1. فحس جزوی (Fa'hs al Juzyi) Molecular Screening). 7.2.2. علم النسل سرطانی (Ilmul Nasal sartani) Cancer Genetics. 7.2.3. سرطان دمووی (Sarta'n-e-Damwi) Haematological malignancies. 7.2.4. علم النسل صیدلی (Ilmul Nasal sai'dali) Pharmacogenetics.					
M-8 علم النسل تناسلی (Ilmul Nasal Tanasuli) Reproduction genetics. علاج جینی و علم المناعة (Ilaj-e-Jeeni wa Ilmul Mana'at) Gene therapy and Immunology. This module explores the genetic basis of reproduction, advancements in gene therapy, and the role of immunology in health and disease. It integrates concepts from reproductive genetics, molecular medicine, and immunogenetics to provide a comprehensive understanding of fertility, genetic disorders, therapeutic gene editing, and immune system interactions. Students will gain expertise in prenatal genetic diagnosis, assisted reproductive technologies (ART), principles of gene therapy, and	2	10	20	30	60

immunological mechanisms in disease pathogenesis and defense. This module provides essential knowledge for careers in medical genetics, reproductive medicine, immunotherapy, and molecular biology. It is particularly relevant for researchers and clinicians specializing in genetic counseling, gene therapy, and immune-based therapies. • M 8U 1 علم النسل تناسلی (Ilmul Nasal Tanasul) Reproductive Genetics 8.1.1. علم النسل تناسلی (Ilmul Nasal Tanasul) Reproduction Genetics. 8.1.2. مردانہ و زنانہ عقیم (باجھ پین) (Mardana wa Zanana uqm) Male and Female Infertility). 8.1.3. تناسل مساعِد (Tanasul-e-musa'id) Assisted reproduction. 8.1.4. علم النسل قبل الغرس (Ilmul Nasl Qabla'lGharas) Preimplantation genetics. 8.1.5. تشخیص قبل الولادة (Tashkhees-e-Qabl al Wiladah) Prenatal diagnosis). 8.1.6. استشراف جینی (Istishrah-e-Jeeni) Genetic Counselling. • M 8U 2 علاج جینی واطلاقی معلومات (Ilaj-e-Jeeni wa Itlaqi Ma'alumat) Gene therapy and its applied knowledge 8.2.1. اخلاقیات علم النسل (Akhlaiyat-e-Ilmul Nasl) Ethics of Genetics. 8.2.2. اصول علاج جینی واطلاقی معلومات (Usool-e-Ilaj-e-Jeeni wa Itlaqi Ma'alumat) Principles of Gene therapy and its applied knowledge. 8.2.3. نظام مناعت اور دفاعی میکانیہ میں شامل ہونے والے خلیات (Nizam-e-Mana'at aur difa'ei makaniyah men shamil hoane wale khaliyat) Immune system and Cell Types Involved in Defence Mechanism. 8.2.4. توافق انسجہ کی سریریاتی اہمیت (Tawa'fuq-e-Ansija-e- Kabeerah ki Sariryati Ahmiyat) Clinical Significance of major Histocompatibility complex.					

		4	20	40	60	120
		16	80	160	240	480
Paper No : 2 تشریح البدن وتشریح اطلاقى (Tashreeh ul Badan wa Tashreeh-e- Itlaqi) Gross and Applied Anatomy						
Semester No : 3						
2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
	M-9 خطہ راس کی ظاہری واطلاقى تشریح (Khitt'a-e- Ra's ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Head Region. This module provides an in-depth study of the gross anatomy, functional significance, and clinical applications of the head region. It covers the skull, cranial nerves, musculature, vasculature, and specialized sensory organs, emphasizing their structural relationships and clinical relevance. Students will gain a comprehensive understanding of head anatomy through cadaveric dissections, radiological imaging, and clinical case discussions, helping them correlate anatomical knowledge with surgical, neurological, and dental applications. This module is essential for medical practitioners, surgeons, dentists, and neuroscientists who require a thorough understanding of head anatomy for diagnostic, surgical, and clinical applications.	2	10	20	30	60

• M 9U 1 مخطط راس (Khitt'a-e- Ra's) Head Region-I 9.1.1. عظام راس (Iza'm –e- Ra's) Osteology of Head Region. 9.1.2. مفاصل راس (Mafasil –e- Ra's) Arthrology Of Head Region. • M 9U 2 مخطط راس (Khitt'a-e- Ra's) Head Region-II 9.2.1. عضلات راس Azla't -e- Ra's (Myology of Head region). 9.2.2. دماغ (Dimagh) Brain. 9.2.3. مخطط راس کی ظاہری واطلاقی تشریح (Khitt'a-e- Ra's ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Head Region.					
M-10 مخطط عنق کی ظاہری واطلاقی تشریح (khitt'a Unq ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Neck Region. This module provides a detailed study of the gross and applied anatomy of the neck, focusing on its complex structures, anatomical relationships, and clinical significance. It covers the cervical vertebrae, muscles, neurovascular structures, fascial planes, lymphatics, and vital organs such as the thyroid and larynx. Through cadaveric dissections, radiological imaging, and clinical correlations, students will develop a comprehensive understanding of the functional anatomy of the neck and its relevance in medical, surgical, and diagnostic fields. This module is highly relevant for ENT specialists, neurosurgeons, general surgeons, radiologists, and oncologists, as it provides critical anatomical insights into diagnosing and managing neck-related conditions • M 10U 1 مخطط عنق (khitt'a Unq)- Neck region-I 10.1.1. عظام عنق (Izam-e- Unq) osteology of neck Region.	2	10	20	30	60

	10.1.2. مفاصل عنق (Mafasil -e- Unq) Arthrology Of neck Region. 10.1.3. عضلات عنق (Azla't -e- Unq) Myology of neck Region. • M 10U 2 خطہ عنق (khitt'a Unq)- Neck region-II 10.2.1. احشاء عنق (Ahsh'a -e-Unq) Splanchnology of neck Region. 10.2.2. خطہ عنق کی ظاہری واطلاقی تشریح (khitt'a Unq ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Neck Region.					
		4	20	40	60	120
Semester No : 4						
2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
	M-11 طرف اعلیٰ کی ظاہری واطلاقی تشریح (Taraf-e-A'ala ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Upper limbs. This module provides an in-depth study of the gross anatomy, functional significance, and clinical applications of the upper limb. It covers the bones, joints, muscles, blood vessels, nerves, and lymphatics, along with their anatomical relationships and applied aspects in orthopaedics, neurology, vascular surgery, and rehabilitation medicine. Students will develop a comprehensive understanding of upper limb anatomy through cadaveric	2	10	20	30	60

	dissections, radiological imaging, and clinical case discussions, allowing them to correlate anatomical knowledge with fractures, nerve injuries, vascular disorders, and surgical procedures. This module is essential for orthopaedic surgeons, physiotherapists, neurologists, radiologists, and sports medicine specialists, as it provides critical anatomical knowledge for diagnosing and managing upper limb disorders and injuries. • M 11U 1 طرف اعلیٰ (Taraf-e-A'ala) upper limb-I 11.1.1. عظام طرف اعلیٰ (Iza'am-e-Taraf-e-A'ala) Osteology of upper limb. 11.1.2. مفاصل طرف اعلیٰ (Mafasil -e- Taraf-e-A'ala) Arthrology of upper limb. • M 11U 2 طرف اعلیٰ (Taraf-e-A'ala) upper limb-II 11.2.1. عضلات طرف اعلیٰ (Azla't-e- Taraf-e-A'ala) Myology of upper limb. 11.2.2. طرف اعلیٰ کی ظاہری واطلاقی تشریح (Taraf-e-A'ala ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Upper limbs.					
	M-12 طرف اسفل کی ظاہری واطلاقی تشریح (Taraf-e-Asfal ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Lower limbs. This module provides an in-depth understanding of the gross anatomy, functional significance, and clinical applications of the lower limb. It covers the bones, joints, muscles, blood vessels, nerves, and lymphatics, their anatomical relationships and clinical correlations in orthopaedics, neurology, sports medicine, and vascular surgery. Students will develop a comprehensive knowledge of lower limb anatomy through cadaveric dissections, radiological imaging, and clinical case discussions. This will allow them to correlate anatomical structures with fractures, nerve injuries, vascular disorders, and	2	10	20	30	60

	surgical interventions. This module is essential for orthopaedic surgeons, physiotherapists, neurologists, sports medicine specialists, vascular surgeons, and rehabilitation experts, as it provides critical anatomical knowledge for diagnosing and managing lower limb disorders and injuries. • M 12U 1 طرف اسفل (Taraf-e-Asfal) Lower limb-I 12.1.1. عظام طرف اسفل (Iza'm -e- Taraf-e- Asfal) Osteology of Lower limbs. 12.1.2. مفاصل طرف اسفل (Mafasil -e- Taraf-e-Asfal) Arthrology of Lower limbs. • M 12U 2 طرف اسفل (Taraf-e-Asfal) Lower limb-II 12.2.1. عضلات طرف اسفل (Azla't-e- Taraf-e-Asfal) Myology of Lower limbs. 12.2.2. طرف اسفل کی ظاہری واطلاقی تشریح (Taraf-e-Asfal ki Zahiri wa Atlaqi Tashreeh) Gross and Applied Anatomy of Lower limbs.					
		4	20	40	60	120
Semester No : 5						
2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
	M-13 صدر کی ظاہری، جراحی و سریری تشریح (Sadr ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Thorax.	2	10	20	30	60

	This module provides a comprehensive study of the anatomical structures of the thoracic region, emphasizing their surgical and clinical significance. It covers the gross anatomy of the thoracic wall, thoracic cavity, mediastinum, lungs, heart, and major vascular structures. Special focus is given to the anatomical basis of thoracic surgeries, clinical conditions, and diagnostic procedures. This module is essential for understanding thoracic anatomy in both basic and applied clinical settings, preparing students for further studies in surgery, radiology, and cardiopulmonary medicine. • M 13U 1 صدر (Sadr) Thorax-I 13.1.1. عظام صدر (Iza'm -e-Sadr) Osteology of Thorax. 13.1.2. مفاصل صدر (Mafasil-e-Sadr) Arthrology of Thorax. • M 13U 2 صدر (Sadr) Thorax-II 13.2.1. عضلات صدر (Azlat-e-Sadr) Myology of Thorax. 13.2.2. احشاء صدر (Ahsh'a-e- Sadr) Splanchnology of Thorax. 13.2.3. صدر کی ظاہری، جراحی و سریری تشریح (Sadr ki Zahiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical anatomy of thorax.					
	M-14 بطن کی ظاہری، جراحی و سریری تشریح (Batan ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Abdomen. This module provides an in-depth exploration of the gross anatomy of the abdomen with an emphasis on its surgical and clinical applications. It covers the structural organization, vascular supply, innervation, and functional significance of the abdominal viscera. The module integrates anatomical knowledge with common abdominal surgical procedures and clinical	2	10	20	30	60

	conditions, preparing students for practical applications in surgery, radiology, and gastroenterology. This module is essential for understanding the anatomy of the abdomen in both basic and clinical contexts, providing a strong foundation for future specializations in surgery, gastroenterology, radiology, and urology. • M 14U 1 (Batan) Abdomen-I 14.1.1. قطن کے سنان کی تشریح (Qutn ke sanasin ki Tashreeh) Osteology of Lumbar spine. 14.1.2. مفاصل قطن (Mafasil-e-Qutn) Arthrology of Lumbar region. 14.1.3. عضلات دیوارِ بطن (Azlat-e- Diwar-e-Batan) Myology of Abdominal wall. • M 14U 2 (Batan) Abdomen-II 14.2.1. قنّۃ اُربی کی تشریح (Qan'at-e-Urbi ki Tashreeh) Anatomy of Inguinal Canal. 14.2.2. احشاءِ بطن (Ahsh'a-e-batan) Splanchnology of Abdomen. 14.2.3. بطن کی ظاہری، جراحی و سریری تشریح (Batan ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Abdomen.					
		4	20	40	60	120
Semester No : 6						
2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including	2G Total

					Modular Assessment	
	M-15 کمانہ و عجان کی ظاہری، جراحی و سریری تشریح (Aanah wa ujan ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Pelvis, Perineum, خارجی اعضاء (Kharji Aaz'a-e- Tanasuliyah, Mardanah wa zananah ki Tashreeh) Anatomy of Male and female external genitalia. This module provides an extensive study of the anatomy of the pelvis, perineum, and external genitalia, with a focus on their structural, functional, surgical, and clinical significance. It covers the osteology, musculature, neurovascular supply, and visceral components of the pelvic region. Additionally, it integrates anatomical knowledge with surgical interventions and common clinical conditions related to the reproductive, urinary, and gastrointestinal systems. This module is essential for understanding the pelvic and perineal anatomy in clinical practice, offering a foundation for specializations in gynecology, urology, general surgery, and radiology • M 15U 1 نظام تناسلیہ (Nizam-e-Tanasuliya) Reproductive System-I 15.1.1. عظام کمانہ و عجان (Izam_e Aanah wa ujan) Osteology of Pelvis and perineum. 15.1.2. مفاصل کمانہ و عجان (Mafasil-e- Aanah wa ujan) Arthrology of Pelvis and perineum. 15.1.3. عضلات کمانہ و عجان (Azlat-e- Aanah wa ujan) Myology of Pelvis and perineum. • M 15U 2 نظام تناسلیہ (Nizam-e-Tanasuliya) Reproductive System-II 15.2.1. احشاء کمانہ و عجان (Ahsh'a-e- Tashreeh-e- Aanah wa ujan) Splanchnology of Pelvis and perineum.	2	10	20	30	60

	15.2.2 خارجی اعضاء تناسلیہ مردانہ و زنانہ کی تشریح (Kharji Aaz'a-e- Tanasuliyah, Mardanaah wa zananah ki Tashreeh) Anatomy of Male and female external genitalia. 15.2.3. عانہ و عجان کی ظاہری، جراحی و سریری تشریح (Aanah wa ujan ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Pelvis, Perineum.					
	M-16 عمومی تشریح بدن (Umoomi Tashreeh-e-Badan) General Anatomy of Human Body and cadaver care یونانی تدابیر کے لیے اطلاقی تشریح (Unani Tadabeer ke liye itlaqi tashreeh) Applied Anatomy for Unani Procedural Management. This module provides a foundational understanding of the general anatomy of the human body, emphasizing its clinical applications in Unani medicine and procedural management. Additionally, it covers essential techniques in cadaver embalming, preservation, and museum specimen preparation. The course integrates traditional anatomical knowledge with applied skills necessary for medical education, research, and clinical practice. This module is essential for students pursuing anatomy, forensic medicine, and Unani medical practice, equipping them with practical skills in human body preservation and applied anatomical techniques. • M 16U 1 عمومی تشریح بدن (Umoomi Tashreeh-e-Badan) General Anatomy of Human Body یونانی تدابیر کے لیے اطلاقی تشریح (Unani Tadabeer ke liye itlaqi tashreeh) Applied Anatomy for Unani Procedural Management, مختلف تخنیتی اعمال کا بیان (Mukhtalif Tahneeti Ama'al ka bayan) Descriptions Of Different Embalming Procedures. 16.1.1. عمومی تشریح بدن (Umoomi Tashreeh-e-Badan) General Anatomy of Human Body.	2	10	20	30	60

	16.1.2. یونانی تدابیر کے لیے اطلاقی تشریح (Unani Tadabeer ke liye itlaqi tashreeh) Applied Anatomy for Unani Procedural Management. 16.1.3. مختلف تحنیطی اعمال کا بیان (Mukhtalif Tahneeti Ama'al ka bayan) Descriptions Of Different Embalming Procedures. • M 16U 2 تحنیط المیت (Tahneetul maiyit) Embalming of Cadaver, تحفظ نعش و عینہ (Tahaffuz-e-N'ash wa Einah-e-Tashreeh) Preservation of Cadaver and specimen, تحذیر متحف (Tahzeer-e-Mat-haf) Museum preparation. 16.2.1. تحنیط المیت (Tahneetul maiyit) Embalming of Cadaver. 16.2.2. تحفظ نعش و عینہ (Tahaffuz-e-N'ash wa Einah-e-Tashreeh) Preservation of Cadaver and specimen. 16.2.3. تحذیر متحف (Tahzeer-e-Mat-haf) Museum preparation.					
		4	20	40	60	120
		16	80	160	240	480
Paper No : 3 تشریح اعصابی (Tashreeh-e-A'sabi) Neuroanatomy						
Semester No : 3						
2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
	M-17 نظام عصبی کا تعارف (Nizam -e-A'sabi ka ta'aruf) Introduction of Nervous System	2	10	20	30	60

	At the end of this module, students will be able to describe and classify the Nervous system and its role in coordinating body functions. The student will acquire the ability to identify the neurons, Neuroglia along with their classification. This module will help the student to understand the role of neurotransmitters in transmission of nerve signals and in identifying the various neural disorders and can also help in understanding the structural and functional importance of Synapses in Neural communication. This module will let students to have the deep understanding of the Autonomic nervous system (ANS) and Enteric Nervous System (ENS) with their cellular components and structural and functional units. • M 17U 1 مرکزی نظام عصبی و محیطی کا تعارف (Markazi, Nizam e A'sabi wa Muheeti ka ta.aruf) Introduction of Central and Peripheral Nervous System. عصب و اقسام عصب (Asab wa Aqam-e Asab) Neurons and classification of Neurons. مشابک (Mashabik) Synapses. نقلات عصبی (Naqlaat –e-As'abi) Neurotransmitters. خلا یا دبقیہ (khalaya-e-Dabqiya) Neuroglia. 17.1.1. مرکزی نظام عصبی و محیطی کا تعارف (Markazi, Nizam e A'sabi wa Muheeti ka ta.aruf) Introduction of Central and Peripheral Nervous System. 17.1.2. عصب و اقسام عصب (Asab wa Aqam-e Asab) Neurons and classification of Neurons. مشابک (Mashabik) Synapses. 17.1.3. نقلات عصبی (Naqlaat –e-As'abi) Neurotransmitters. 17.1.4. خلا یا دبقیہ (khalaya-e-Dabqiya) Neuroglia. • M 17U 2 نظام عصبی غیر ارادی (Nizam e A'sabi Ghair Iradi) Autonomic nervous system. غیر شری نظام عصبی (Shirkee Nizam e A'sabi) sympathetic nervous system.					

نظام عصبي معوي (Ghair Shirkee Nizam e A'sabi) para sympathetic nervous system. (Nizam e A'sabi Mew) enteric nervous system. نظام عصبي جسدی (Nizam e A'sabi Jasdi) Somatic nervous system. 17.2.1. نظام عصبي غير ارادی (Nizam e A'sabi Ghair Iradi) Autonomic nervous system. 17.2.2. نظام عصبي معوي (Nizam e A'sabi Mewi) Enteric nervous system. 17.2.3. نظام عصبي جسدی (Nizam e A'sabi Jasdi) Somatic nervous system.					
M-18 نظام اعصاب کی بالیدگی (Nizam-e- A'asab ki Baleedgi) Development of the Nervous System. At the end of this module, students will be able to describe and explain the development of the Central nervous system and the Peripheral nervous system from the embryonic structure with the knowledge of the formation of primary and secondary brain vesicles. It will further help students to understand the formation and differentiation of Autonomic nervous system and how they form the connectivity between the Central nervous system and the targeted organs. In addition to this students will also identify the developmental stages of Enteric nervous system. This module will give an overview regarding the development of Nervous system from embryonic structure into specialized components which will help students to understand and identify the various Neural disorders. • M 18U 1 نظام عصبي مرکزی کی بالیدگی (Nizam e A'sabi Markazi ki Baleedgi) Development of central nervous system. نظام عصبي محیطی کی بالیدگی (Nizam e A'sabi Muheeti ki Baleedgi) Development of peripheral nervous system.	2	10	20	30	60

	18.1.1. نظام عصبي مرکزی کی بالیدگی (Nizam e A'sabi Markazi ki Baleedgi) Development of central nervous system. 18.1.2. نظام عصبي محیطی کی بالیدگی (Nizam e A'sabi Muheeti ki Baleedgi) Development of peripheral nervous system. • M 18U 2 نظام عصبي غیر ارادی کی بالیدگی (Nizam e A'sabi Ghair Iradi ki Baleedgi) Development of Autonomic nervous system. نظام عصبي معوی کی بالیدگی (Nizam e A'sabi Mewi ki Baleedgi) Development of Enteric nervous system. 18.2.1. نظام عصبي غیر ارادی کی بالیدگی (Nizam e A'sabi Ghair Iradi ki Baleedgi) Development of Autonomic nervous system. 18.2.2. نظام عصبي معوی کی بالیدگی (Nizam e A'sabi Mewi ki Baleedgi) Development of Enteric nervous system.					
		4	20	40	60	120
Semester No : 4						
2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
	M-19 طریق حسی مخصوصہ (Tariq-e- Hissi Makhsoosa) Special Sensory Pathways At the end of this module, students will be able to understand and explain the Olfactory and Optic pathways and their components along with the knowledge	2	10	20	30	60

	of the Mechanism of perception of smell and taste. This module will also provide students to identify the cochleovestibular and Gustatory pathways with the indepth knowledge of the structure related to the acts of Hearing ,Balance and equilibrium and the sensation of taste. It will help students to demonstrate the eye movements, auditory processing along with the detection of variety of taste perceive by individuals and their role in perception and neurological disorders. • M 19U 1 شمى طريق (Tariq-e- Shammi) Olfactory pathway. بصرى طريق (Tariq-e- Basari) optic pathway. 19.1.1. شمى طريق (Tariq-e- Shammi) Olfactory pathway. 19.1.2. بصرى طريق (Tariq-e- Basari) optic pathway. • M 19U 2 طريق ذوقى (Tariq-e- Qauqa'ei) Cochleovestibular Pathway. طريق ذوقى (Tariq-e- Zawaqa) Gustatory pathway. 19.2.1. طريق ذوقى (Tariq-e- Qauqa'ei) Cochleovestibular Pathway. 19.2.2. طريق ذوقى (Tariq-e- Zawaqa) Gustatory pathway.					
	M-20 طرائق عصبي (Taraq-e- A'sabi) Neural Pathways The module explains the Motor and Sensory Pathways and Central Autonomic Pathways. At the end of this module ,students will be able to describe ,explain and demonstrate the Sensory pathways (Ascending tracts) and the Motor pathways (Descending tracts) along with their differentiation. This module will guide students to identify the central autonomic pathways with identifying the key brain region involved in autonomic control. They will understand the neural	2	10	20	30	60

	connections between the central nervous system and peripheral nervous system. It will further help students to understand the anatomical structure of Hypothalamic-pituitary-adrenal (HPA) axis, Hypothalamic-sympathetic pathway, Brainstem-parasympathetic .pathway and Spinal-sympathetic reflex and their role in regulating the Hormonal regulation and feed back mechanism, homeostasis, stress responses, metabolism, immune function. • M 20U 1 (Tariq-e- Harki) Motor Pathways. (Tariq-e- Hissi) Sensory Pathways. 20.1.1. (Tariq-e- Harki) Motor Pathways. 20.1.2. (Tariq-e- Hissi) Sensory Pathways. • M 20U 2 (Tariq-e- Markazi Ghair iradi ka Ta'aruf) Introduction of Central Autonomic Pathways. (Mehwar-e-Kuzri tahtani) Hypothalamic-pituitary-adrenal (HPA) axis. (Tareeq-e-shirki Tahtani) Hypothalamic-sympathetic pathway. (Tareeq-e-saqi jar shirki) Brainstem-parasympathetic .pathway. (Ine'ikas-e-shirki nukhae'i) Spinal-sympathetic reflex. 20.2.1. (Tariq-e- Markazi Ghair iradi ka Ta'aruf) Introduction of Central Autonomic Pathways. 20.2.2. (Mehwar-e-Kuzri tahtani) Hypothalamic-pituitary-adrenal (HPA) axis. 20.2.3. (Tareeq-e- shirki Tahtani) Hypothalamic-sympathetic pathway.					

	20.2.4. طریق ساقی جارشرکی (Tareeq-e-saqi jar shirki) Brainstem-parasympathetic pathway. 20.2.5. انعکاس شرکی نخاعی (Ine'ikas-e-shirki nukhae'i) Spinal-sympathetic reflex.					
		4	20	40	60	120
Semester No : 5						
2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
	M-21 نظام تحت السریری، جوفی، قاعدی اور شبکی (Nizam-e-Tahataassareeri, Jaufi, Qa'edi and Shabki) Hypothalamo-Hypophyseal System, Limbic system The module explains the hypothalamo-hypophyseal, limbic system, basal nuclei and reticular system. At the end of this module, students will have in-depth understanding of the hypothalamo-hypophyseal system, limbic system, basal nuclei and reticular system. Students will be able to analyze the structural organization of each systems and their respective roles in neuroendocrine regulation, correlation with behaviour and memory, motor and autonomic regulation.	2	10	20	30	60

	This module will help students in identifying and interpreting the clinical conditions related to their dysfunctions. • M 21U 1 (نظام تحت السریری و تحت النخاعی) (Nizam-e-Tahataassareeri wa Tahtan-Nukha,ei) Hypothalamo-Hypophyseal System. (نظام جوفی) (Nizam e Jaufi) Limbic system. 21.1.1. (نظام تحت السریری و تحت النخاعی) (Nizam-e-Tahataassareeri wa Tahtan-Nukha,ei) Hypothalamo-Hypophyseal System. (نظام جوفی) (Nizam e Jaufi) Limbic system. • M 21U 2 (نواة قاعدی) (Nawat-e-Qa'edi) Basal Nuclei. (نواة شبکی) (Nizam-e-Shabki) Reticular System. 21.2.1. (نواة قاعدی) (Nawat-e-Qa'edi) Basal Nuclei. 21.2.2. (نواة شبکی) (Nizam-e-Shabki) Reticular System.					
	M-22 (تشریح عصبی اطلاحی) (Tashreeh-e- A'sabi Itlaqi) Clinical Neuroanatomy The module explains the Cross-Sectional anatomy of Brain, Spinal and applied aspects of Nervous System. At the end of this module, students will be able to describe the cross-sectional anatomy of Brain and Spinal cord at various level and correlates the anatomical structures and apply the anatomical knowledge in understanding clinical conditions. • M 22U 1 (دماغ و نخاع کا مستعرض تراشه) (Dimagh wa Nukha ka Tashreehi Musta'raz Tarsha) Cross Sectional anatomy of Brain and Spinal cord. 22.1.1. دماغ و نخاع کا مستعرض تراشه Dimagh wa Nukha ka Tashreehi Musta'raz Tarsha (Cross Sectional anatomy of Brain and Spinal cord). • M 22U 2 (نظام عصبی کے اطلاحی پہلو) (Nizam e-A'sbi ke Itlaqi Pehlu) Applied aspects of Nervous System.	2	10	20	30	60

	22.2.1. نظام عصبی کے اطلاقی پہلو (Nizam e-A'sbi ke Itlaqi Pehlu) Applied aspects of Nervous System.					
		4	20	40	60	120
Semester No : 6						
2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
	M-23 عصبی الیاف (Asab-e-alyaf) Nerve fibres. عصبی ضفیرات (Asabi Zafiraat) Nerve Plexuses. At the end of this module, students will be able to describe and classify the different types of nerve fibres both structural and functional. They can explain the anatomical organization of the Nerve plexuses. The student will also be able to differentiate between the Central and peripheral nerves along with identification of Upper Motor Neurons (UMN) and Lower Motor Neurons (LMN). This module will further help students in understanding, diagnosing and managing neurological disorders affecting the motor and sensory systems. • M 23U 1 عصب مرکزی (Asab-e- Markazi) Central Nerve. عصب محیطی (Asab-e- Muheeti) Peripheral Nerve. عصبی ضفیرات (Asabi Zafiraat) Nerve Plexuses. 23.1.1. عصب مرکزی (Asab-e- Markazi) Central Nerve.	2	10	20	30	60

23.1.2. عصب محیطی (Asab-e- Muheeti) Peripheral Nerve. 23.1.3. عصبی ضفیرات (Asabi Zafiraat) Nerve Plexuses. • M 23U 2 عصبیہ حرکی اعلیٰ (Asabiyah Harki, A'la) Upper motor Neuron. عصبیہ حرکی اسفل (Asbiyah Harki asfal) Lower motor Neuron. 23.2.1. عصبیہ حرکی اعلیٰ (Asabiyah Harki, A'la) Upper motor Neuron. 23.2.2. عصبیہ حرکی اسفل (Asbiyah Harki asfal) Lower motor Neuron.					
M-24 نظام بطنی و خلاء تحت العنكبوت، (Majmo'ah-e- Sareeri) Thalamic complex (Nizam-e-Batani wa khil'a Tahat-e-Ankabutiyah) Ventricular system and Sub Arachnoid spaces. At the end of this module, students will be able to describe the structural anatomy of Thalamic complex along with the identification of its nuclei and their clinical correlation. The student will have the knowledge of the Developmental and structural description of the Ventricular system. They will be able to describe the Subarachnoid space, Cerebrospinal Fluid (CSF) as well as their clinical significance. This module will guide students to correlate their anatomical knowledge with the clinical conditions. • M 24U 1 سریر مؤخر (Sareer-e-Moakh'ar) Dorsal thalamus. سریر مقدم (Sareer-e-Muqaddam) Ventral thalamus. 24.1.1. سریر مؤخر (Sareer-e-Moakh'ar) Dorsal thalamus. 24.1.2. سریر مقدم (Sareer-e-Muqaddam) Ventral thalamus. • M 24U 2 نظام بطنی (Nizam-e-Batani) Ventricular system. خلاء تحت العنكبوت (Khil'a Tahat-e-Ankabutiyah) Sub Arachnoid spaces.	2	10	20	30	60

	24.2.1. نظام بطنی (Nizam-e-Batani)Ventricular system. 24.2.2. خلاء تحت عنكبوتیہ (Khil'a Tahat-e-Ankabutiyah) Sub Arachnoid spaces.					
		4	20	40	60	120
		16	80	160	240	480
Paper No : 4 (Tashreeh-e-Satahi ,Shua'ei wa Qanooni wa Jadeed Tashreehi Tahqeeqat) Surface, Radiological, Forensic Anatomy and Recent Advances						
Semester No : 3						
2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
	M-25 خطہ راس و عنق کی سطحی تحدید (Khitta-e-Ra's wa Unq ki satahi Tahdeed) Surface marking of Head and Neck region. This module takes an in-depth look into the surface anatomy of the head and neck, focusing on key landmarks, underlying structures, and their clinical relevance. It integrates theoretical concepts with practical applications, enabling students to understand anatomical relationships and their significance in medical practice. Hands-on learning experiences, including palpation techniques and case-based discussions, enhance the ability to identify surface structures accurately. Experiential learning through clinical	2	10	20	30	60

	scenarios and imaging correlations further reinforces anatomical knowledge. By combining theoretical foundations, practical skills, and real-world applications, this module prepares students for clinical examinations, diagnostic procedures, and surgical interventions. • M 25U 1 خطہ راس کی سطحی تحدید (Khitta-e-Ra's ki satahi Tahdeed) Surface marking of Head region. 25.1.1. خطہ راس کی سطحی تحدید (Khitta-e-Ra's ki satahi Tahdeed) Surface marking of Head region. • M 25U 2 خطہ عنق کی سطحی تحدید (Khitta-e- Unq ki satahi Tahdeed) Surface marking of Neck region. 25.2.1. خطہ عنق کی سطحی تحدید (Khitta-e- Unq ki satahi Tahdeed) Surface marking of Neck region.					
	M-26 تشریح شعاعی (Tashreeh-e- Shua'ei) Radiological Anatomy. This module provides an in-depth exploration of the normal study of various medical imaging modalities, including X-ray, Ultrasonography (USG), computed tomography (CT), contrast-enhanced computed tomography (CECT), mammography, magnetic resonance imaging (MRI), and radionuclide imaging. It covers the fundamental principles, techniques, and applications of each modality, emphasizing their role in assessing normal anatomical structures. Students will engage in theoretical learning, hands-on image interpretation, and case-based discussions to enhance their diagnostic skills. Experiential learning through simulated clinical scenarios, interactive workshops, and exposure to real patient imaging studies will reinforce their	2	10	20	30	60

	ability to differentiate normal findings from pathological variations. By integrating theoretical knowledge with practical and experiential approaches, this module prepares students for accurate image analysis, clinical decision-making, and effective application of medical imaging in healthcare settings. • M 26U 1 سادہ عکس ریزی (Sadah aks srezi) Simple x-rays procedures. تصویر بالموجات (Tasveer Bil Maujatis Sautiya) Ultrasonography. تصویر مقطعی حاسوبی (Tasweer maqta'ei Hasubi) Computed Tomography Scan. تصویر مقطعی حاسوبی مع التباين (Tasweer maqta'ei Hasubi ma'attabaun) Contrast Enhanced Computed Tomography Scan. 26.1.1. سادہ عکس ریزی (Sadah aks srezi) Simple x-rays procedures. 26.1.2. تصویر بالموجات الشعاعیہ (Tasveer Bil Maujatis Sautiya) Ultrasonography. 26.1.3. تصویر مقطعی حاسوبی (Tasweer maqta'ei Hasubi) Computed Tomography Scan. 26.1.4. تصویر مقطعی حاسوبی مع التباين (Tasweer maqta'ei Hasubi ma'attabaun) Contrast Enhanced Computed Tomography Scan. • M 26U 2 تصویر بالرین المقتناطیسی (Tasweer Bil Raneen Al Maqnateesi) Magnetic Resonance Imaging. تصویر شعاعی ثدی (Tasweer-e-Shu'ai Sadyi) Mammography. تصویر شعاعی نواتی (Tasveer Shu'a'ei Navati) Radionuclide scanning. 26.2.1. تصویر بالرین المقتناطیسی (Tasweer Bil Raneen Al Maqnateesi) Magnetic Resonance Imaging. 26.2.2. تصویر شعاعی ثدی (Tasweer-e-Shu'ai Sadyi) Mammography. 26.2.3. تصویر شعاعی نواتی (Tasveer Shu'a'ei Navati) Radionuclide scanning.					
		4	20	40	60	120

Semester No : 4						
2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
	M-27 تصویروں کی تعبیر (Tasveeron Ki Ta'abeer) Interpretation of Radiographs. This module provides an in-depth exploration of the interpretation of various medical imaging modalities, including X-ray, Ultrasonography (USG), computed tomography (CT), contrast-enhanced computed tomography (CECT), mammography, magnetic resonance imaging (MRI), and radionuclide imaging. It focuses on developing a systematic approach to image analysis, enabling students to accurately identify normal anatomical structures, recognize pathological findings, and understand their clinical implications. Through a blend of theoretical learning, hands-on image interpretation, and case-based discussions, students will gain proficiency in differentiating normal variants from disease processes. Experiential learning opportunities, such as simulated diagnostic exercises, interactive radiology workshops, and exposure to real clinical cases, will further enhance their interpretative skills. By integrating foundational principles with practical	2	10	20	30	60

	applications, this module prepares students for effective decision-making in diagnostic imaging and clinical practice. • M 27U 1 (Sadah aks srezi Tasveeron Ki Ta'abeer) plain x-rays. (Tasveer Bil Maujatis Sautiyah Ki Ta'abeer) Ultrasonography. (Tasweer maqta'ei Hasubi Ki Ta'abeer) Interpretation of Computed Tomography Scan. 27.1.1. (Sadah aks srezi Tasveeron Ki Ta'abeer) plain x-rays. 27.1.2. (Tasveer Bil Maujatis Sautiyah Ki Ta'abeer) Ultrasonography. 27.1.3. (Tasweer maqta'ei Hasubi Ki Ta'abeer) Interpretation of Computed Tomography Scan. • M 27U 2 (Tasweer maqta'ei Hasubi ma'attabaun Ki Ta'abeer) Interpretation of Contrast Enhanced Computed Tomography Scan. (Tasweer Bil Raneen Al Maqnateesi Ki Ta'abeer) Interpretation of Magnetic Resonance Imaging. (Tasveer Shua'aei al- Nawavi Ki Ta'abeer) Interpretation of Radionuclide scanning. 27.2.1. (Tasweer maqta'ei Hasubi ma'attabaun Ki Ta'abeer) Interpretation of Contrast Enhanced Computed Tomography Scan. 27.2.2. (Tasweer Bil Raneen Al Maqnateesi Ki Ta'abeer) Interpretation of Magnetic Resonance Imaging. 27.2.3. (Tasveer Shua'aei al- Nawavi Ki Ta'abeer) Interpretation of Radionuclide scanning.					

M-28 خطہ صدر و بطن کی سطحی تحدید (Khitta-e-Sadr wa Batan ki Satahi Tahdeed) Surface marking of Thorax and Abdomen region. This module offers an in-depth analysis of the surface anatomy of the thorax and abdomen, focusing on key anatomical landmarks, underlying structures, and their clinical significance. It examines the relationship between external features and deeper anatomical components, aiding in the assessment of vital organs such as the heart, lungs, liver, and intestines. The module integrates theoretical concepts with practical applications, enabling students to develop essential palpation techniques and surface markings for clinical evaluation. Experiential learning through hands-on exercises, case-based discussions, and imaging correlations enhances the ability to identify and interpret anatomical structures accurately. By combining theoretical foundations, practical skills, and real-world clinical applications, this module prepares students for effective anatomical assessment in medical practice, surgery, and diagnostic imaging. • M 28U 1 خطہ صدر کی سطحی تحدید (Khitta-e-Sadr ki satahi Tahdeed) Surface marking of Thorax. 28.1.1. خطہ صدر کی سطحی تحدید (Khitta-e-Sadr ki satahi Tahdeed) Surface marking of Thorax. • M 28U 2 خطہ بطن کی سطحی تحدید (Khitta-e- Batan ki satahi Tahdeed) Surface marking of Abdomen region 28.2.1. خطہ بطن کی سطحی تحدید (Khitta-e- Batan ki satahi Tahdeed) Surface marking of Abdomen region.	2	10	20	30	60

		4	20	40	60	120
Semester No : 5						
2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning including Modular Assessment	2G Total
	M-29 طرف اعلیٰ و طرف اسفل کی سطحی تحدید (Taraf-e-Aa'la wa Taraf-e-Asfal ki satahi Tahdeed) Surface Marking of Upper And Lower Limbs. This module provides an in-depth study of the surface anatomy of the upper and lower limbs, focusing on key anatomical landmarks, muscular and skeletal structures, neurovascular pathways, and their clinical relevance. It examines the external features in relation to underlying bones, joints, muscles, and nerves, enhancing students' understanding of limb function and movement. The module integrates theoretical learning with practical applications, including palpation techniques, surface markings, and functional assessments essential for clinical evaluation. Experiential learning through hands-on exercises, case-based discussions, and imaging correlations further strengthens students' ability to accurately identify anatomical structures. By combining foundational knowledge with real-world applications, this module	2	10	20	30	60

prepares students for clinical examinations, physical assessments, surgical procedures, and rehabilitation practices • M 29U 1 طرف اعلیٰ کی سطحی تحدید (Taraf-e-Aa'la ki satahi Tahdeed) Surface marking of upper limbs. 29.1.1. طرف اعلیٰ کی سطحی تحدید (Taraf-e-Aa'la ki satahi Tahdeed) Surface marking of upper limbs. • M 29U 2 طرف اسفل کی سطحی تحدید (Taraf-e-Asfal ki satahi Tahdeed) Surface marking of lower limbs 29.2.1. طرف اسفل کی سطحی تحدید (Taraf-e-Asfal ki satahi Tahdeed) Surface marking of lower limbs.					
M-30 تشریح قانونی (Tashreeh-e-Qanooni) Forensic Anatomy. This module explores forensic anatomy, focusing on the identification of human bones from their remains and the determination of sex, age, and height for medico-legal applications. It covers key anatomical markers used in forensic investigations, skeletal analysis techniques, and the scientific principles underlying biological profiling. Students will gain expertise in differentiating human from non-human remains, assessing skeletal maturity, and applying anthropometric methods to estimate stature and demographic characteristics. The module integrates theoretical foundations with practical applications through hands-on skeletal examination, forensic case studies, and simulated investigative scenarios. Experiential learning opportunities, such as forensic reconstruction exercises and radiographic analysis, will further enhance students' ability to apply anatomical knowledge in legal and	2	10	20	30	60

	forensic contexts. By combining anatomy with forensic science, this module equips students with essential skills for medico-legal investigations, criminal case assessments, and human identification processes. • M 30U 1 تشریح قانونی (Tashreeh -e-Qanooni) Forensic Anatomy. بدنی عظام کی شناخت انکی نعش کے ذریعے کرنا (Badni Eza'm ki Shinakht unki Na'sh ke Zariye karna) Identification of human bones from their remains. 30.1.1. تشریح قانونی (Tashreeh -e-Qanooni) Forensic Anatomy. 30.1.2. بدنی عظام کی شناخت انکی نعش کے ذریعے کرنا (Badni Eza'm ki Shinakht unki Na'sh ke Zariye karna) Identification of human bones from their remains. • M 30U 3 تشریح کو طبی و قانونی نظر یہ میں استعمال کرتے ہوئے جنس، عمر، قد کا تعین کرنا۔ (Tahreeh ko Tibbi wa Qanooni Nazariye me Iste'mal karte hue Jins, Umar wa Qa'd ka Ta'yyun karna) Determination of sex, age, and height. for medico legal application of Anatomy. 30.2.1. تشریح کو طبی و قانونی نظر یہ میں استعمال کرتے ہوئے جنس، عمر، قد کا تعین کرنا۔ (Tahreeh ko Tibbi wa Qanooni Nazariye me Iste'mal karte hue Jins, Umar wa Qa'd ka Ta'yyun karna) Determination of sex, age, and height. for medico legal application of Anatomy.					
		4	20	40	60	120
Semester No : 6						
2A Module Number	2B Modules & units	2C Number of Credits	Notional Learning hours			
			2D Lectures	2E Practical Training	2F Experiential Learning	2G Total

					including Modular Assessment	
	M-31 تشریح میں جدید تحقیقات (Tashreeh men Jadeed Tahqeeqaat) Recent Advances in Anatomy This module covers the intricate aspects of intravenous urography (IVU), angiography, fluoroscopy, and their various types and clinical indications. It covers essential contrast-based imaging techniques, including barium studies for gastrointestinal tract evaluation, cholecystography for gallbladder assessment, and hysterosalpingography for reproductive health diagnostics. Students will gain a thorough understanding of the principles, procedural techniques, and interpretation of these imaging modalities in diagnosing and monitoring various medical conditions. The module integrates theoretical knowledge with practical applications, emphasizing patient preparation, imaging protocols, and contrast media usage. Experiential learning through case-based discussions, hands-on imaging analysis, and exposure to real clinical scenarios will enhance students' ability to evaluate radiographic findings accurately. By combining foundational concepts with real-world applications, this module equips students with essential skills for radiological assessments and clinical decision-making in diagnostic imaging. • تشریح میں جدید تحقیقات جس میں ساخت و افعال کے باہمی تعلقات کو سمجھنے میں مدد ملتی ہے اور سریریاتی مسئلوں کو حل کرنے میں استعمال ہوتے ہیں (Tashreeh Men Jadeed Tahqeeqaat Jisse Saakht-o-af'al ke bahmi ta'luqaat ko Samajhney Mem Ma'dad Milti Hai Aur Sareeryati mas'lo ko	2	10	20	30	60

	hal karney mai iste'mal hotay hai) Recent advances in Anatomy which facilitate comprehension of structure function correlations and applications in clinical problem solving. تصویر اوعیہ (Tasveer-e-Auiyyah) Angiography. 31.1.1. تشریح میں جدید تحقیقات جس میں ساخت و افعال کے باہمی تعلقات کو سمجھنے میں مدد ملتی ہے اور سریریاتی مسئلوں کو حل کرنے میں استعمال ہوتے ہیں (Tashreeh Men Jadeed Tahqeeqaat Jisse Saakht-o-af'al ke bahmi ta'luqaat ko Samajhney Mem Ma'dad Milti Hai Aur Sareeryati mas'lo ko hal karney mai iste'mal hotay hai) Recent advances in Anatomy which facilitate comprehension of structure function correlations and applications in clinical problem solving. 31.1.2. تصویر اوعیہ (Tasveer-e-Auiyyah) Angiography. • M 31U 2 تصویر تلون فلوری اور اس کے مختلف اقسام و اشارات (Tasveer-e-Talawwun Flori wa Iske Mukhtalif Aqsa'm wa Isharaat) fluoroscopy its different types and indications. تصویر مرارہ شعاعی (Tasweer mrarah shua'ei) Cholecystography. تصویر شعاعی رحمی قاذنی (Tasweer-e- shua'ei qazifi) Hystero-salpingography. 31.2.1. تصویر تلون فلوری اور اس کے مختلف اقسام و اشارات (Tasveer-e-Talawwun Flori wa Iske Mukhtalif Aqsa'm wa Isharaat) fluoroscopy its different types and indications. 31.2.2. تصویر مرارہ شعاعی (Tasweer mrarah shua'ei) Cholecystography. 31.2.3. تصویر شعاعی رحمی قاذنی (Tasweer-e- shua'ei rahmi-qazifi) Hystero-salpingography.					
M-32 قانون تشریح و تشریح اخلاقیات (Qanoon-e-Tashreeh wa Tashreehi Akhlaqiyat) Anatomy Law & Anatomical Ethics		2	10	20	30	60

	This module provides a thorough exploration of organ donation, focusing on the ethical, legal, and anatomical principles involved in the donation process. It examines the key aspects of organ procurement, including the ethical considerations surrounding consent, donor selection, and the allocation of organs. The module also addresses the legal frameworks governing organ donation, ensuring compliance with laws and regulations. Students will gain a thorough understanding of the anatomical implications of organ donation, from recent procurement to transplantation. The module integrates theoretical knowledge with practical applications, emphasizing the importance of ethical decision-making and anatomical considerations in the context of organ donation. Through case-based discussions and experiential learning, students will develop the necessary skills to navigate the complexities of organ donation and its impact on medical practice, law, and society. • M 32U 1 تبرع بالاعضاء (Tabarr'u bil A'aza) organ donation. 32.1.1. تبرع بالاعضاء (Tabarr'u bil A'aza) organ donation. 32.1.2. حالیہ حاصل شدہ اعضاء کی متعلق تبرع بالاعضاء کے اصول (Haliya Hasil Shuda Aa'za ke Muta'lliq Tabarr'u bil A'aza ke Usool) Principles of organ donation from recently procured. • M 32U 2 تشریح اخلاقیات (Tashreehi Akhlaqiyaat) Ethics of Anatomy. قانون تشریح (Qanoon-e-Tashreeh) Anatomy Law. 32.2.1. تشریح اخلاقیات (Tashreehi Akhlaqiyaat) Ethics of Anatomy. 32.2.2. قانون تشریح (Qanoon-e-Tashreeh) Anatomy Law.					
		4	20	40	60	120

		16	80	160	240	480
		64	320	640	960	1920

Table 3 : Modules - Unit - Module Learning Objectives and Session Learning Objective- Notional Learning Hours- Domain- Level- TL Methods

Paper No : 1 (تشریح جنینی، خوردبینی و علم النسل) (Tashreeh-e-Janeeni, Khurd-Beeni wa Ilmul Nasal) Embryology, Microscopic Anatomy and Genetics)						
Semester No : 3						
Module 1 : علم الجنین عمومی (Ilmul Janeen Umoomi) General Embryology.						
Module Learning Objectives (At the end of the module, the students should be able to) 1. Describe General Embryology, Placenta and Early Human Embryonic Development. 2. Conduct Presentation and Group Discussion Regarding General Embryology, Placenta And Early Human Embryonic Development. 3. Identify the Early Human Embryonic Development of Stages.						
Unit 1 علم الجنین عمومی (Ilmul Janeen Umoomi) General Embryology -1 1.1.1 علم الجنین عمومی (Ilmul Janeen Umoomi) General Embryology. 1.1.2 تكون خلايا جنسية (Takawwun-e-khlaya jinsiyah) Gametogenesis). 1.1.3 تخصيب (Takhseeb) Fertilization. 1.1.4 غرس الجنين (Gharsul-Janeen) Implantation. References: 24,41,42,44,77,78,79,80,81,82,83,84,85,97,102,103,104,105						
3A Course Outcome	3B Learning Objective (At the end of the (lecture/practical training /experiential learning) session, the students should be able to)	3C Notio nal learni	3D Lecture/ Practical Training/	3E Domain / Sub Domain	3F Level (Does/Shows	3G Teaching Learning Methods

		ng Hours	Experiential Learning		how/Knows how/Know)	
CO1,CO4, CO7	Demonstrate the general Embryology and gametogenesis,	5	Practical1.1	PSY- ADT	Shows-how	PER,FC,D,D-M,BS
CO1,CO4, CO7	Analyse the Fertilization and Implantation.	7	Experiential- Learning1.1	AFT- RES	Does	D,PER,BS,D- M,SDL
CO1,CO4	Describe fertilization and implantation	2	Lecture	CC	Knows-how	L_VC,L&PPT
CO1,CO4	Describe general embryology and gametogenesis.	3	Lecture	CC	Knows-how	L_VC,L&PPT
CO1,CO4, CO7	Document the key mechanisms of embryology and gametogenesis	6	Experiential- Learning1.2	AFT- RES	Does	L_VC,PSM,PL
CO1,CO4, CO7	Illustrate the fertilization and Implantation.	5	Practical1.2	PSY- MEC	Shows-how	D,PER,RP,CBL
Unit 2 علم الجنين عمومی (Ilmul Janeen Umoomi) General Embryology -II 1.2.1 مشیمہ (Mashimah) placenta. 1.2.2 بالیدگی جنین اولی (Baleedgi-e-Janeen awwali) Early Embryonic Development. References: 77,78,79,80,81,82,83,84,85,87,88						
3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the early embryonic development.	2	Lecture	CC	Knows-how	L&PPT ,L_VC

CO1,CO4, CO7	Demonstrate the anatomy of placenta	5	Practical1.3	PSY- GUD	Shows-how	D- M,SDL,PER,DIS,B S
CO1,CO4	Describe the developmental anatomy of placenta.	3	Lecture	CC	Knows-how	L_VC,L&PPT
CO1,CO4, CO7	Evaluate and analyse different sites of the Placenta	7	Experiential- Learning1.3	CE	Shows-how	PER,DIS,CD,PSM, RP
CO1,CO4, CO7	Analyse the different stages of Early Embryonic Development	6	Experiential- Learning1.4	PSY- MEC	Shows-how	DIS,SIM,PrBL,PER ,CBL
CO1,CO4, CO7	Demonstrate the early embryonic development.	5	Practical1.4	PSY- ADT	Shows-how	D- M,PBL,PER,D,DIS

Practical Training Activity

Practical Training 1.1 General Embryology

Total Learning Hours: 5:00 Hours

Activity 1: Demonstration (1 Hour)

The teacher will explain gametogenesis and early embryonic stages using 3D models, charts, and diagrams, providing step-by-step explanations. Students will observe, take notes, and ask questions.

Activity 2: Group Chart-Making (1 Hour)

The teacher will guide students in creating flowcharts on gametogenesis phases. Groups will design detailed charts and present them to the class.

Activity 3: Flipped Classroom (1.5 Hour)

The teacher will assign preparatory tasks on gametogenesis and embryology. Students will complete materials at home and engage in discussions during the session.

Activity 4: Brainstorming (1.5 Hour)

The teacher will organize groups to discuss genetic disorders linked to gametogenesis errors. Students will brainstorm causes, consequences, and share findings.

Practical Training 1.2 Fertilization and Implantation.

Total Learning Hours: 5:00 Hours

Activity 1: Teacher Demonstration (1 Hour)

The teacher will use models and animations to explain the processes of fertilization and implantation.

Students will observe the demonstration, take notes, and ask questions to clarify concepts related to fertilization and implantation.

Activity 2: Self-Directed Learning (1 Hour)

The teacher will provide curated resources (articles, videos, diagrams) on hormonal changes during fertilization and implantation.

Students will independently explore the materials, research key hormonal changes, and present their findings to peers in small groups or as short summaries.

Activity 3: Case-Based Learning (1 Hour)

The teacher will guide students in small groups to analyze clinical cases related to implantation disorders or hormonal imbalances.

Students will discuss the clinical scenarios, identify problems, apply anatomical and physiological knowledge, and propose appropriate interventions or explanations.

Activity 4: Role Play (1 Hour)

The teacher will create simulated patient counseling scenarios related to implantation issues.

Students will prepare scripts, assume roles (e.g., doctor, patient), and perform role-plays using visual aids to effectively communicate medical concepts in a clinical context.

Activity 5: Chart/Model Making (1 Hour)

The teacher will assist student groups in designing visual representations of the fertilization process.

Students will collaboratively create charts or 3D models illustrating the stages of fertilization, and present and explain their models to the class, reinforcing their understanding.

Practical Training 1.3 The placenta

Total Learning Hours: 5:00 Hours

Activity 1: Teacher-Led Demonstration (1 Hour)

The teacher will use models and images to explain placental anatomy, highlighting structures like chorionic villi and their functions in gas exchange, nutrient transfer, and waste elimination. Students will observe and ask questions.

Activity 2: Self-Directed Learning (1 Hour)

Students will research topics like hormonal functions or immunological roles of the placenta, preparing a write-up or presentation.

Activity 3: Brainstorming Session (1 Hour)

Student's groups will brainstorm aspects of placental functions and discuss clinical conditions like placenta previa and preeclampsia, presenting their findings.

Activity 4: Quiz/Interactive Polls (1 Hour) Students will participate in quizzes or polls to test their understanding of placental anatomy and related scenarios.

Activity 5: Specimen Handling (1 Hour)

Students will handle preserved placental specimens to examine physical features and discuss their roles in pregnancy.

Practical Training 1.4 Early Embryonic Development.

Total Learning Hours: 5:00 Hours

Activity 1: Teacher-Led Demonstration (1 Hour)

The teacher will use visual aids to explain embryonic development stages and germ layer functions.

Activity 2: Hands-On Model Building (1 Hour)

Students will construct models of embryonic stages using creative materials, focusing on structure and germ layers.

Activity 3: Microscopy Lab (1 Hour)

Students will examine histological slides to identify key embryonic structures.

Activity 4: Group Discussion (1 Hour)

Students will discuss developmental processes and their implications for anomalies.

Activity 5: Problem-Based Learning (1 Hour)

Students will analyze clinical cases of developmental errors and propose solutions.

Experiential Learning Activity

Experiential-Learning Learning 1.1: Fertilization and Implantation.

Total Learning Hours: 7:00 Hours

Activity 1: Model-Based Activity (1 Hour) Students will use 3D models or digital platforms to trace the journey of sperm, egg, zygote, and blastocyst, mapping key interactions and roles in fertilization and implantation.

Activity 2: Histological Slide Analysis (1 Hour) Students will examine slides to identify cellular elements of implantation, linking structures to functions like nutrient exchange.

Activity 3: Fertility Treatment Simulation (1 Hour) Students will role-play clinicians, designing ART protocols to address fertilization or implantation challenges, simulating IVF or endometrial priming.

Activity 4: Brainstorming Developmental Failures (1.5 Hour) Groups will brainstorm disruptions in fertilization or implantation, exploring causes like chromosomal abnormalities or hormonal imbalances.

Activity 5: Experimental Data Interpretation (1.5 Hour) Students will analyze datasets on hormone levels or genetic markers, drawing conclusions for reproductive health.

Activity 6: Hormonal Pathways Study (1 Hour) Students will map hormonal changes like LH, FSH, progesterone, and hCG, linking fluctuations to physiological impacts.

Experiential-Learning Learning 1.2: Basics of General Embryology

Total Learning Hours: 6:00 Hours

Activity 1: Case-Based Learning (1 Hour)

Students will analyze clinical cases on gametogenesis defects or embryological abnormalities, identifying affected stages, causes, and solutions.

Activity 2: Conceptual Mind Mapping (1 Hour)

Students will create mind maps linking gametogenesis and embryology processes to structures and functions.

Activity 3: Peer teaching (1 Hour)

Students will teach specific gametogenesis or embryology stages to their peers using diagrams and presentations.

Activity 4: Problem-Solving Challenge (1 Hour)

Students will work in groups to solve scenarios involving errors in gametogenesis or embryonic development, proposing solutions.

Activity 5: Creative Visualization (1 Hour)

Students will design creative outputs like posters or infographics to represent gametogenesis and embryology processes.

Activity 6: Reflective Q&A (1 Hour)

Students will participate in a Q&A session to reflect on learning, clarify doubts, and solidify understanding.

Experiential-Learning Learning 1.3: The Placenta

Total Learning Hours: 7:00 Hours

Activity 1: Laboratory Analysis (1 Hour)

Students will examine placenta slides under a microscope, identifying key features and understanding its role in maternal-fetal exchange.

Activity 2: To make flash card (1 Hour)

Students will simulate physiological processes of the placenta, acting out functions like nutrient transfer and hormone secretion.

Activity 3: Critical Comparison (1.5 Hour)

Students will compare the human placenta with those of other species, discussing structural and functional differences.

Activity 4: Problem-Solving Challenge (1 Hour)

Students will analyze scenarios of placental dysfunction, identifying causes and proposing solutions.

Activity 5: Mind Mapping (1.5 Hour)

Students will create integrative mind maps linking the placenta's structure to its functions, promoting holistic understanding.

Activity 6: Creative Visuals (1 Hour)

Students will design posters or videos showcasing the placenta's structure and roles with scientific accuracy.

Experiential-Learning Learning 1.4: Early Embryonic Development.

Total Learning Hours: 6 Hours

Activity 1: Interactive Model Analysis (1 Hour)

Students will analyze and interpret detailed 3D models of embryonic stages, focusing on identifying key developmental features. They will explore spatial relationships and functional aspects of the structures.

Activity 2: Problem-Based Learning (1 Hour)

Students will be presented with a clinical scenario involving disrupted embryonic development (e.g., congenital abnormalities). They will work in groups to analyze the scenario, identify the developmental stage affected, and suggest possible causes or interventions.

Activity 3: Sequential Visualization (1 Hour)

Students will create sequential diagrams or flowcharts illustrating the stages of early embryonic development. Each diagram will emphasize critical milestones, transitions, and their physiological or morphological significance, encouraging clarity and precision in representation.

Activity 4: Simulation Activities ((1 Hour)

Using virtual or augmented reality tools, students dynamically simulate the progression of embryonic stages.

Activity 5: Case Study Evaluation (1 Hour)

Students will analyze a case study involving embryonic developmental abnormalities, reviewing available data to deduce which stage of development was disrupted.

Activity 6: Timed Challenge: Stage Assembly (1 Hour)

Using provided resources (e.g., images, model parts, written descriptions); students will construct a timeline or visual representation of embryonic development within a set duration.	
Modular Assessment	
Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep structured marking pattern. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C Total Marks for this module: 50 1. Histological Slide Interpretation Students will identify and explain developmental stages or structures. (Marks: 10) 2. Case Based Assessment or practical performance or Dissection/ virtual dissection or or exploration through virtual reality - (Marks: 15) 3. Portfolio Submission Students will compile of learning activities: annotated images, case summaries, technique reviews, and reflections. (Marks: 10) 4. Making model or Poster making- (Marks: 15) or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	4
Module 2 : علم الجنين نظامي (Ilmul Janeen Nizami) Systemic Embryology.	
Module Learning Objectives (At the end of the module, the students should be able to) 1. Describe Systemic Embryology Development Of Organ Systems And Anatomical Basis Of Congenital Anomalies.	

2. Conduct Presentation And Group Discussion Regarding Systemic Embryology Development Of Organ Systems And Anatomical Basis Of Congenital Anomalies.

3. Identify Systemic Embryological Development Of Organ Systems.

Unit 1 علم الجنين نظامي (Ilmul Janeen Nizami) Systemic Embryology-I

2.1.1. علم الجنين نظامي (Ilmul Janeen Nizami) Systemic embryology.

2.1.2. تطور نظام اعضاء (Tatawwur -e-Nizm-e-A'aza) Development of Organ systems.

2.1.3. Systemic embryology, Development of Organ systems

References: 77,78,79,80,81,82,83,84,85

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the Systemic embryology	2	Lecture	CC	Knows-how	L&PPT ,L_VC,L&GD
CO1,CO4, CO7	Evaluate the Developmental Anatomy of Organ systems.	7	Experiential- Learning2.1	CE	Does	SIM,JC,PSM,PER, CD
CO1,CO4, CO7	Demonstrate coordinated assembly of a model illustrating stages of general systemic embryology.	5	Practical2.1	PSY- MEC	Shows-how	FC,D,PER,D-M,FV
CO1,CO4, CO7	Demonstrate systemic embryological development through clinically integrated tasks to enhance understanding of developmental processes and cngenital anomalies.	6	Experiential- Learning2.2	AFT- VAL	Does	CBL,CD,DIS,PER
CO1,CO4	Describe the Development of Organ systems.	3	Lecture	CC	Knows-how	L&PPT ,L&GD,L_VC

CO1,CO4	Describe the Anatomical Basis Of Congenital Anomalies.	2	Lecture	CC	Knows-how	L&GD,L_VC,L&PP T
CO1,CO4, CO7	Demonstrate the development of organ systems.	5	Practical2.2	PSY- MEC	Shows-how	PER,BS,SDL,D,D- M
Unit 2 علم الجنين نظامی (Ilmul Janeen Nizami) Systemic Embryology-II 2.2.1 خلقی نقص مع مکون شذوذ (Khalqi Naqais ma;a takawwun-e-Shuzooz) Congenital abnormalities with Teratogenesis. 2.2.2 خلقی نقص کی تشریحی اساس (Khalqi Naqais ki Tashreehi Asas) Anatomical Basis Of Congenital Anomalies. References: 77,78,79,80,81,82,83,84,85						
3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the Congenital abnormalities with Teratogenesis.	3	Lecture	CC	Knows-how	L_VC,L&PPT ,L&GD
CO1,CO4, CO7	Analyze the Congenital abnormalities with Teratogenesis.	7	Experiential- Learning2.3	AFT- RES	Does	IBL,CBL,DIS,JC,C D
CO1,CO4, CO7	Illustrate and demonstrate the congenital abnormalities with teratogenesis.	5	Practical2.3	PSY- GUD	Shows-how	PER,DIS,D- M,FV,ML
CO1,CO4, CO7	Demonstrate the Anatomical Basis Of Congenital Anomalies.	6	Experiential- Learning2.4	PSY- GUD	Shows-how	PBL,DIS,PL,PER
CO1,CO4, CO7	Illustrate and demonstrate the anatomical Basis of Congenital anomalies.	5	Practical2.4	PSY- ADT	Shows-how	PER,CBL,D,RP,D- M

Practical Training Activity
Practical Training 2.1 General Systemic embryology.
Total Learning Hours: 5 Hours Activity 1: Teacher Demonstration (1 Hour) The teacher will use 3D models, diagrams, and charts to explain the sequential development of organ systems and embryological stages. Students will take notes, analyze normal and abnormal sequences, and clarify key concepts. Activity 2: Flipped Classroom Session (1 Hour) Students will review pre-assigned materials on systemic embryology and engage in classroom discussions to apply their knowledge, analyze concepts, and solve case-based scenarios collaboratively. Activity 3: Concept Mapping (1 Hour) Students will design concept maps connecting embryological stages, derivatives, and anomalies for various organ systems, linking development processes to conditions like spina bifida or congenital heart defects. Activity 4: Clinical Correlation Assignment (1 Hour) The teacher will assign organ systems for students to research and link to clinical conditions. Students will present findings on embryological bases, pathophysiology, diagnostics, and therapeutic approaches. Activity 5: Real-Life Clinical Exposure (1 Hour) Students will visit a pediatric or obstetric department to observe real cases of congenital anomalies. They will learn diagnostic techniques, counseling strategies, and management methods, followed by reflective discussions.
Practical Training 2.2 Development of organ systems.
Total Learning Hours: 5 Hours Activity 1: Teacher Demonstration (1 Hour)

The teacher will demonstrate the sequential development of major organ systems, highlighting key embryological stages using 3D models, diagrams, and charts. Students will observe, take notes, and ask questions to clarify anatomical relationships and congenital conditions.

Activity 2: Histology Slide Observation (1 Hour)

Students will analyze microscopic slides of developing organs, such as the heart, lungs, or brain, identifying structural features and correlating them with their developmental functions.

Activity 3: Case-Based Learning (CBL) (1 Hour)

Students will explore clinical cases involving organ development disorders, using patient data and imaging studies to trace embryological origins, identify affected structures, and propose interventions.

Activity 4: Group Discussion (1 Hour)

Students will engage in discussions to review organ system development timelines and brainstorm clinical implications of errors at specific stages, debating topics.

Activity 5: Self-Directed Learning (SDL) with Reflection (1 Hour)

Students will independently research the development of a chosen organ system, preparing a report or presentation that emphasizes common disorders and their impact on anatomy and physiology.

Practical Training 2.3 Congenital abnormalities with teratogenesis.

Total Learning Hours: 5 Hours

Activity 1: Teacher Demonstration (1 Hour)

The teacher will use 3D models, diagrams, and animations to explain congenital abnormalities and teratogenesis, focusing on errors during embryogenesis and teratogen exposure. Students will observe, analyze step-by-step development, take notes, and ask questions.

Activity 2: Museum Specimen Observation (1 Hour)

Students will observe preserved fetal specimens with congenital abnormalities in an anatomy museum. They will analyze structural changes, document observations on a guided worksheet, and discuss embryological origins of defects.

Activity 3: Histological Slide Observation (1 Hour)

Students will examine microscopic slides of tissues impacted by teratogens, identifying structural abnormalities like neural tube defects or skeletal malformations, and correlating them with functional consequences.

Activity 4: Animated Video/Documentary Screening (1 Hour)

Students will watch animations or documentaries on teratogenesis and congenital anomaly development, visualizing processes such as neural tube closure disruption or heart septation errors.

Activity 5: Guest Lecture by Clinical Expert (1 Hour)

A pediatrician or geneticist will present clinical cases of congenital birth defects, discussing diagnostic approaches, prevention strategies (e.g., folic acid supplementation), and management. Students will engage in a Q&A session.

Practical Training 2.4 Congenital Anomalies**Total Learning Hours: 5 Hours****Activity 1: Demonstration (1 Hour)**

The teacher will demonstrate congenital anomalies using 3D models. Students will observe, analyze deviations from normal anatomy, take notes, and ask questions for better understanding.

Activity 2: Embryological Chart/Model Preparation (1 Hour)

The teacher will guide students in creating charts or models of congenital anomalies caused by embryological errors. Students will illustrate sequential development stages and present their work to peers.

Activity 3: Histological Slide Analysis (1 Hour)

The teacher will explain histological slides related to anomalies. Students will analyze slides under microscopes, document structural changes, and share insights in group discussions.

Activity 4: Case-Based Learning (CBL) (1 Hour)

The teacher will present clinical cases of congenital anomalies. Students will analyze cases, identify affected structures, and propose interventions or preventive measures.

Activity 5: Role Play / Patient Counseling Simulation (1 Hour)

The teacher will guide scenarios for simulated counseling sessions. Students, as doctors, will counsel parents, explaining the anatomical basis of anomalies with visual aids, enhancing communication and empathy skills

Experiential Learning Activity

Experiential-Learning Learning 2.1: Developmental Anatomy of Organ systems.

Total Learning Hours: 7 Hours

Activity 1: Clinical Exposure or Observation (1.5 Hours)

Students will visit pediatric or obstetric departments to observe congenital anomaly cases, diagnostic procedures, and medical management. Reflections will link embryology concepts to clinical practice, such as neural tube defect prevention.

Activity 2: Timeline Construction (1.5 Hours)

Students will create timelines for the development of organ systems, including key embryological events (e.g., heart looping, neurulation) and their critical time points.

Activity 3: Journal Club (2 Hours)

Students will review journal articles on topics like congenital anomalies or regenerative medicine. Group discussions and debates will analyze research findings, emphasizing systemic embryology and clinical innovations, such as prenatal diagnostics.

Activity 4: Problem-Solving: Developmental Failure Analysis (1 Hour)

Students will analyze scenarios of developmental errors (e.g., septal defect or neural crest migration failure). They will identify causes and propose interventions, such as surgical corrections or preventive strategies.

Activity 5: Interactive Clinical Case Discussions (1 Hour)

Students will engage with a clinical expert presenting real cases of congenital anomalies. Discussions will analyze embryological roots and treatment options, such as managing diaphragmatic hernias or ventricular septal defects.

Experiential-Learning Learning 2.2: General systemic embryology

Total Learning Hours: 6 Hours

Activity 1: Peer Teaching (1 Hour)

Students will prepare presentations on the embryological development of organ systems, incorporating visual aids and linking developmental stages to potential anomalies for better engagement and clinical relevance.

Activity 2: Clinical Correlation Assignment (1 Hour)

Students will research and present systemic embryology's links to clinical conditions, such as congenital heart defects, explaining their embryological basis, features, and therapeutic approaches using case studies and imaging.

Activity 3: Reflection Writing (1 Hour)

Students will write reflective essays connecting systemic embryology knowledge with its role in diagnosing and managing congenital disorders, emphasizing clinical applications and patient education.

Activity 4: Timeline Activity (1 Hour)

Students will create timelines of developmental milestones for various organ systems, highlighting stages like gastrulation and neurulation while identifying critical periods where errors could lead to anomalies.

Activity 5: Real-Life Clinical Case Review (1 Hour)

Students will analyze real clinical cases of congenital anomalies, examining patient histories, imaging, and outcomes to understand the link between embryological errors and anatomical defects.

Activity 6: Literature Review (1 Hour)

Students will review recent advancements in systemic embryology, summarizing studies on topics like gene editing and organoid modeling, and discussing their clinical implications in a report or presentation.

Experiential-Learning Learning 2.3: Congenital abnormalities with Teratogenesis.

Total Learning Hours: 7 Hours

Activity 1: Group Teratogen Research and Discussion (1 Hour)

Students will research specific teratogens and their effects on fetal development. They will discuss findings in groups, present insights using diagrams and timelines, and analyze disrupted embryological processes.

Activity 2: Clinical Case Studies (1 Hour)

Students will analyze cases involving congenital anomalies caused by teratogens. They will identify disrupted developmental stages, propose diagnostic tools, and discuss management strategies.

Activity 3: Journal Club (2 Hours)

Students will review and critically evaluate research articles on teratogenesis, discussing methodologies, results, and clinical applications. Presentations will connect findings to embryology and congenital anomaly management.

Activity 4: Hypothetical Experiment Design (1 Hour)

Students will design theoretical experiments on teratogen effects. They will propose methodologies, outcomes, and ethical considerations, with discussions on public health applications.

Activity 5: Literature Review Club (1 Hour)

Students will conduct literature reviews on topics like teratogen detection technologies, presenting findings and debating advancements in maternal-fetal medicine to address teratogen-induced anomalies.

Activity 6: Real-World Application: Policy Analysis (1 Hour)

Students will assess policies on teratogen regulation and propose improvements or new strategies, presenting actionable recommendations for enhancing policy impact.

Experiential-Learning Learning 2.4: Anatomical Basis Of Congenital Anomalies.

Total Learning Hours: 6 Hours

Activity 1: Peer Teaching (1 Hour)

Students will research and present a congenital anomaly, focusing on its embryological development, anatomical basis, and clinical implications, using visual aids like diagrams or 3D models.

Activity 2: Comparative Anatomy Activity (1 Hour)

Students will compare normal and abnormal anatomical models, analyzing structural deviations and their functional impacts, such as scoliosis or reduced flexibility.

Activity 3: Problem-Solving Session (1 Hour)

In teams, students will address scenarios of developmental errors, trace their embryological origins, and propose interventions, such as managing atrial septal defects through postnatal surgical techniques.

Activity 4: Clinical Anatomy Workshop (1 Hour)

Students will examine preserved specimens of congenital anomalies, document structural features, and trace them to specific embryological stages. Discussions may include teratogens and preventive measures.

Activity 5: Role-Playing as Counselors (1 Hour)

Students will simulate counseling parents about congenital anomalies, explaining the anatomical basis in simple terms, providing emotional support, and outlining treatment options.

Activity 6: Research Project on Preventive Measures (1 Hour)

Students will research preventive measures for congenital anomalies, such as folic acid supplementation or teratogen screening, and prepare presentations or reports emphasizing maternal health and environmental safety.

Modular Assessment**Assessment****Hour**

Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep structured marking pattern. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C

4

Total Marks for this module: 50 1.Labeling Diagrams: Students will label parts, developmental stages, and key molecular signals on provided images or schematic diagrams of developing organs (10 Marks) 2. Research Proposal Writing: Students will draft proposals focusing on advancements in fetal medicine, stem cell research, or gene therapy (15 Marks). 3.Critical Review of Recent Studies: Students will analyze groundbreaking research on fetal development and congenital malformations, evaluating the methodology, findings, and implications (15 Marks). 4. Seminar Presentations: The teacher will assign topics such as prenatal diagnosis or regenerative medicine, requiring students to present their insights and participate in peer discussions (10 Marks). or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	
Semester No : 4	
Module 3 : خوردبینی تشریح (Tashreeh-e- Khurd-beeni) Microscopic Anatomy. علم حیات خلوی (Ilm-e-Hayat-e-Khalwi) Cell Biology.	
Module Learning Objectives (At the end of the module, the students should be able to) 1. Describe Microscopic Anatomy- Cytoplasm, Cytoplasmic Matrix, Cell membrane and Cellular organelles. Cytoskeleton, Cell inclusions, Cilia and flagella and about information of Collection Maintenance and Application of Stem Cells, Cryobanking and its Application. 2. Conduct presentation and group Discussion on Microscopic Anatomy. 3. Identify the cellular organelles.	

Unit 1 علم حیات خلوی (Ilm-e-Hayat-e-Khalwi) Cell Biology

3.1.1. علم حیات خلوی (Ilm-e-Hayat-e-Khalwi) Cell Biology.

3.1.2. رطوبت خلیہ (Ratubat-e-Khalya) Cytoplasm.

3.1.3. مصفوفہ خلیہ (Masfufah-e-Khuwiyah) Cytoplasmic Matrix.

3.1.4. غشاء خلیہ (Ghisha-e-khalyah) cell membrane.

3.1.5. عضویات خلیہ (Uzwyat-e- Khalyah) Cell organelles.

References: 65,66,67,68,69,70,71,72,73,74,75,76

3A	3B	3C	3D	3E	3F	3G
CO1,CO3	Describe the Cell Biology with Cytoplasm, Cytoplasmic Matrix, cell membrane.	2	Lecture	CC	Know	L&PPT ,L&GD,L_VC
CO1,CO3, CO7	Evaluate the cell biology, cytoplasm, cytoplasmic matrix and cell membrane.	7	Experiential- Learning3.1	AFT- VAL	Does	D,IBL,JC,SIM,PER
CO1,CO3, CO7	Demonstrate the cell biology, cytoplasm, cytoplasmic matrix and cell membrane.	5	Practical3.1	PSY- SET	Shows-how	PER,BS,D- M,FC,DIS
CO1,CO3, CO7	Construct and present to demonstrate structural and functional aspects of cellular organelles.	6	Experiential- Learning3.2	AFT- RES	Does	DIS,JC,SDL,D,PE R
CO1,CO3	Describe the Cellular organelles.	3	Lecture	CC	Knows-how	L_VC,L&PPT ,L&GD
CO1,CO7	Demonstrate the cellular organelles.	5	Practical3.2	PSY- GUD	Shows-how	PER,D,D- M,SDL,DIS

Unit 2 خوردبینی تشريح (Tashreeh-e- Khurd-beeni) Microscopic Anatomy

3.2.1. بیکل خلیه (Haikal-e-Khalya) cytoskeleton.

3.2.2. خلوی مشمولات (Khalvi Mashmulat) Cell inclusions.

3.2.3. عصیہ (Isiyah) flagella) Cilia) اهداب (Hudbah).

3.2.4. خلیات اساسیہ کا حصول، استحکام و استعمال (Khulaya't -e-Asasiyah ka Husul, istehkam aur Iste'mal) Collection, Maintenance and Application of Stem Cells.

3.2.5. بنک التبرید (Bankuttabreed). Cryobanking.

References: 65,66,67,68,69,70,71,72,73,74,75,76

3A	3B	3C	3D	3E	3F	3G
CO1,CO3	Describe the cytoskeleton, Cell inclusions, Cilia and flagella.	2	Lecture	CC	Know	L_VC,L&GD,L&PPT
CO1,CO3,CO7	Examine the cytoskeleton,cell inclusions,cilia and flagella	6	Experiential-Learning3.3	CAN	Shows-how	CBL,SDL,PL,JC,D
CO1,CO3,CO7	Demonstrate the cytoskeleton, cell inclusions, cilia and flagella.	5	Practical3.3	PSY-SET	Shows-how	D,SDL,SIM,PER,DIS
CO1,CO3,CO7	Discuss the collection, maintenance and application of stem cells and cryobanking.	7	Experiential-Learning3.4	CAN	Shows-how	PER,SDL,PL,CBL,SIM
CO1,CO3	Discuss the information of Collection, Maintenance and Application of Stem Cells and Introduction of Cryobanking and its Application.	3	Lecture	CC	Knows-how	L&GD,L&PPT,L_VC

CO1,CO3, CO7	Illustrate and demonstrate the maintenance and application of stem cells and cryobanking.	5	Practical3.4	PSY- GUD	Shows-how	FV,DIS,PER,D,SIM
Practical Training Activity						
Practical Training 3.1 Cell Biology.						
Total Learning Hours: 5 Hours Activity 1: Teacher Demonstration (1 Hour) The teacher will demonstrate cell structures, cytoplasm, and membranes using light and electron microscopy. Students will observe slides, note features like the phospholipid bilayer, and discuss how these structures support cellular processes. Activity 2: Clinical Correlation / Case Discussion (1 Hour) The teacher will present clinical cases of membrane transport defects and cytoplasmic abnormalities. Students will analyze cellular dysfunctions, trace impacts, and discuss diagnostic and management strategies. Activity 3: Self-Directed Learning / Flipped Classroom (1 Hour) Students will study membrane transport mechanisms independently, preparing presentations on processes like osmosis and active transport, and share insights in class discussions. Activity 4: Brainstorming Session (1 Hour) In groups, students will brainstorm the roles of the cytoplasmic matrix in processes like protein synthesis and energy production. Presentations will explore implications of cytoplasmic abnormalities and potential adaptations. Activity 5: Interactive Diagram Labeling (1 Hour) Students will label high-resolution diagrams of cellular structures, identifying and explaining features like transport proteins and actin filaments, discussing their coordination in maintaining cellular function.						
Practical Training 3.2 Cellular organelles.						

Total Learning Hours: 5 Hours**Activity 1: Teacher Demonstration (Microscopy) (1 Hour)**

The teacher will use light and electron microscopes to demonstrate cellular organelles like mitochondria, ER, and Golgi apparatus. Students will observe, take notes, and discuss organelle structures and their functions.

Activity 2: Student Microscopic Observation (1 Hour)

Students will examine stained slides under microscopes, identify organelles, sketch their features, and write notes on their structures and functions, enhancing observational skills.

Activity 3: 3D Model / Virtual Lab Demonstration (1 Hour)

Using 3D models or virtual simulations, the teacher will explain organelle structures and functions. Students will interact with models, document mechanisms, and discuss functional coordination between organelles.

Activity 4: Group Activity – Organelle Roleplay (1 Hour)

Students will roleplay as organelles, creatively presenting their functions, such as ATP production by mitochondria or protein packaging by the Golgi apparatus, emphasizing interdependence in cellular activity.

Activity 5: Concept Mapping / Flowcharts (1 Hour)

Students will create concept maps or flowcharts illustrating organelle relationships and functions, presenting and explaining coordination processes like energy production, transport, and repair.

Practical Training 3.3 Cellular structures.

Total Learning Hours: 5 Hours**Activity 1: Teacher Demonstration (1 Hour)**

The teacher will use 3D models, animations, and microscopic slides to demonstrate cytoskeleton components, cell inclusions, cilia, and flagella, highlighting their cellular roles and specialized functions. Students will take notes, ask questions, and connect the concepts to real-life processes like mitosis.

Activity 2: Microscopy Session (1 Hour)

Students will observe stained slides of cytoskeletal components and cell inclusions under microscopes, identifying and labeling structures like microtubules and lipid droplets while comparing their distribution across cell types.

Activity 3: 3D Model Making (1 Hour)

Under teacher supervision, students will create 3D models of cytoskeletal components, cilia, and flagella, showcasing details like microtubule arrangements and basal body features. They will explain the role and importance of each structure in cellular function.

Activity 4: Clinical Correlation / Case Diagnosis (1 Hour)

Students will analyze clinical cases involving cytoskeletal defects, such as Kartagener syndrome, identifying affected structures, explaining pathological impacts, and discussing management strategies.

Activity 5: Model Dissection Activity (1 Hour)

Students will dissect virtual or physical cell models to locate and identify components like microtubules and cilia. They will label structures, explain their functions, and discuss integration within cellular processes.

Practical Training 3.4 Stem Cells and Cryobanking.

Total Learning Hours: 5 Hours

Activity 1: Teacher Demonstration (1 Hour)

The teacher will use 3D models, animations, and live demonstrations to explain stem cell culture processes, including cell isolation, maintenance, and cryopreservation. Students will observe, take notes, and discuss critical checkpoints and potential deviations.

Activity 2: Student Hands-on Practice (1 Hour)

Under teacher supervision, students will perform mock setups for stem cell isolation, culturing, and cryopreservation, using virtual tools or practice equipment. They will document progress and identify areas for improvement.

Activity 3: Virtual Lab / Simulation (1 Hour)

Students will explore virtual lab platforms, observing procedures like cryobanking and cell differentiation. They will complete guided exercises, such as simulating freezing techniques and predicting outcomes of errors.

Activity 4: Visit to Stem Cell Lab / Cryobank (1 Hour)

Students will visit a cryobank facility to observe real-time practices, such as freezing and storage of stem cells. They will interact with lab personnel to understand the equipment and current advancements.

Activity 5: Group Discussion & Q&A Session (1 Hour)

The teacher will lead a session on the ethical and clinical aspects of stem cell research. Students will discuss topics like accessibility, regulatory challenges, and future developments, fostering critical thinking.

Experiential Learning Activity

Experiential-Learning Learning 3.1: Cellular biology.

Total Learning Hours: 7 Hours**Activity 1: Journal Club (1 Hour)**

Students will critically review research articles on cytoplasmic matrix properties, membrane transport mechanisms, or breakthroughs in cell biology, presenting findings and discussing implications during group sessions.

Activity 2: Dynamic Roleplay of Cellular Processes (1 Hour)

Students will act out cellular processes like ion transport and protein synthesis, assigning roles such as membrane proteins or cytoskeletal elements to simulate interactions and cellular coordination.

Activity 3: Design a Lab Protocol (1 Hour)

Students will create detailed hypothetical protocols for studying processes like osmosis or active transport, defining objectives, methods, and experimental parameters for peer review.

Activity 4: Multimedia Explanation Creation (1 Hour)

Students will develop multimedia content (e.g., videos or animations) explaining cytoplasm and membrane contributions to processes like endocytosis or signal transduction, simplifying complex mechanisms.

Activity 5: Real-World Application Research (1 Hour)

Students will research applications of cellular biology, such as drug delivery or vaccine development, linking membrane transport mechanisms to therapeutic approaches and presenting their findings.

Activity 6: Organelle Dissection Simulation (1 Hour)

Using digital tools or diagrams, students will virtually dissect cells to analyze cytoplasmic matrix and membrane roles in metabolism and permeability, documenting findings in structured reports.

Activity 7: Case-Based Problem Solving (1 Hour)

Students will solve case-based problems involving cellular abnormalities, like altered membrane fluidity or cytoplasmic viscosity, predicting outcomes and proposing solutions to restore cellular balance.

Experiential-Learning Learning 3.2: Cellular organelles.

Total Learning Hours: 6 Hours

Activity 1: Concept Mapping (1 Hour)

Students will create concept maps showing interconnections and functions of cellular organelles, linking processes like protein synthesis (ER) and energy production (mitochondria) to emphasize organelle coordination.

Activity 2: Comparative Analysis (1 Hour)

Students will compare organelle structures and functions across cell types (e.g., plant vs. animal cells), analyzing adaptations like chloroplasts in plants for photosynthesis or mitochondria in muscle cells for energy.

Activity 3: Literature Review (1 Hour)

Students will review recent discoveries on organelle functions, such as autophagy or lysosomal activity, summarizing findings and discussing their relevance to medicine and biotechnology.

Activity 4: Problem-Solving Scenarios (1 Hour)

Students will address hypothetical organelle dysfunction scenarios, such as Golgi apparatus failures or lysosomal defects, proposing solutions to mitigate issues like waste buildup or protein transport errors.

Activity 5: Journal Club (1 Hour)

Students will critically evaluate research articles on organelle functions and disorders, analyzing methodologies and clinical implications, and sharing insights through group discussions.

Activity 6: Peer Teaching (1 Hour)

In groups, students will research and teach organelle structures and functions (e.g., mitochondria or lysosomes) using interactive tools like diagrams and animations to enhance peer learning.

Experiential-Learning Learning 3.3: Cytoskeleton and Cell inclusions.

Total Learning Hours: 6 Hours**Activity 1: Concept Mapping (1 Hour)**

Students will create concept maps to illustrate interconnections among the cytoskeleton, cell inclusions, cilia, and flagella, highlighting roles like energy storage (lipid inclusions) and fluid movement.

Activity 2: Peer Teaching (1 Hour)

Students will independently research topics like microtubule dynamics or primary cilia functions, presenting their findings through models or presentations to teach their peers collaboratively.

Activity 3: Problem-Solving Scenarios (1 Hour)

Students will analyze hypothetical structural defects, such as absent intermediate filaments or impaired flagellar function, propose solutions, and justify their approaches using cellular principles.

Activity 4: Brainstorming and Discussion (1 Hour)

Students will brainstorm innovative applications of cytoskeletal elements in medical and technological fields, such as drug delivery or nanotechnology, fostering interdisciplinary thinking.

Activity 5: Literature Review (1 Hour)

Students will review advancements in cytoskeletal dynamics or related fields, summarizing findings and discussing their implications for cellular functions and disease understanding.

Activity 6: Journal Club Activity (1 Hour)

Students will critically evaluate research articles on cytoskeletal components and their functions, discussing methodologies and clinical implications in group sessions to connect literature to practical biology.

Experiential-Learning Learning 3.4: Stem Cells and Cryobanking.

Total Learning Hours: 7 Hours

Activity 1: Clinical Correlation / Case Discussion (1 Hour)

Students will analyze case studies of membrane transport defects or cytoplasmic abnormalities, such as cystic fibrosis, linking cellular issues to functional implications and proposing solutions.

Activity 2: Problem-Solving Scenario (1 Hour)

Students will address scenarios involving cellular defects, predicting outcomes of membrane dysfunction or cytoplasmic irregularities, and exploring their impact on cellular homeostasis.

Activity 3: Group Discussions (1 Hour)

Students will lead discussions reflecting on how abnormalities in cellular structures contribute to health problems, connecting molecular disruptions to systemic effects.

Activity 4: Peer Teaching (1 Hour)

Students will present topics like membrane protein functions, using diagrams or models to enhance understanding and foster collaborative learning.

Activity 5: Application to Research and Medicine (1 Hour)

Students will explore how advancements in membrane and cytoplasmic dynamics have influenced medical treatments and discuss potential applications like drug delivery or precision medicine.

Activity 6: Debate on Public vs. Private Cryobanks (1 Hour)

Students will debate public versus private cryobanking systems, presenting arguments on accessibility, ethical concerns, and affordability, enhancing communication and critical thinking.

Activity 7: Research Presentation on Emerging Technologies (1 Hour)

Students will deliver presentations on cutting-edge technologies in stem cell applications, showcasing their impact on cryobanking and therapeutic advancements.

Modular Assessment

Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep structured marking pattern. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C Total Marks for this module: 50 1. Microscopy Practical Assessments: Students will analyze tissue slides, document cellular structures, and identify pathology markers (10 Marks). 2. Case-Based Discussions (CBDs): The teacher will present clinical cases related to tissue degeneration or regenerative medicine, prompting students to connect histology with disease pathology (15 Marks). 3. Viva Voce or Presentation/Demonstration or critical paper reading or Clinical examination - (Marks: 10) 4. Histological Sketching & Annotation: The teacher will ask students to create labeled diagrams of tissues, linking structural details to their functions and pathologies (Marks: 15) or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	4
Module 4 : نوات (Nawat) Nucleus دورہ ظلیہ (Daurah-e-Khaliyah) cell cycle. جسم کی خردبینی ساخت (Jism ki Khurdbeeni Sakhten) Microscopic Structures of the body.	

Module Learning Objectives

(At the end of the module, the students should be able to)

1. Describe Describe the Nucleus, Nuclear Envelope and Nucleolus DNA and Other Components of Chromatin, protein synthesis, Nuclear changes that indicate cell death. Mitosis, Meiosis, Cell Renewal, Cellular Differentiation and Cellular Proliferation. Microscopic Anatomy of the Structures of the body, light and Electron Microscopic features of the structures, Structure - function Correlations of the different structures of the body
2. Conduct Presentation And Group Discussion For Cell Cycle
3. Identify Nuclear changes that indicate cell death and DNA strands.

Unit 1 نواة (Nawat) Nucleus

4.1.1. نواة (Nawat) Nucleus) .

4.1.2. لفافہ نواة (Lifafah-e-Nawat) Nuclear Envelope.

4.1.3. مصفوفہ نواة (Masfufah-e- Nawat) Nuclear matrix.

4.1.4. نويہ (Nuwaiyah) Nucleolus.

4.1.5. حمض نواتی (Himz-e-Nawawi) DNA.

4.1.6. اجسام لونیہ کے دیگر اجزاء (Ajsam-e- Launiyah ke deegar Ajza) Other Components of Chromatin.

4.1.7. تعمیر لحمین (Ta'ameer-e- Lahmeen) protein synthesis.

References: 66,67,68,69,70,71,72,73,74,75,76

3A	3B	3C	3D	3E	3F	3G
CO1,CO3	Describe the the nucleus, nuclear envelope, nuclear matrix and nucleolus.	2	Lecture	CC	Know	L_VC,L&GD,L&PP T
CO1,CO3, CO7	Evaluate the nucleus,nuclear envelope,nuclear matrix and nucleolus.	7	Experiential- Learning4.1	CE	Shows-how	DIS,JC,D- M,PER,CBL

CO1,CO4, CO7	Demonstrate the nucleus, nuclear envelope, nuclear matrix and nucleolus.	5	Practical4.1	PSY- SET	Shows-how	DIS,PER,SDL,BS, CBL
CO1,CO3, CO7	Create 3D model of DNA and discuss the various components.	6	Experiential- Learning4.2	PSY- SET	Shows-how	PER,DIS,D- M,CBL,D
CO1,CO3, CO4	Describe the DNA and Other Components of Chromatin, protein synthesis.	3	Lecture	CC	Knows-how	L&GD,L&PPT ,L
CO1,CO4, CO7	Illustrate and demonstrate the DNA and other components of chromatin and protein synthesis.	5	Practical4.2	PSY- GUD	Shows-how	PER,BS,DIS,SDL, D-M

Unit 2 دورہ خلیہ (Daurah-e-Khaliyah) cell cycle

4.2.1. نواۃ کے وہ تغیرات جو موت الخلیہ کی نشاندہی کرتے ہیں (Nawat ke who taghiyurat, jo maut-e- Khalyah ki Nishandahi karti hain) Nuclear changes indicating cell death.

4.2.2 انقسام مساوی (Inqisam-e-musawi) Mitosis.

4.2.3 انقسام تقلیلی (Inqisam -e- Taqleeli) Meiosis.

4.2.4 تجدید خلیہ (Tajdeed-e-khalyah) Cell Renewal

4.2.5. وٹکار خلیہ تفرق خلیہ (Tafarruq-e-Khalyah wa Takasur-e Khalyah) Cellular Differentiation and Cellular Proliferation.

4.2.6. تنظیم خلوی (Tanzeem-e-Khalwi) Cellular organization. جسم کی خوردبینی ساخت (Jism ki Khurdbeeni Sakhten) Microscopic Structures of the body.

4.2.7. روشنی اور الیکٹران خوردبینی خواص (Raushni aur electron Khurdbeeni Khawas) light and Electron Microscopic features.

4.2.8. ساخت اور افعال کے باہمی تعلقات (Sakht-wa-Af'al ke Bahmi Ta'alluqat) Structure - function Correlations.

References: 65,66,67,68,69,70,71,72,73,74,75,76

3A	3B	3C	3D	3E	3F	3G
CO1,CO3	Describe the nuclear changes indicating cell death and mitosis, meiosis, cell renewal, cellular differentiation, cellular proliferation.	3	Lecture	CC	Knows-how	L&PPT ,L&GD,L_VC

CO1,CO3, CO7	Explore & demonstraet the nuclear changes indicating cell death, mitosis, meiosis, cell renewal, cellular differentiation and cellular proliferation.	7	Experiential-Learning4.3	PSY-MEC	Shows-how	D,PER,CBL,DIS,SDL
CO1,CO3, CO7	Illustrate and demonstrate the nuclear changes indicating cell death, mitosis, meiosis, cell renewal, cellular differentiation and cellular proliferation.	5	Practical4.3	PSY-SET	Shows-how	DIS,PER,SDL,PBL,D
CO1,CO3, CO7	Explore the microscopic structures, cellular organization, light and electron, microscopic features and structures of the body - function Correlations.	6	Experiential-Learning4.4	PSY-GUD	Does	PER,BS,JC,D,DIS
CO1,CO3	Describe the microscopic structures of the body, cellular organization, light and electron, microscopic features and structure - function correlations.	2	Lecture	CC	Knows-how	L&GD,L_VC,L&PP T
CO1,CO4, CO7	Illustrate and demonstrate the microscopic structures of the body, cellular organization, light and electron, microscopic features and structure - function correlations.	5	Practical4.4	PSY-GUD	Shows-how	D-M,PER,SDL,D,DIS

Practical Training Activity

Practical Training 4.1 The nucleus.

Total Learning Hours: 5 Hours

Activity 1: Teacher Demonstration using 3D Models (30 Min)

The teacher will use 3D models or animations to explain nucleus components like the nuclear envelope, matrix, and nucleolus, detailing their roles in protecting genetic material, providing structural support, and synthesizing rRNA.

Activity 2: Diagram Drawing and Labeling (1 Hour)

Students will create and label diagrams of nucleus components, such as nuclear pores, nucleolus, and matrix, ensuring accuracy and spatial relationships while discussing their functions.

Activity 3: Group Brainstorming Session (1 Hour)

Students will explore functions like ribosome synthesis by the nucleolus and structural integrity from the nuclear matrix, connecting these roles to cellular processes like protein synthesis.

Activity 4: Self-Directed Learning (SDL) (1 Hour)

Students will research disorders related to nuclear envelope defects, summarizing how these impact cellular functions and presenting findings on related diseases during class discussions.

Activity 5: Case-Based Discussion (30 Min)

Students will analyze genetic disorder cases, such as laminopathies, linking nuclear envelope defects to cellular consequences and proposing therapeutic approaches during group discussions.

Activity 6: Presentation of Recent Research (1 Hour)

Students will review research papers on the nuclear matrix's role in cancer, aging, or other topics, summarizing findings and discussing implications for cellular behavior in health and disease.

Practical Training 4.2 Chromatin and protein synthesis.

Total Learning Hours: 5 Hours**Activity 1: Teacher Demonstration of DNA Structure (1 Hour)**

The teacher will explain DNA's double helix structure using 3D models and animations, focusing on components like the sugar-phosphate backbone, base pairing (A-T, G-C), and genetic coding. Students will observe, take notes, and discuss the significance of DNA features.

Activity 2: Chromatin Staining under Microscope (1 Hour)

Students will examine stained slides of euchromatin and heterochromatin under a microscope to observe differences in structure and function. They will sketch and note the role of chromatin states in transcription and gene expression.

Activity 3: Protein Synthesis Flowchart Preparation (1 Hour)

Students will design flowcharts illustrating transcription and translation, from mRNA formation to protein assembly. Visual aids and annotations will clarify each step in the protein synthesis process.

Activity 4: Model Making Activity (1 Hour)

Students will build physical models of DNA, chromatin, and ribosomes, demonstrating molecular structures like nucleotide pairs or nucleosomes. They will present their models, explaining interactions and functions.

Activity 5: Brainstorming Session (1 Hour)

Students will brainstorm the clinical significance of chromatin in diseases like cancer, discussing chromatin remodeling and its effect on gene expression. They will generate ideas for diagnostics and therapies.

Practical Training 4.3 Cellular activity.

Total Learning Hours: 5 Hours

Activity 1: Teacher Demonstration (1 Hour)

The teacher will showcase histological slides and electron micrographs, highlighting nuclear changes during apoptosis, necrosis, mitosis, and meiosis. Students will observe and take notes on morphological distinctions, engaging in discussions about functional relevance.

Activity 2: Group Discussion & Brainstorming (1 Hour)

Students will explore differences between apoptosis, necrosis, proliferation, and differentiation during group discussions. Real-world examples like tissue remodeling and degenerative diseases will help link these processes to clinical applications.

Activity 3: Problem-Based Learning (PBL) (1 Hour)

Students will analyze clinical cases, such as cancer or degenerative diseases, identifying disrupted cellular mechanisms and proposing interventions like promoting apoptosis or preventing necrosis.

Activity 4: Flipped Classroom Activity (1 Hour)

Students will study pre-assigned materials on cell cycle phases and differentiation before class. Classroom discussions and activities will deepen their understanding and application of these concepts.

Activity 5: Q&A and Reflection (1 Hour)

The teacher will lead a Q&A session on topics like tissue health and differentiation, prompting students to reflect on key takeaways and their relevance to clinical and research applications.

Practical Training 4.4 Microscopic organization of the cell.

Total Learning Hours: 5 Hours**Activity 1: Teacher Demonstration (1 Hour)**

The teacher will demonstrate tissue and cellular structures using light microscopy, explaining slide preparation, magnification, and staining techniques. Students will observe and take notes on methods and tissue features.

Activity 2: Student Hands-On Microscopy Session (1 Hour)

Students will examine pre-stained slides under microscopes, sketch tissues like muscle or epithelial layers, and label features such as nuclei and membranes while analyzing structure-function relationships.

Activity 3: Group Slide Discussion (1 Hour)

Students will compare light and electron microscopic images of tissues in groups, discussing structural features like organelles and their functional roles, summarizing findings for class presentations.

Activity 4: Diagrammatic Illustration (1 Hour)

Students will draw detailed, labeled diagrams of observed tissues, capturing features like stratification or fiber alignment, and annotate diagrams with notes on functional relevance, guided by the teacher.

Activity 5: Research Article Review (1 Hour)

Students will review articles on electron microscopy advancements, summarizing findings and analyzing contributions to tissue structure-function understanding in small groups or class-wide discussions.

Experiential Learning Activity

Experiential-Learning Learning 4.1: Basics of nucleus

Total Learning Hours: 7 Hours

Activity 1: Case Study Analysis (1 Hour)

Students will analyze clinical cases involving nuclear changes, such as cancer or degenerative diseases, connecting disruptions to their cellular and systemic effects.

Activity 2: Flowchart Creation (1 Hour)

Students will design flowcharts illustrating nuclear changes during processes like the cell cycle, meiosis, and apoptosis, emphasizing sequential progression and logical flow.

Activity 3: Experimental Data Interpretation (1 Hour)

Students will interpret experimental data, such as DNA fragmentation in apoptosis or chromosomal alignment in mitosis, drawing conclusions about nuclear changes and their broader implications.

Activity 4: Virtual Microscopy Exploration (1 Hour)

Students will use virtual microscopy tools to observe nuclear changes across tissues and cell types, documenting variations in chromatin structure, spindle formation, and nuclear fragmentation.

Activity 5: Cross-Sectional Cellular Analysis (1 Hour)

Students will analyze images or models of nuclear activities in tissues, such as mitotic figures or apoptotic bodies, linking observations to tissue health and functionality.

Activity 6: Cellular Lifecycle Presentation (1 Hour)

Students will collaborate to deliver presentations detailing the lifecycle of a cell, focusing on nuclear events like differentiation, division, and apoptosis, using diagrams for clarity.

Activity 7: Scientific Poster Creation (1 Hour)

Students will create scientific posters summarizing nuclear changes, integrating diagrams and data interpretations to showcase connections between cell death, renewal, differentiation, and proliferation.

Experiential-Learning Learning 4.2: DNA and protein synthesis.

Total Learning Hours: 6 Hours

Activity 1: DNA Model Building (1 Hour)

Students will construct 3D DNA models showcasing the double helix structure, base-pairing (A-T, G-C), and antiparallel strands. They will explain the role of base pairing in replication and transcription.

Activity 2: Diagrammatic Representation (1 Hour)

Students will create diagrams of chromatin organization, highlighting nucleosomes and histones, and illustrating transcription and translation steps while annotating how chromatin structure affects gene accessibility.

Activity 3: Flowchart Creation (1 Hour)

Students will design flowcharts detailing protein synthesis from transcription to translation, including RNA splicing, codon recognition, and peptide chain formation for logical clarity.

Activity 4: Case Study on Chromatin and Gene Expression (1 Hour)

Students will analyze case studies on chromatin remodeling, linking euchromatin and heterochromatin to gene expression and protein synthesis outcomes.

Activity 5: Literature Review of Chromatin Research (1 Hour)

Students will review articles on chromatin dynamics and histone modifications, summarizing their impact on gene regulation and presenting findings to peers.

Activity 6: Case Analysis of Epigenetic Disorders (1 Hour)

Students will investigate cases of epigenetic disorders, analyzing how transcription and protein synthesis are disrupted and proposing therapeutic interventions.

Experiential-Learning Learning 4.3: Cellular activity.

Total Learning Hours: 7 Hours

Activity 1: Microscopic Slide Examination (1 Hour)

Students will analyze histological slides and micrographs to identify nuclear changes during apoptosis, necrosis, mitosis, and meiosis, documenting observations and correlating findings with cellular processes.

Activity 2: Case Study Analysis (1 Hour)

Students will investigate clinical cases of nuclear abnormalities, evaluating how disruptions in processes like proliferation and differentiation affect tissue functionality.

Activity 3: Group Debate on Cellular Processes (1 Hour)

Students will debate the roles of nuclear changes, such as apoptosis in preventing overgrowth, mitosis in tissue repair, and meiotic errors in genetic stability, fostering critical discussions.

Activity 4: 3D Model Construction (1 Hour)

Students will create physical or digital 3D models of nuclear structures, demonstrating their changes during processes like mitosis and apoptosis, emphasizing functionality.

Activity 5: Experimental Data Interpretation (1 Hour)

Students will analyze datasets or microscopy images showing nuclear changes, interpreting them to explain cellular behaviors like chromatin condensation or spindle formation.

Activity 6: Literature Review and Presentation (1 Hour)

Students will summarize research articles on nuclear changes in differentiation, proliferation, or apoptosis, presenting insights and molecular mechanisms to their peers.

Activity 7: Group Presentation on Cell Renewal Strategies (1 Hour)

Students will research cell renewal mechanisms in humans or planarians, detailing how nuclear changes support tissue maintenance and regeneration.

Experiential-Learning Learning 4.4: Microscopic organization of the cell.

Total Learning Hours: 6 Hours**Activity 1: Comparative Diagram Drawing (1 Hour)**

Students will draw comparative diagrams of structures observed under light and electron microscopes, such as muscle fibers or epithelial tissues, annotating key features and their functions.

Activity 2: Group Brainstorming on Structural Specializations (1 Hour)

Students will brainstorm structural adaptations in specific cell types, discussing how these adaptations enhance cellular functions.

Activity 3: Self-Directed Research on Microscopy Techniques (1 Hour)

Students will research advanced microscopy techniques, such as confocal or scanning electron microscopy, and prepare reports on their applications in studying cellular structures and disease pathology.

Activity 4: Experimental Data Interpretation (1 Hour)

Students will analyze microscopic data sets or images, identifying structural features like organelles or tissue layers and linking these features to their functional roles.

Activity 5: Critical Review of Research Papers (1 Hour)

Students will review research articles on microscopic studies, summarizing findings, discussing advancements, and explaining insights into structure-function relationships.

Activity 6: Case Presentation on Pathological Changes (1 Hour)

Students will present cases of pathological changes, such as in cancer or fibrosis, analyzing how these changes affect tissue structure and function, supported by microscopic evidence.

Modular Assessment**Assessment****Hour**

Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep structured marking pattern. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C

Total Marks for this module: 50

1. **Concept Mapping:** The teacher will ask students to construct diagrams linking cell cycle regulation, pathology, and regenerative medicine (15 Marks).

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2. Peer Teaching: Each student will prepare a 5-minute explanation of a specific structure (e.g., rough ER, mitotic spindle) and teach it to a small group (10 Marks). 3. Microscopy Slide Identification: Students will identify tissues, cell types, or stages of mitosis on slides or images (10 Marks). 4. Histology Sketchbook Assignment: Students will maintain a notebook with hand-drawn or digitally labeled sketches of microscopic tissues observed during practical sessions (15 Marks). or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	
Semester No : 5	
Module 5 : نسیجی (Ajsam-e-Launiah wa Kimya-e-Naseeji) Human Chromosomes and Histochemistry	
Module Learning Objectives (At the end of the module, the students should be able to) 1. Describe Human Chromosomes, Chromosome Preparation Banding Patterns, Chromosomal Abnormalities, Molecular Genetics, Cytogenetics. Various histo-chemical and Immuno-histochemical Techniques. 2. Conduct Presentation and group Discussion on Human chromosome and its various Abnormalities. 3. Identify Human chromosome and its various Abnormalities.	
Unit 1 اجسام لونیه (Ajsam-e-Launiah) 5.1.1. علم النسل خلوی (Ilmul Nasal khalwi) Cytogenetics , اجسام لونیه اور ان کی تعداد (Ajsam-e- Launiah aur un ki Ta'dad) Chromosomes and their Number). 5.1.2. تقسیم اجسام لونیه (Ta'qseem Ajsam-e- Launiah) Chromosomes classification. 5.1.3. اجسام لونیه: ترکیب و ترتیب (Ajsam-e- Launiah tarkeeb-wa-tarteef) Methods of Chromosome Preparation Banding Patterns.	

5.1.4. اقسام لونیه کے نقائص (Ajsam-e-Launiyah ke naqais) Chromosomal Abnormalities.

5.1.5. اقسام لونیه مستقلہ کے نقائص (Ajsam-e-Launiyah mustaqillah ke naqais) Autosomal Abnormalities.

References: 149,150,151,152,153,154

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Discuss the introduction of cytogenetics and explain the chromosomes and their numbers,chromosomes classification and methods of chromosome preparation banding pattern.	3	Lecture	CC	Knows-how	L&GD,L&PPT ,L_VC
CO1,CO3, CO4,CO7	Evaluate and corelate the chromosomes and their number, chromosomes classification, methods of chromosome preparation banding pattern.	7	Experiential- Learning5.1	CE	Shows-how	LS,PER,CBL,SDL
CO1,CO3, CO4,CO7	Illustrate and demonstrate the human chromosomes and chromosomes number.	5	Practical5.1	PSY- GUD	Shows-how	FC,D,RP,DIS,PER
CO1,CO4, CO7	Evaluate and relate the autosomes, sex chromosomes and their abnormalities.	6	Experiential- Learning5.2	CE	Shows-how	CD,CBL,DIS,PER, PrBL
CO1,CO4	Discuss the autosomal and sex chromosomal abnormalities.	2	Lecture	CC	Shows-how	L&GD,L_VC,L&PP T
CO1,CO3, CO4,CO7	Illustrate and demonstrate the autosomes and sex chromosomes and their abnormalities.	5	Practical5.2	PSY- GUD	Shows-how	CBL,PER,D,CD,DI S

Unit 2 کیمیا ئے نسجی (Kimya-e-Naseeji)

5.2.1. اقسام لونیه جنسیہ کے نقائص (Ajsam-e-Launiyah jinsiyah ke naqais) Sex Chromosomal Abnormalities.

5.2.2. علم النسل جزوی (Ilmul Nasal Juzvi) Molecular Genetics.

5.2.3. مختلف نسیجی کیمریائی تکنیک (Mukhtalif Naseeji Keemyawi Takneek) Various histochemimcal Techniques.

References: 149,150,151,152,153,154

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the molecular genetics.	2	Lecture	CC	Knows-how	L&PPT ,L&GD,L_VC
CO1,CO3, CO4,CO7	Explain the molecular genetics.	7	Experiential- Learning5.3	CAN	Does	DIS,PSM,PL,SDL, PER
CO1,CO4, CO7	Illustrate and demonstrate the molecular genetics.	5	Practical5.3	PSY- SET	Shows-how	D,DIS,BS,CBL,SIM
CO1,CO3, CO7	Explain the Various histochemimcal and Immunohistochemical Techniques.	6	Experiential- Learning5.4	CAN	Shows-how	PSM,W,PL,JC,SIM
CO1,CO4, CO7	Describe the various histo-techniques and immuno-histochemical techniques.	3	Lecture	CC	Knows-how	L&PPT ,L_VC,L&GD
CO1,CO3, CO4,CO7	Illustrate and Demonstrate the various histochemimcal and Immunohistochemical Techniques.	5	Practical5.4	PSY- GUD	Shows-how	PER,PBL,CBL,DIS, IBL

Practical Training Activity

Practical Training 5.1 Human Chromosomes.

Total Learning Hours: 5:00 Hours

Activity 1: Teacher Demonstration (60 Min)

The teacher will demonstrate the process of karyotyping by showcasing metaphase chromosome spreads using either a microscope or virtual karyotyping software. Then, the teacher will explain the procedures for identifying chromosomes, differentiating autosomes from sex chromosomes, and detecting abnormalities.

Students will observe the karyotyping demonstration, take notes on key steps and techniques, and ask relevant questions to clarify the criteria for chromosome identification.

Activity 2: Case-Based Group Activity (60 Min)

Teacher Will: Present case scenarios involving chromosomal abnormalities, such as Down syndrome (Trisomy 21) and Turner syndrome, and provide karyograms for analysis. Facilitate group discussions to connect karyotype findings to clinical outcomes.

Students will work collaboratively in groups to analyze case scenarios and provided karyograms, identify abnormalities, and prepare a short presentation linking findings to clinical implications.

Activity 3: Flipped Classroom Activity (60 Min)

The teacher will provide pre-class materials, such as video lectures or presentations, focusing on chromosome structures and disorders. During class, the teacher will lead a discussion to connect student insights to practical examples.

Student will review the pre-class materials, take notes on key concepts, participate in class discussions, share their understanding, and ask questions to enhance clarity.

Activity 4: Role-Play Clinical Counseling – Interpreting Chromosomal Analysis (60 Min)

Teacher will distribute mock chromosomal analysis reports, along with patient scenarios, and outline the objectives of the role-play exercise. Guide students in understanding how to effectively communicate findings.

Students will role-play as genetic counselors in groups, explaining chromosomal analysis findings to simulated patients or families. Discuss the health implications and respond to patient questions with empathy and professionalism.

Activity 5: Poster Presentation – Human Karyotype and Disorders (60 Min)

The teacher will assign students to prepare posters or digital infographics illustrating the human karyotype, autosomes, sex chromosomes, and chromosomal abnormalities. Provide guidelines for content and visual representation.

Students will collaborate in groups to design and present informative posters or infographics. Use visuals to explain chromosomal structures, highlight abnormalities, and engage with peers during a gallery walk or presentation session.

Practical Training 5.2 Cytogenetics..

Total Learning Hours: 5:00 Hours

Activity 1: Teacher Demonstration – Introduction to Chromosomes

Activity 1: Teacher Explanation and Demonstration (60 Min)

The teacher will explain the structure, number, and classification of chromosomes, differentiating autosomes and sex chromosomes with the aid of charts and 3D models. Additionally, they will demonstrate the karyotyping process using slides or virtual tools, emphasizing the identification criteria for autosomes and sex chromosomes.

Student Role: Students will observe the demonstration, take notes, and engage in interactive questioning to clarify concepts and gain deeper insights.

Activity 2: Student Activity – Hands-On Karyotyping (60 Min)

Students will perform karyotyping using provided chromosomal images or virtual software tools. They will identify and classify autosomes and sex chromosomes, documenting observations to reinforce their learning through practical application.

Activity 3: Student Activity – Case-Based Chromosome Analysis (60 Min)

Students will analyze case studies featuring abnormal karyotypes. They will identify chromosomal abnormalities and explain their implications for cellular and organismal functions, reinforcing their ability to apply theoretical knowledge to real-world scenarios.

Activity 4: Group Activity – Chart/Model Preparation (60 minutes)

Students will collaborate in groups to design detailed charts or 3D models that depict normal autosomes and sex chromosomes. They will compare these representations with charts or models showcasing chromosomal abnormalities, highlighting key differences and their implications.

Activity 5: Q&A Session (60 minutes)

The teacher will conduct a Q&A session to address students' doubts and reinforce important concepts related to chromosomal disorders. They will provide applied insights to connect theoretical learning with clinical applications.

Student Role: Students will present their findings, engage in peer discussions, and respond to clinical questions by applying their understanding.

Practical Training 5.3 Basics of molecular genetics.

Total Learning Hours: 5:00 Hours

Activity 1: Teacher Demonstration – DNA Extraction (60 Min)

Teacher will demonstrate the process of extracting DNA from a biological sample, such as fruit (e.g., banana) or buccal swab. Explain the principle behind each step, including cell lysis, the role of reagents (e.g., salt and detergent), and the precipitation of DNA using alcohol. Highlight the significance of DNA extraction in molecular studies.

Student will observe the demonstration, take detailed notes to understand each step, and ask relevant questions about the techniques and reagents used. Reflect on the importance of DNA extraction in research and diagnostics.

Activity 2: Case-Based Learning– Clinical Genetics Case Analysis (60 Min)

Teacher will introduce a clinical case involving a genetic disorder (e.g., cystic fibrosis, sickle cell anemia). Explain how molecular techniques like PCR or karyotyping were used for diagnosis, and provide key data for analysis.

Student will work in groups to analyze the case, identify the molecular diagnostic methods mentioned, evaluate their effectiveness, and prepare a presentation. Link the molecular findings to the patient's symptoms and clinical outcomes.

Activity 3: Brainstorming Session – Applications of Molecular Genetics (60 Min)

Teacher will facilitate a brainstorming session, encouraging students to explore and discuss real-world applications of molecular genetics in areas like forensic science, personalized medicine, agriculture, and gene therapy.

Student will actively participate in brainstorming, propose innovative applications, and discuss how molecular genetics contributes to solving real-world problems. Document ideas for further exploration.

Activity 4: Clinical Correlation Session – Linking Findings to Treatment (60 Min)

Teacher will guide students in correlating molecular findings, such as specific mutations, with patient symptoms. Provide examples of how such findings inform treatment strategies, like gene therapy or targeted drug development.

Student will analyze provided molecular data, correlate findings with observed symptoms, and work in pairs to propose potential treatments. Present proposed strategies and explain their significance in improving patient outcomes.

Activity 5: Visit to Genetic Lab / Virtual Lab Simulation (60 Min)

Teacher will arrange a virtual or physical lab visit to a molecular genetics facility. Demonstrate cutting-edge testing techniques, including RT-PCR, sequencing, or microarray analysis. Explain how these tools are utilized in diagnosing and studying genetic conditions.

Student will observe the demonstration, take notes on lab techniques, and ask questions to understand practical applications. Reflect on how these tools contribute to advances in genetics.

Practical Training 5.4 Histochemimcal and Immunohistochemical Techniques.

Total Learning Hours: 5:00 Hours

Activity 1: Teacher Demonstration (60 Min)

Teacher will begin by introducing the fundamental principles of Histochemical and Immunohistochemical (IHC) techniques. Use engaging visual aids, such as models, flowcharts, and diagrams, to explain their significance, applications, and key differences. Emphasize their importance in diagnosis and research to provide context and relevance.

Students will actively listen to the explanation, carefully observe the visual aids, and take comprehensive notes on the concepts, applications, and distinctions between the two techniques

Activity 2: Microscopic Observation and Slide Interpretation (60 Min)

Teacher will present stained tissue slides under the microscope and guide students through the observation process step by step. They will teach students how to identify positive and negative staining patterns and explain their significance (e.g., staining of the nucleus, cytoplasm, or membrane).

Students will use microscopes to carefully observe their own prepared slides, identify staining patterns, and connect their findings to the principles taught earlier. They will document their observations thoroughly and seek clarification whenever necessary.

Activity 3: Group Discussion and Brainstorming Session (60 Min)

Teachers will facilitate an interactive group discussion to encourage students to compare and contrast findings from Histochemical and Immunohistochemical techniques. They will guide students in identifying challenges, common errors, and strategies for overcoming them while providing clarity on doubts and reinforcing key insights.

Students will actively participate in the discussion by sharing observations, asking questions, and collaborating with peers to explore diverse perspectives and solutions to challenges.

Activity 4: Case-based Learning / Problem-solving Activity (60 Min)

Teacher will present clinical case studies or unknown tissue slides to students, challenging them to apply their knowledge to suggest suitable staining techniques (e.g., for cancer detection). They will provide guidance and foster group collaboration as students analyze and discuss the scenarios.

Student will analyze the provided cases or slides in groups, identify possible solutions, and leverage their understanding of the techniques to determine the most appropriate approach. They will present their findings to the class with logical reasoning and evidence to support their conclusions.

Activity 5: Student Summarization and Reflection Session (60 Min)

Teacher will guide students in summarizing their key learning from all the activities, either individually or collaboratively. They will encourage students to highlight critical takeaways, such as the principles, techniques, and applications of Histochemical and Immunohistochemical staining, and facilitate a reflective discussion on applying these insights in real-world diagnostic scenarios.

Student will prepare concise summaries of the techniques, observations, and insights gained during the sessions. They will reflect on their learning experience, identify areas requiring further clarification, and present their thoughts to the class for collective review and reinforcement.

Experiential Learning Activity
Experiential-Learning Learning 5.1: Identification of chromosomes.
Total Learning Hours: 7:00 Hours Activity 1: Chromosome Classification Diagram (90 Min) Students will create detailed diagrams to classify chromosomes into metacentric, submetacentric, acrocentric, and telocentric types. They will annotate diagrams to showcase how centromere position determines classification. Activity 2: Literature Review on Chromosomal Techniques (90 Min) Students will review recent research articles focusing on advancements in chromosome preparation and banding techniques. They will summarize methodologies, discuss their significance, and present findings to peers. Activity 3: Case Study Analysis (60 Min) Students will analyze clinical case studies involving chromosomal abnormalities, such as translocations or inversions. They will use knowledge of banding patterns and chromosome classification to explain the genetic basis of these abnormalities. Activity 4: Chromosome Evolution Presentation (90 Min) Students will research and present on how chromosomes have evolved across different organisms, focusing on changes in chromosome number, structure, or organization. They will relate these changes to genetic diversity and adaptation. Activity 5: Peer Teaching on Chromosome Structure (90 Min) Students will collaborate in groups, with each group studying specific chromosome features such as centromeres, telomeres, or chromatid arms. They will present their findings to their peers using models or diagrams for effective teaching.
Experiential-Learning Learning 5.2: Chromosomes and their abnormality.
Total Learning Hours: 6:00 Hours Activity 1: Chromosome Karyotyping Analysis (60 Min)

Students will analyze karyotype images to identify autosomes and sex chromosomes. They will document chromosomal arrangements and identify abnormalities such as trisomy (e.g., Down syndrome) or sex chromosome aneuploidy (e.g., Turner or Klinefelter syndrome).

Activity 2: Comparative Chart Creation (60 Min)

Students will create comparative charts outlining the structural and functional differences between autosomes and sex chromosomes. They will include details such as gene content, chromosomal size, and inheritance patterns, linking these features to observed abnormalities.

Activity 3: Case Study Investigation (60 Min)

Students will examine clinical case studies involving chromosomal disorders, such as Down syndrome (trisomy 21) or Turner syndrome (45, X). They will analyze the genetic basis, clinical manifestations, and implications of these conditions.

Activity 4: Real-World Application Research (60 Min)

Students will research how the study of chromosomal abnormalities informs medical practices, such as prenatal screenings or fertility treatments. They will present findings to highlight the relevance of understanding autosomes and sex chromosomes in clinical settings.

Activity 5: Literature Review (60 Min)

Students will conduct a literature review of recent advancements in chromosomal research, such as techniques for detecting abnormalities or novel therapies for chromosomal disorders. They will summarize findings and discuss future directions for research and applications.

Activity 6: Historical Research on Chromosomal Studies (60 Min)

Students will investigate key milestones in the history of chromosomal studies, such as the discovery of sex chromosomes or the identification of Down syndrome. They will present how these findings shaped modern genetics and medical practices.

Experiential-Learning Learning 5.3: Molecular genetics.

Total Learning Hours : 7:00 Hours

Activity 1: Problem-Solving Genetic Disorders (60 Min)

Students will solve hypothetical scenarios involving molecular genetics problems. For example, they might predict the molecular consequences of a defective promoter sequence or analyze how alternative splicing affects protein function.

Activity 2: Literature Review on Molecular Techniques (90 Min)

Students will critically review research articles on molecular techniques like PCR, gel electrophoresis, or genome-wide association studies (GWAS). They will summarize methodologies, results, and implications for understanding genetic regulation.

Activity 3: Journal Club (90 Min)

Students will critically review research articles focused on topics such as gene regulation, molecular techniques, or applications of genome editing. They will summarize findings, evaluate methodologies, and discuss implications for molecular genetics during collaborative presentations.

Activity 4: Peer Learning (90 Min)

Students will work in groups to research specific molecular genetics topics (e.g., alternative splicing, gene silencing) and teach their peers using interactive methods such as presentations, visual aids, or group discussions.

Activity 5: Clinical Correlation on Genetic Disorders (90 Min)

Students will research the molecular genetics underlying specific genetic disorders, such as sickle cell anemia or cystic fibrosis. They will connect the molecular mutations to their phenotypic effects and discuss current therapeutic approaches.

Experiential-Learning Learning 5.4: Various histochemimcal and Immunohistochemical Techniques.

Total Learning Hours: 6:00 Hours

Activity 1: Comparison Exercise (60 Min)

Students will prepare a detailed side-by-side comparison of the results obtained from histochemical and immunohistochemical techniques. They will document differences in staining patterns, intensity, and specificity, critically analyzing the strengths and limitations of each technique.

Activity 2: Problem-Solving Workshops (60 Min)

Students will discuss common challenges encountered during staining and analysis processes, such as uneven staining or reagent issues. They will brainstorm and propose collaborative solutions to optimize the outcomes of these techniques.

Activity 3: Virtual Dissection and Simulation (60 Min)

Using virtual tools or simulations, students will practice staining techniques in a controlled and repeatable environment. They will analyze outcomes, ensuring an accurate understanding of procedural steps and results.

Activity 4: Role-Playing as Diagnosticians (60 Min)

Students will assume the roles of pathologists and analyze hypothetical patient cases. They will apply their knowledge of histochemical and immunohistochemical techniques to diagnose these cases based on provided clinical data, simulating real-world applications.

Activity 5: Peer-to-Peer Teaching (60 Min)

Groups of students will research specific histochemical or immunohistochemical techniques and teach their findings to their peers. This method reinforces their understanding and encourages collaborative and interactive learning.

Activity 6: Journal Club and Literature Review (60 Min)

Students will read and summarize scientific articles related to advancements in histochemical and immunohistochemical techniques. They will present their findings and discuss their implications with peers, staying updated on current research.

Modular Assessment

Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep structured marking pattern. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C Total Marks for this module: 50 1. Short Answer Questions (SAQs) or Multiple choice questions (MCQs)- (Marks: 10) (Short Answer Questions or Multiple-choice questions will be asked from each unit) 2. Case Based Assessment or practical performance or Dissection/ virtual dissection or or exploration through virtual reality - (Marks: 15) 3. Viva Voce or Presentation/Demonstration or critical paper reading or Clinical examination - (Marks: 10) 4. Making model or Poster making- (Marks: 15) or	4

Any practical in converted form can be taken for assessment. (25 Marks)						
and						
Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)						
Module 6 : مختلف نسیجی کیسایوی و مناعتی تکنیک (Ilmul Nasal) Genetics. (Ajsam-e-Launiyah jinsiyah ke naqais) Sex Chromosomal Abnormalities. علم النسل (Mukhtalif Naseeji Keemyawi wa Mana'ati Takneek) Various Histological and Immunohistochemical Techniques.						
Module Learning Objectives (At the end of the module, the students should be able to)						
1. Describe Single gene pattern inheritance, Autosomal chromosome pattern of inheritance, Sex chromosomal pattern of inheritance and Intermediate pattern of Inheritance. Multiple alleles, Mutations and Genome Imprinting, Non-Mendelian inheritance, Mitochondrial inheritance and parental Disomy. 2. Conduct Presentation and Group Discussion on Genetic inheritance, Mitochondrial inheritance and parental Disomy. 3. Identify Abnormal Genetic inheritance.						
Unit 1 ورثہ نمط یکجینی علم النسل (Ilmul Nasal Juzvi) Molecular Genetics 6.1.1. ورثہ نمط یکجینی (Wirsah Namt-e-yakjeeni) Single gene pattern inheritance. 6.1.2. ورثہ نمط جینی مستقل (Wirsah Namt-e-Jeeni mustaqillah) Autosomal chromosome pattern of inheritance. 6.1.3. ورثہ نمط جینی جنسی (Wirsah Namt-e-Jeeni Jinsi) Sex chromosomal pattern of inheritance. 6.1.4. ورثہ نمط متوسط (Wirsah Namt-e-mutawassit) Intermediate pattern of Inheritance. References: 149,150,151,152,154						
3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the Single gene pattern inheritance, Autosomal chromosome pattern of inheritance.	3	Lecture	CC	Knows-how	L_VC,L&PPT,SY,L&GD

CO1,CO4, CO7	Explain and analyse the single gene pattern inheritance and autosomal chromosome pattern of inheritance.	7	Experiential-Learning6.1	CAN	Shows-how	PrBL,CD,IBL,D,DIS
CO1,CO4, CO7	Acquire knowledge of the single gene pattern inheritance and autosomal chromosome pattern of inheritance.	5	Practical6.1	PSY-MEC	Shows-how	IBL,W,BS,DIS,PER
CO1,CO4, CO7	Explain and analyse the sex chromosomal pattern of inheritance and intermediate pattern of inheritance.	6	Experiential-Learning6.2	CAN	Does	PSM,SDL,D,SIM,PER
CO1,CO4	Describe the Sex chromosomal pattern of inheritance and Intermediate pattern of Inheritance.	2	Lecture	CC	Knows-how	L_VC,L&GD,L&PP T
CO1,CO4, CO7	Interpret the sex chromosomal pattern of inheritance and intermediate pattern of inheritance.	5	Practical6.2	PSY-MEC	Shows-how	PER,D,PT,DIS

Unit 2 کیمیائی تکنیک مناعی (Naseeji Keemyawi Mana'ati Takneek) Immunohistochemical techniques

6.2.1. متعدد نسبی جوڑے (Muta'addad nasbee jorhe) Multiple alleles.

6.2.2. طفرہ (Tafrāh) Mutations.

6.2.3. غیر مندیلی ورثہ (Wirsah-e-Ghair Mendeli) Non-Mendelian inheritance.

6.2.4. ورثہ متقدردہ (Wirsah-e-Mutaqaddirah) Mitochondrial inheritance.

6.2.5. طبعی مجموعہ جینی (Tab'a -e-majmoo'ah-e- Jeeni) Genome Imprinting.

6.2.6. شایات الابوین (Sunaiyatul Abawain) parental Disomy.

References: 149,150,151,152,153,154

3A	3B	3C	3D	3E	3F	3G

CO1,CO4	Describe the Multiple alleles,Mutations,Non-Mendelian inheritance,Mitochondrial inheritance.	3	Lecture	CC	Knows-how	L&GD,L&PPT ,L_VC
CO1,CO4, CO7	Explain and analyse the multiple alleles, mutations, non-mendelian inheritance and mitochondrial inheritance.	7	Experiential- Learning6.3	CAN	Shows-how	DIS,CBL,LS,PER, D
CO1,CO4, CO7	Acquire knowledge of the multiple alleles, mutations, non-mendelian inheritance and mitochondrial inheritance.	5	Practical6.3	PSY- MEC	Shows-how	PL,DIS,D,W,PBL
CO1,CO4, CO7	Explain and analyse the genome imprinting and parental disomy.	6	Experiential- Learning6.4	CAN	Shows-how	DIS,D,SDL,CBL,P ER
CO1,CO4	Describe the Genome Imprinting and parental Disomy.	2	Lecture	CC	Knows-how	L&PPT ,L&GD,L_VC
CO1,CO4, CO7	Demonstrate the genome imprinting and parental disomy.	5	Practical6.4	PSY- GUD	Shows-how	PER,CBL,PL,D,RP

Practical Training Activity

Practical Training 6.1 Single gene pattern inheritance.

Total Learning Hours: 5:00 Hours

Activity 1: Teacher Demonstration (Introduction with Visual Aids) (30 Min)

The teacher will introduce the concepts of single-gene inheritance (dominant and recessive traits) and autosomal chromosome inheritance patterns. Visual aids such as flowcharts, Punnett squares, and family pedigree charts will be used to explain the concepts step-by-step. The demonstration will include practical examples to highlight key differences between inheritance types.

Students will actively observe the demonstration, taking detailed notes on the examples provided and key distinctions between the inheritance patterns. This foundation will prepare students for interactive activities.

Activity 2: Interactive Simulation / Virtual Lab (60 Min)

The teacher will guide students through a virtual simulation demonstrating monohybrid and dihybrid crosses, emphasizing autosomal inheritance patterns. The simulation will visualize genetic combinations, providing clarity on how genotypes determine phenotypes.

Students will practice hands-on simulations to predict genotypes and phenotypes in offspring. They will explore different scenarios and outcomes by altering parental traits, reinforcing their understanding through interactive experimentation.

Activity 3: Group Activity: Pedigree Chart Analysis (60 Min)

The teacher will distribute sample case studies and pedigree charts representing single-gene disorders (e.g., cystic fibrosis) and autosomal inheritance patterns. Instructions will guide students on how to analyze and classify these patterns.

Students will work in groups to analyze the given pedigrees, identify inheritance patterns, and classify each as a single-gene or autosomal pattern. They will discuss their findings within the group and justify their conclusions, encouraging collaboration and critical thinking.

Activity 4: Problem Solving and Worksheet (60 Min)

The teacher will provide problem-based scenarios involving single-gene and autosomal chromosome inheritance. Worksheets will include tasks like predicting inheritance probabilities or analyzing phenotypic ratios.

Students will work in pairs or small groups to solve the problems collaboratively. They will explain the inheritance logic behind each solution, building confidence in applying theoretical knowledge to practical situations.

Activity 5: Brainstorming and Discussion Session (60 Min)

The teacher will facilitate a brainstorming session and group discussion on real-life diseases caused by single-gene mutations (e.g., sickle cell anemia) and autosomal chromosome inheritance disorders (e.g., Down syndrome). Key questions will prompt students to explore causes, impacts, and diagnostic methods.

Students will brainstorm examples of such diseases, share insights from their prior knowledge, and actively participate in discussions. They will ask questions, clarify doubts, and contribute to collective understanding through peer interaction.

Activity 6: Quiz / Peer Teaching / Presentation (30 Min)

The teacher will organize a quiz or assign student groups to prepare short presentations on their assigned inheritance type.

Students will participate in the quiz or present their assigned topic to the class. Peer teaching will allow students to explain inheritance patterns to their peers, reinforcing their grasp of the content while fostering collaboration and communication skills.

Practical Training 6.2 Sex chromosomal pattern and intermediate pattern of inheritance.

Total Learning Hours: 5:00 Hours

Activity 1: Concept Demonstration and Discussion (60 Min)

The teacher will introduce the concepts of sex chromosomal inheritance and intermediate inheritance patterns using visually engaging materials such as diagrams, charts, and multimedia presentations. The session will also involve a detailed explanation of the methods for practical activities; ensuring students understand the objectives and steps of the hands-on tasks. This activity sets a strong theoretical foundation and prepares students for practical applications.

Activity 2: Practical Activity on Chromosomal Analysis (60 Min)

Students will engage in assigned practical tasks to deepen their understanding of sex chromosomal and intermediate inheritance patterns. Activities include:

- **Karyotyping:** Students will visualize chromosomes and identify potential abnormalities.
- **Chromosome Analysis:** Students will analyze patterns of inheritance in sex-linked traits.
- **Genetic Testing:** Students will explore disorders caused by sex chromosomal abnormalities, such as Turner Syndrome or Klinefelter Syndrome.
- **Gene Mapping:** Students will locate specific genes on sex chromosomes to understand inheritance patterns.
- **Virtual Reality Exploration:** For a more immersive experience, students may explore simulated environments demonstrating sex chromosomal and intermediate inheritance mechanisms.

Activity 3: Clinical Examination and Findings Presentation (60 Min)

Students will perform clinical examinations of patients (real or simulated) presenting with disorders linked to sex chromosomal inheritance or intermediate inheritance patterns. They will document their findings, focusing on genetic traits, phenotypic features, and diagnostic markers. Each group will present their analysis to the teacher, fostering a connection between theoretical knowledge and practical clinical application.

Activity 4: Poster or Illustration Development (60 Min)

Students will create detailed and visually appealing posters or illustrations representing sex chromosomal inheritance patterns, intermediate inheritance mechanisms, and related disorders. This activity promotes creativity while reinforcing key concepts. Posters will be displayed for peer review and discussion to enhance collaborative learning.

Activity 5: Practical Activity Report and Summary (60 Min)

Students will compile comprehensive reports summarizing their practical activities, including observations, findings, and interpretations. Each report will reflect the students' understanding of the inheritance patterns and associated disorders. The teacher will conclude the session with a detailed summary of key takeaways, addressing questions and emphasizing the clinical relevance of the topic.

Practical Training 6.3 Alleles, Non-Mendelian inheritance and Mitochondrial inheritance.

Total Learning Hours: 5:00 Hours

Activity 1: Teacher Demonstration and Concept Introduction (30 Min)

The teacher will introduce and thoroughly explain key concepts such as multiple alleles, types of mutations, non-Mendelian inheritance patterns, and mitochondrial inheritance. Using clinical examples and visual aids like charts, animations, and 3D models, the teacher will illustrate inheritance patterns and associated genetic conditions.

Activity 2: Flipped Classroom Approach (60 Min)

Pre-Class Preparation: Students will watch pre-recorded video lectures or animations explaining inheritance patterns and genetic mechanisms. These materials provide a concise overview of the topic, allowing students to come prepared with basic knowledge.

In-Class Application: During class, students will actively engage in solving genetic problems and analyzing case studies related to inheritance. This time will also include group discussions facilitated by the teacher to clarify doubts and reinforce understanding.

Activity 3: Problem-Based Learning (PBL) (60 Min)

Students will be presented with a complex clinical case that involves traits such as blood groups, genetic mutations, or mitochondrial diseases.

In collaborative groups, they will:

Identify key issues and challenges in the case.

Conduct research using textbooks, online resources, or provided materials to analyze the inheritance mechanisms.

Propose plausible solutions or explanations based on their findings. This activity fosters critical thinking, research skills, and the ability to apply theoretical knowledge in clinical contexts.

Activity 4: Peer Teaching / Jigsaw Method (60 Min)

Students will be divided into small expert groups, each focusing on one specific concept, such as mutations, mitochondrial inheritance, or non-Mendelian patterns.

Each group will delve deeply into their assigned topic, preparing explanatory notes, examples, and visual aids.

Afterward, they will reassemble into mixed groups, teaching their specific concept to peers.

Activity 5: Clinical Correlation Workshop (60 Min)

The teacher will organize an interactive workshop where students correlate their theoretical knowledge with real-world clinical case studies.

Case studies will feature patients with conditions related to non-Mendelian traits, such as mitochondrial disorders or X-linked inheritance.

Students will analyze the cases, identify the inheritance patterns, and connect the observed symptoms with underlying genetic mechanisms. This activity emphasizes the clinical relevance of theoretical knowledge.

Activity 6: Reflection and Group Discussion (30 Min)

Reflection: Students will write a reflection on their learning experience, focusing on what they found most insightful and how the knowledge can be applied in real-world clinical or research settings.

Group Discussion: The session will conclude with a dynamic group discussion where students share their key takeaways, debate interpretations, and clarify lingering questions.

Practical Training 6.4 Genome Imprinting and Parental Disomy.

Total Learning Hours: 5:00 Hours

Activity 1: Teacher Demonstration and Concept Introduction (60 Min)

The teacher will introduce the concepts of genome imprinting and UPD through detailed illustrations, diagrams, and clinical examples. They will use tools like whiteboards, models, or digital simulations to demonstrate inheritance patterns, emphasizing key genetic mechanisms.

Activity 2: Student Observation and Note-Taking (60 Min)

Students will closely observe teacher demonstrations, recording critical points on mechanisms, genes involved, and imprinting-related disorders. These notes will be shared in a peer-reviewed format for cross-checking.

Activity 3: Hands-On Activity: Inheritance Mapping (60 Min)

Working in small groups, students will construct inheritance maps or Punnett squares to illustrate different scenarios. They can also use genetic simulation apps or software for more dynamic mapping of maternal or paternal disomy cases.

Activity 4: Case-Based Discussion (60 Min)

Teachers will present real or simulated clinical cases related to imprinting disorders. Students will collaborate to dissect the case, identify the genetic disorder, and explain the underpinning mechanisms. Using online forums or collaborative tools can make this more interactive.

Activity 5: Role-Play / Peer Teaching (60 Min)

Students will simulate genetic counseling sessions, where they explain concepts like parental disomy or imprinting disorders to "patients" (peers). Scenarios might include delivering genetic test results or counseling about risks

Experiential Learning Activity

Experiential-Learning Learning 6.1: Single gene pattern inheritance.

Total Learning Hours: 7:00 Hours**Activity 1: Problem-Based Learning (PBL) with Clinical Cases (60 Min)**

Students will work in groups to analyze complex clinical cases involving single-gene inheritance and autosomal chromosome inheritance (e.g., cystic fibrosis or Huntington's disease). They will identify the core problem, research relevant inheritance mechanisms, and propose diagnostic or therapeutic solutions. By collaborating, students will apply their theoretical understanding to real-world medical scenarios, honing their problem-solving and teamwork skills.

Activity 2: Inquiry-Based Learning: Exploring Genetic Patterns (60 Min)

Students will develop their own questions related to inheritance patterns, such as “How do mutations affect autosomal traits?” or “What are the exceptions to Mendelian inheritance?” They will design and execute small research projects using resources like scientific literature, databases, or genetic simulation tools to find answers. This activity encourages curiosity, independent learning, and critical inquiry.

Activity 3: Scenario-Based Problem Solving (60 Min)

Students will engage in solving provided genetic scenarios, such as calculating the probability of inheriting a specific single-gene disorder or interpreting pedigree charts and Punnett squares. These scenarios will challenge students to apply genetic principles to practical problems, reinforcing logical reasoning and analytical thinking.

Activity 4: Hypothesis Testing Through Simulation (60 Min)

Using virtual lab tools, students will simulate genetic crosses for single-gene and autosomal inheritance. They will form hypotheses about expected inheritance outcomes, test these predictions through simulations, and analyze their results to confirm or adjust their hypotheses. This activity connects theoretical models with experimental validation in an engaging, interactive way.

Activity 5: Role-Playing Diagnostic Scenarios (60 Min)

Students will role-play as geneticists diagnosing a patient based on genetic testing results, family history, and observed traits. They will determine whether the condition results from autosomal inheritance or single-gene mutations. Students will then communicate their findings, providing recommendations in the form of a simulated patient report or counseling session, fostering real-world application and communication skills.

Activity 6: Collaborative Research Proposal (60 Min)

Students will collaboratively design a research proposal to investigate a genetic disorder related to single-gene or autosomal inheritance. They will outline clear objectives, form hypotheses, and propose methodologies, such as molecular testing or computational models, to explore inheritance patterns. This activity emphasizes creativity, collaboration, and the integration of genetic knowledge.

Activity 7: Reflection and Presentation on Applied Genetics (60 Min)

Students will write reflective reports discussing how single-gene and autosomal inheritance patterns influence genetic counseling, diagnostics, and treatment planning. They will present their reflections along with real-world examples to the class, facilitating peer learning and knowledge synthesis.

Experiential-Learning Learning 6.2: Sex chromosomal pattern and intermediate pattern of inheritance.

Total Learning Hours: 6:00 Hours

Activity 1: Karyotype and Chromosome Analysis (45 Min)

Students will perform karyotyping or chromosome analysis to visualize abnormalities in sex chromosomes. They will explain findings like aneuploidy and structural changes, correlating them with phenotypic and clinical outcomes.

Activity 2: Genetic Counseling Simulation (45 Min)

Students will role-play genetic counselors, explaining sex chromosomal inheritance patterns and intermediate inheritance disorders to simulated patients (peers). This activity fosters empathy, communication skills, and technical accuracy in delivering genetic insights.

Activity 3: Clinical Problem-Solving (45 Min)

Students will interpret genetic test results and clinical data to diagnose sex chromosomal disorders. They will explain intermediate inheritance patterns and their implications, proposing strategies for patient management.

Activity 4: Collaborative Concept Mapping (45 Min)

Students will collaborate to create visual concept maps linking sex chromosomal inheritance patterns, intermediate inheritance mechanisms, genetic disorders, and diagnostic tools. These maps will serve as a resource for peer learning and discussion.

Activity 5: Comparative Study of Genetic Mechanisms (60 Min)

Students will compare sex chromosomal inheritance patterns with other inheritance types, like autosomal inheritance or epigenetic regulation. They will analyze similarities and differences in traits and disorders, presenting their findings as charts or presentations.

Activity 6: Team-Based Project (60 Min)

Objective: Foster collaboration and in-depth exploration of a complex topic.

Students will work in teams to design a comprehensive project on sex chromosomal and intermediate inheritance patterns. The project can include:

Research on a specific genetic disorder (e.g., Turner Syndrome or Mosaicism).

Designing a Patient Education Module: Teams will create materials (brochures, videos, presentations) to educate patients about the disorder.

Data Analysis: Teams can analyze simulated patient data, identify inheritance patterns, and propose diagnostic or treatment approaches.

The project will culminate in a team presentation, allowing students to synthesize knowledge and receive feedback from peers and teachers.

Activity 7: Report Writing (60 Min)

Students will write detailed reflection reports summarizing their learning journey on sex chromosomal inheritance and intermediate inheritance patterns. They will analyze the clinical importance, propose future study areas, and explain how this knowledge can be applied in real-world scenarios.

Experiential-Learning Learning 6.3: Alleles, Non-Mendelian inheritance and Mitochondrial inheritance.

Activity 1: Comparative Mechanism Analysis (60 Min)

Students will compare inheritance mechanisms, such as Mendelian and non-Mendelian inheritance or mutations versus epigenetic modifications. They will create structured comparison charts or tables that include specific examples (e.g., autosomal dominant traits vs. incomplete dominance, point mutations vs. methylation changes).

Activity 2: Scientific Literature Review (60 Min)

Students will review and critically analyze recent scientific articles on topics like mutations, mitochondrial inheritance, and non-Mendelian patterns. They will identify key advancements, challenges in research, and clinical applications. Summaries will be presented to peers in either oral or visual formats (e.g., slides), enhancing communication or synthesis skills.

Activity 3: Data Analysis Workshop (60 Min)

Students will use software tools or spreadsheets to analyze genetic datasets. Tasks include interpreting SNP variations, mapping mitochondrial DNA sequences, or analyzing allele frequency distributions. They will derive conclusions on inheritance patterns or disease risks and present their findings in structured formats such as graphs or tables.

Activity 4: Role-Playing as Researchers (60 Min)

Students will take on the roles of researchers, designing hypothetical experiments to study genetic traits controlled by multiple alleles, mutations, or mitochondrial inheritance. They will outline objectives, propose methodologies (e.g., PCR or sequencing), predict expected outcomes, and discuss potential challenges or limitations. This fosters problem-solving, creativity, and application of genetic concepts.

Activity 5: Genetic Case Diagnosis Competition (60 Min)

In small groups, students will compete to diagnose genetic disorders based on provided case data. Materials include family histories, genetic test results, and phenotypic information. Teams will work collaboratively to identify inheritance patterns (e.g., mitochondrial disorders, co-dominance) and justify their diagnosis, promoting teamwork and rapid application of knowledge.

Activity 6: Disease Progression Mapping (60 Min)

Students will create visual maps illustrating the progression of genetic disorders caused by mutations, non-Mendelian inheritance patterns, or mitochondrial DNA errors. These maps will trace the impact of genetic mechanisms on the onset, progression, and severity of symptoms, bridging molecular genetics with clinical outcomes.

Activity 7: Group Debate on Genetic Therapies (60 Min)

Students will participate in structured debates, exploring ethical and scientific aspects of modern genetic therapies, such as mitochondrial replacement therapy or CRISPR gene editing. They will research their stance, evaluate the pros and cons, and address societal and ethical implications. This encourages critical analysis and public speaking skills

Experiential-Learning Learning 6.4: Genome Imprinting and parental Disomy.

Total Learning Hours: 6:00 Hours

Activity 1: Case Study Analysis (60 Min)

Students will explore into real or simulated clinical cases to deepen their understanding of genome imprinting and parental disomy disorders. They will examine the genetic mechanisms underlying the cases, identify the specific disorder presented, and propose potential clinical solutions or genetic counseling strategies. This activity encourages analytical thinking and real-world application of theoretical concepts.

Activity 2: Creation of Infographics (60 Min)

Students will channel their creativity by designing visually appealing and informative infographics. These will summarize key processes, such as genome imprinting and parental disomy, breaking down complex concepts into easily digestible visual elements. The final infographics can be used for peer education or displayed in the classroom for review.

Activity 3: Debate or Ethical Discussion (60 Min)

Students will engage in a structured debate or discussion that explores the ethical, social, and clinical implications of genome imprinting and parental disomy. Potential topics include the challenges of genetic testing, patient confidentiality, or societal implications of disorders like Prader-Willi Syndrome. This activity encourages critical thinking, teamwork, and articulation of complex ideas.

Activity 4: Poster or Chart Development (60 Min)

Students will work individually or in small groups to create detailed posters or charts that explain inheritance patterns, genetic mechanisms, and clinical implications of imprinting and disomy. These visual aids will be reviewed and discussed during a classroom display session, promoting peer learning and collaborative feedback.

Activity 5: Problem-Solving Activity (60 Min)

Students will tackle hands-on problem-solving scenarios. These include interpreting pedigree charts, analyzing genetic test data, or diagnosing cases of imprinting errors and disomy. Through this activity, they will hone their critical thinking, data interpretation skills, and ability to connect theoretical knowledge with practice.

Activity 6: Reflection and Report Writing (60 Min)

To consolidate their learning, students will write a reflective report on genome imprinting and parental disomy. They will analyze its relevance to clinical practice, synthesize key takeaways from previous activities, and propose strategies for addressing genetic disorders. This exercise encourages self-reflection and deeper understanding.

Modular Assessment

Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks . Keep structured marking pattern. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C Total Marks for this module: 50 1. Problem-Solving Scenarios: The teacher will present hypothetical lab data or test results and ask students to interpret the findings, suggest a diagnosis, and determine the next steps (15 Marks).	4

2. Peer-Generated Quiz Questions: The teacher will ask each student to write 2–3 MCQs or short-answer questions on module topics, which will be compiled into a class quiz (15 Marks). 3. Summary Posters: Students will summarize an entire topic (e.g., histochemical staining types) on a single poster for quick revision (10 Marks). 4. Discussion on Ethical Issues: Students will write short essays or participate in group discussions on topics such as prenatal genetic testing, privacy of genetic information, and implications of chromosomal diagnosis etc (10 Marks). or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	
Semester No : 6	
Module 7 : علم النسل سرطانی و صیدلی (Ilmul Nasal Sartani wa sai'dali) Multifactorial Pattern of Inheritance. نمط ارثی کے متعدد ترتیبی عوامل (Namt-e-Irsi ke muta'addad tarteebi Awamil) Multifactorial Pattern of Inheritance. cancer and Pharmacogenetics.	
Module Learning Objectives (At the end of the module, the students should be able to) 1. Describe Multifactorial Pattern of Inheritance, Criteria for Multifactorial inheritance, Teratology and the Teratogens, Structure of Gene, Molecular Screening, Cancer Genetics, Pharmacogenetics and Haematological malignancies. 2. Conduct Presentation and Group Discussion for Anatomical Abnormalities associated with Teratology and Terotogens. 3. Identify The Anatomical Abnormalities Associated With Terotogens.	
Unit 1 نمط ارثی (Inheritance) 7.1.1. نمط ارثی کے متعدد ترتیبی عوامل (Namt-e-Irsi ke muta'addad tarteebi Awamil) Multifactorial Pattern of Inheritance.	

7.1.2. نمط ارثی کے متعدد عوامل کا معیار (Namt-e-Irsi ke muta'addad awamil ka Me'ayar) Criteria for Multifactorial inheritance.

7.1.3. علم التشوهات (Ilmul Tashwwuhah) Teratology.

7.1.4. جینی ساخت (Jeeni saakht) Structure of Gene.

References: 86,87,88,89,90,91,92,93,94,95,96,97,98

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the Multifactorial Pattern of Inheritance, Criteria for Multifactorial inheritance.	3	Lecture	CC	Knows-how	L_VC,L&GD,L&PP T
CO1,CO4, CO7	Explain and analyse the multifactorial pattern of inheritance and criteria for multifactorial inheritance.	7	Experiential- Learning7.1	CAN	Does	DIS,RP,JC,PER,S DL
CO1,CO4, CO7	Illustrate and demonstrate the multifactorial pattern of inheritance and criteria for multifactorial inheritance.	5	Practical7.1	PSY- SET	Shows-how	PER,D,FC,PAL,SD L
CO1,CO4, CO7	Evaluate the teratology and the structure of gene..	6	Experiential- Learning7.2	CE	Does	PER,JC,CD,IBL,C BL
CO1,CO4	Describe the Teratology and the Structure of Gene.	2	Lecture	CC	Knows-how	L&GD,L&PPT ,L_VC
CO1,CO4, CO7	Evaluate the implications of teratology on gene structure.	5	Practical7.2	CE	Shows-how	D- M,IBL,SIM,PER,D

Unit 2 فحس جزوی (Fa'hs al Juzyi)

7.2.1. فحس جزوی (Fa'hs al Juzyi) Molecular Screening).

7.2.2. علم النسل سرطانی (Ilmul Nasal sartani) Cancer Genetics.

7.2.3. سرطان دموی (Sarta'n-e-Damwi) Haematological malignancies.

7.2.4. علم النسل صیدلی (Ilmul Nasal sai'dali) Pharmacogenetics.

References: 86,90,91,92,93,94,95

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the Molecular Screening,Cancer Genetics and Pharmacogenetics.	3	Lecture	CC	Knows-how	L&PPT ,L_VC,L&GD
CO1,CO4, CO7	Explain and analyse the molecular screening and cancer genetics.	7	Experiential- Learning7.3	CAN	Does	SIM,PER,CBL,DIS, PrBL
CO1,CO4, CO7	Demonstrate and illustrate the molecular screening and cancer genetics.	5	Practical7.3	PSY- GUD	Shows-how	D- M,D,SIM,SDL,DIS
CO1,CO4, CO7	Demonstrate the haematological malignancies and pharmacogenetics.	6	Experiential- Learning7.4	PSY- GUD	Does	IBL,CBL,PSM,JC,D IS
CO1,CO4	Describe the Haematological malignancies.	2	Lecture	CC	Knows-how	L&GD,L_VC,L&PP T
CO1,CO4, CO7	Analyze the haematological malignancies and pharmacogenetics.	5	Practical7.4	CAN	Shows-how	D,BL,CD,SDL

Practical Training Activity

Practical Training 7.1 Multifactorial pattern of inheritance

Total Learning Hours:5:00 Hours

Activity 1: Flipped Classroom - Pre-Class Preparation (90 Min)

Before the session, students will independently explore online resources, videos, and reading material on multifactorial inheritance and its criteria. They will review case examples provided by the instructor and complete a short reflective quiz or worksheet to assess their understanding and prepare for the upcoming class discussion.

Activity 2: Teacher Demonstration and Clarification (90 Min)

During the class session, the teacher will address any misconceptions or challenging concepts from the pre-class materials. They will use real-life examples and visual aids, such as charts or animations, to explain multifactorial inheritance patterns, the role of environmental influences, and clinical criteria for assessing these traits.

Activity 3: Group Activity – Case Analysis and Pedigree Mapping (60 Min)

In small groups, students will analyze clinical case studies involving multifactorial traits. They will construct pedigree charts to trace inheritance patterns, identify contributing genetic and environmental factors, and evaluate the risk based on clinical criteria. This activity will encourage collaborative problem-solving and practical application.

Activity 4: Group Presentation, Peer Discussion, and Reflection (60 Min)

Each group will present their case analysis, including their reasoning and conclusions. The session will include peer reviews, open discussions, and an interactive Q&A moderated by the teacher. To conclude, students will write a brief reflective summary documenting their learning experience, highlighting key takeaways, and identifying areas for further exploration.

Practical Training 7.2 Teratology and Gene structure

Total Learning Hours: 5:00 Hours

Activity 1: Teacher Demonstration (60 Min)

The teacher will utilize a 3D model of a gene to demonstrate how teratogens—such as radiation, chemicals, or viruses—can induce mutations or structural abnormalities in DNA. By manipulating the 3D model, the teacher will illustrate how a specific teratogen (e.g., radiation) may cause chromosomal breakage or

gene deletion. Additionally, the teacher will enhance understanding by using images or videos showcasing real-life examples of teratogenic effects (e.g., fetal alcohol syndrome, thalidomide), highlighting their connection to genetic structure.

Activity 2: Simulation of Teratogenic Impact on Gene Structure (60 Min)

The teacher will divide students into small groups and provide them with genetic simulation software or physical DNA models.

Students will simulate the effects of various teratogens on a model gene or DNA strand (e.g., altering nucleotide sequences, inducing chromosomal breaks, or causing deletions/duplications).

Each group will modify a genetic sequence to demonstrate how a specific teratogen affects gene structure and function. They will analyze how these changes could disrupt normal gene function, potentially leading to developmental abnormalities.

Activity 3: Analysis of Teratogen Impact Using Microscopic Samples (60 Min)

Students will be provided with prepared slides of cells or organisms exposed to teratogens, alongside control samples. Using microscopes, they will observe and identify structural changes in the cells or chromosomes (e.g., damaged DNA, chromosomal aberrations).

Observations will be recorded in lab notebooks, focusing on the differences between normal and teratogen-exposed samples.

Students will analyze how structural changes could impact gene function and contribute to birth defects or genetic disorders, presenting their observations within their groups.

Activity 4: Group Discussion and Reflection (60 Min)

After completing the simulations and observations, each group will share their findings in a brief presentation, discussing the biological and developmental implications of teratogenic effects on gene structure.

A guided group discussion will follow, where students reflect on the long-term genetic consequences of teratogen exposure. Topics may include the potential for these mutations to be inherited by future generations and the ethical and social considerations of teratogen exposure during pregnancy.

Activity 5: Conclusion (60 Min)

Students will summarize the activities and reinforce key concepts about how teratogens induce genetic mutations and disrupt normal development.

The teacher will encourage reflection on the importance of studying teratology in the context of genetic health, emphasizing preventive measures such as prenatal care and avoiding harmful substances.

Optionally, the teacher can provide additional resources or reading material for students interested in exploring teratology within the fields of genetics and medicine.

Practical Training 7.3 Molecular Screening and Cancer Genetics.

The teacher will demonstrate the molecular screening and cancer genetics and will discuss method of practical activity. (45 Minutes).

The teacher will assign the topic(s) to the students and students will perform practical activity related to the molecular screening and cancer genetics through-

1. DNA extraction from cancer cell using various methods, such as PCR/next-generation sequencing, Genetic mutation analysis of cancer cells using techniques such as Sanger sequencing / PCR and culture of cancer cells in the laboratory, observing their growth and behaviour or DNA extraction from cancer cell, Genetic mutation analysis of cancer cells and culture of cancer cells through virtual reality. (45 Minutes)
2. PCR (Polymerase Chain Reaction) to detect genetic mutations or variations using specific DNA sequences ,DNA sequencing to identify genetic mutations/variations to determine the order of nucleotide bases in a DNA molecule and Microarray analysis to Measure the expression levels of thousands of genes simultaneously to identify patterns associated with disease or exploration of techniques used in molecular screening through virtual reality. (45 Minutes)
3. Demonstration on molecular screening and cancer genetics using 3D/4D models /multimedia presentation/digital tools /softwares/clinical video cases. (45 Minutes)
4. Diagrams illustrating the structure of a gene, including exons, introns, and regulatory elements or illustration related to teratology. (45 Minutes)
5. Group discussion related to teratology and its causes and the structure of Gene.(45 Minutes)

Students will report the practical activity of their assigned topic(s) and teacher will summarize the practical activity to the students. (30 Minutes)

Practical Training 7.4 Haematological malignancies and Pharmacogenetics.

Total Learning Hours: 5:00 Hours

Activity 1: Case Study Analysis with Demonstration (60 Min)

The teacher will initiate the session with a structured demonstration, analyzing a sample case study and meticulously guide students through the process of examining diagnostic test results, identifying haematological malignancy types, and interpreting pharmacogenetic profiles to devise personalized treatment plans. To enhance comprehension, the teacher will incorporate engaging visual aids such as annotated slides, detailed diagrams, or illustrative video clips, ensuring clarity and active student engagement.

Activity 2: Student's Role (60 Min)

Following the demonstration, the teacher will distribute comprehensive case histories to students, featuring examples such as patients diagnosed with leukemia or lymphoma. Each case will include diagnostic results and pharmacogenetic data, providing a foundation for analysis. Students will be tasked with examining these cases either independently or collaboratively in small groups, encouraging critical thinking and application of learned concepts.

Activity 3: Comparative Literature Review (60 Min)

The teacher will assign student groups to review and analyze selected research articles that compare pharmacogenetic approaches in the treatment of haematological malignancies. Each group will critically evaluate the methodologies, findings, and implications of the studies, fostering collaborative learning and deeper insights into current advancements in pharmacogenetics.

Activity 4: Pre-Class Digital Module and In-Class Case Analysis (60 Min)

The teacher will offer an online module comprising videos, readings, and interactive quizzes to introduce the fundamentals of haematological malignancies and pharmacogenetics. Students will complete this self-paced module prior to the class, laying a solid conceptual foundation. During the class session, the teacher will guide students through hands-on analysis of real or simulated case studies, fostering active learning. Discussions will be facilitated throughout, with the teacher providing timely feedback to enhance understanding and application.

Activity 5: Diagnostic Q&A (60 Min)

The teacher will present a detailed diagnostic scenario and pose targeted questions. Students will critically analyze the scenario, formulate responses to the questions, and actively participate in follow-up discussions to deepen their understanding and refine their analytical skills.

Experiential Learning Activity

Experiential-Learning Learning 7.1: Multifactorial Pattern of Inheritance.

Total Learning Hours: 7:00 Hours**Activity 1: Case Study Exploration (60 Min)**

Students will analyze real-world case studies involving diseases with multifactorial inheritance, such as diabetes or cardiovascular or any other disorders. They will identify the genetic and environmental factors contributing to these conditions and discuss how these interactions influence the onset and progression of the disease.

Activity 2: Gene-Environment Interaction Analysis (60 Min)

Through simulated scenarios, students will explore how environmental factors like diet, stress, or pollution interact with genetic predispositions. They will create visual diagrams or models mapping the interplay between these factors and their cumulative impact on trait expression.

Activity 3: Family Pedigree Construction (60 Min)

Students will construct family pedigrees for hypothetical or real scenarios, tracing inheritance patterns of multifactorial traits across generations. Emphasis will be placed on analyzing incomplete penetrance and the challenges in detecting clear genetic patterns in such cases.

Activity 4: Data Analysis Project (60 Min)

Students will engage with genetic datasets (real or simulated) to identify inheritance trends and calculate the statistical contributions of multiple factors. This could include creating graphs or charts to illustrate their findings and presenting insights on the complexity of multifactorial inheritance.

Activity 5: Interactive Modeling (60 Min)

Using 3D models or virtual tools, students will explore how multiple genes and environmental factors together shape phenotypes. They can manipulate the model to observe how changes in specific factors alter the expression of a particular trait.

Activity 6: Role-Playing Debate (60 Min)

Students will take on roles such as geneticists, environmental scientists, and ethicists to debate issues related to multifactorial inheritance. Topics could include its implications for public health policies, personalized medicine, or genetic counseling.

Activity 7: Simulation Activity (60 Min)

In this hands-on activity, students will simulate how altering environmental factors such as exposure to toxins, lifestyle changes, or diet impacts the expression of genetically influenced traits. They will observe hypothetical outcomes over several simulated generations.

Experiential-Learning Learning 7.2: Teratology and Gene structure.

Total Learning Hours: 6:00 Hours

Activity 1: Group Research & Presentation (60 Min)

Students will collaborate in small groups to research specific teratogens, such as drugs, radiation, or infections, and their associated genetic mutations. Each group will create a detailed presentation, highlighting how the structure of genes influences the teratogenic effects. Presentations can include diagrams, charts, or videos for enhanced visual learning.

Activity 2: Case-Based Analysis (90 Min)

Using clinical case studies, students will examine congenital anomalies or genetic disorders. They will identify the potential teratogenic factors and underlying gene defects, explaining mechanisms such as chromosomal breakage, gene deletion, or epigenetic modifications. This activity encourages analytical thinking and real-world application.

Activity 3: Simulation / Virtual Lab Activity (90 Min)

Students will engage in virtual lab simulations to explore the effects of teratogens on embryonic development. They will observe how gene mutations disrupt developmental pathways using online platforms or software. This activity allows students to visualize complex interactions in a controlled digital environment.

Activity 4: Reflective Writing / Concept Mapping (60 Min)

Students will synthesize their knowledge by writing a reflective summary on the connection between teratogens, gene structure, and developmental anomalies. Alternatively, they can create concept maps to visually represent these relationships, fostering deeper understanding and integrative thinking.

Activity 5: Hospital/Clinic Visit (Observational Learning) (60 Min)

Students will visit a genetics or pediatrics department at a hospital or clinic to observe real cases of genetic syndromes or congenital anomalies. They will interact with clinicians to learn how teratogens influence gene structure and how genetic insights aid diagnosis and treatment planning.

Experiential-Learning Learning 7.3: Molecular Screening and Cancer Genetics.

Total Learning Hours: 7:00 Hours

Activity 1: Literature Review (Self-Directed Learning - SDL) (60 Min)

Students will independently review academic literature on molecular screening methods and the genetic mutations commonly associated with cancer. They will summarize key findings, focusing on the techniques used and the molecular basis of cancer mutations.

Activity 2: Hands-On Practice (Lab Simulation or Virtual Lab) (60 Min)

Through laboratory simulations or virtual labs, students will practice molecular screening techniques, including sample preparation, analysis, and result interpretation. They will gain hands-on experience with techniques such as PCR, electrophoresis, or next-generation sequencing (depending on available resources).

Activity 3: Case-Based Learning (CBL) – Cancer Case Study (60 Min)

Students will work on a clinical case study involving cancer genetics. They will identify specific mutations and biomarkers, determine the molecular diagnostic methods required, and discuss how this information impacts patient diagnosis and treatment plans.

Activity 4: Problem-Based Learning (PBL) – Diagnostic Challenge (60 Min)

In collaborative groups, students will tackle a diagnostic challenge. Using the patient's family history, clinical symptoms, and molecular test results, they will develop a comprehensive genetic screening plan and justify their approach.

Activity 5: Brainstorming Session – Risk Factors and Ethical Concerns (60 Min)

Students will brainstorm both genetic and environmental risk factors for cancer. They will also engage in discussions on the ethical considerations of genetic testing, such as consent, confidentiality, and the potential impact on family members.

Activity 6: Data Analysis and Report Preparation (60 Min)

Students will analyze simulated molecular screening data, identifying relevant mutations and their implications. They will prepare a professional diagnostic report that includes genetic counseling recommendations and suggests next steps for patient care.

Activity 7: Group Presentation and Q&A (60 Min)

Each group will present their analysis of the clinical case, including their screening results, diagnostic plan, and counseling recommendations. Following the presentation, they will engage in a peer-led Q&A session to refine their understanding and receive constructive feedback from instructors.

Experiential-Learning Learning 7.4: Haematological malignancies and Pharmacogenetics.

Total Learning Hours: 6:00 Hours

Activity 1: Digital Portfolio Creation (120 Min)

Students will independently develop a comprehensive digital portfolio analyzing assigned cases. Each portfolio will feature:

Annotated diagnostic images.

In-depth pharmacogenetic evaluations.

Proposed personalized treatment plans. Portfolios will undergo **peer review sessions**, where students provide constructive feedback to one another. The process culminates in **teacher-led feedback sessions**, reinforcing critical concepts, fostering collaboration, and promoting reflective learning.

Activity 2: Collaborative Diagnosis Challenge (90 Min)

Students will be divided into small teams, each provided with distinct diagnostic datasets, such as:

Blood counts.

Genetic markers.

Pharmacogenetic profiles. Teams will collaboratively interpret the data to:

Identify malignancy types.

Propose evidence-based treatment strategies. Each team will present their findings to the class, followed by **peer critiques and Q&A sessions** to deepen the analytical discussion.

Activity 3: Problem-Solving Rotations (90 Min)

Multiple stations will be set up, each featuring a unique diagnostic case or pharmacogenetic problem. Small groups of students will:

Rotate through the stations.

Analyze the cases and solve challenges at each station. After completing all rotations, groups will reconvene to **share their outcomes and insights**, encouraging collaborative evaluation and reflection.

Activity 4: Independent Research Brief (60 Min)

Students will independently explore haematological malignancies and pharmacogenetics by researching scientific articles, clinical guidelines, or databases. Each student will prepare a concise research brief that:

Summarizes their findings. Highlights key concepts or controversies. These briefs will be shared during a class session, fostering knowledge exchange and critical evaluation of different perspectives.	
Modular Assessment	
Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep structured marking pattern. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C Total Marks for this module: 50 1. Case-Based Questions: The teacher will provide clinical cases involving multifactorial diseases and ask students to identify the genetic and environmental factors involved (10 Marks). 2. Poster Presentation: The teacher will ask students to create posters on topics such as the genetic basis of breast cancer or the pharmacogenetics of anticancer drugs (15 Marks). 3. Viva Voce or Presentation/Demonstration or critical paper reading or Clinical examination - (Marks: 10) 4. Making model or Poster making- (Marks: 15) or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	4
Module 8 : علم النسل تناسلي (Ilmul Nasal Tanasuli) Reproduction genetics. علاج جيني وعلم المناعة (Ilaj-e-Jeeni wa Ilmul Mana'at) Gene therapy and Immunology.	
Module Learning Objectives (At the end of the module, the students should be able to)	

1. Describe Reproduction Genetics, Preimplantation genetics, Assisted reproduction, Male and Female Infertility and its genetical Basis. Prenatal diagnosis, Genetic Counselling. Ethics of Genetics, Principles of Gene therapy and its applied knowledge, Immune system and Cell Types Involved in Defence Mechanism. Clinical Significance of major Histocompatibility complex
2. Conduct Project Activity or Presentation On Reproduction Genetics.
3. Identify infertility with its genetical Basis.

Unit 1 علم النسل تناسلي (Ilmul Nasal Tanasul) Reproductive Genetics

- 8.1.1. علم النسل تناسلي (Ilmul Nasal Tanasul) Reproduction Genetics.
- 8.1.2. مردانه و زنانه عقیم (بأنجھ پین) (Mardana wa Zanana uqm) Male and Female Infertility).
- 8.1.3. تناسل مساعد (Tanasul-e-musa'id) Assisted reproduction.
- 8.1.4. علم النسل قبل الغرس (Ilmul Nasl Qabl alGharas) Preimplantation genetics.
- 8.1.5. تشخيص قبل الولادة (Tashkhees-e-Qabl al Wiladah) Prenatal diagnosis).
- 8.1.6. استشرار جینی (Istishrah-e-Jeeni) Genetic Counselling.

References: 86,87,88,89,90,91,92,93

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the Reproduction Genetics, Male and Female Infertility, Assisted reproduction.	3	Lecture	CC	Knows-how	L&GD, L_VC, L&PP T
CO1,CO4, CO7	Evaluate reproduction genetics, male and female infertility, and assisted reproduction.	7	Experiential- Learning 8.1	CE	Does	PSM, PER, IBL, SDL , SIM
CO1,CO4, CO7	Perform and evaluate techniques in Reproductive Genetics, engage with Assisted Reproduction methodologies, and investigate aspects of Male and Female Infertility.	5	Practical 8.1	PSY- SET	Shows-how	PL, BS, DIS, D, PER

CO1,CO4, CO7	Investigate the Ethics of Genetics, study the Principles of Gene Therapy and connect its applied knowledge to societal challenges.	6	Experiential- Learning8.2	PSY- ORG	Shows-how	JC,SIM,PBL,SY
CO1,CO4	Describe the Preimplantation genetics, Prenatal diagnosis and Genetic Counselling.	2	Lecture	CC	Knows-how	L&PPT ,L&GD,L_VC
CO1,CO3, CO7	Design Preimplantation Genetics, Conduct an exploration of Prenatal Diagnosis, and Practice the application of Genetic Counselling	5	Practical8.2	PSY- ORG	Shows-how	CD,PER,SDL,SY,D

Unit 2 علاج جینی واطلاقی معلومات (Ilaj-e-Jeeni wa Itlaqi Ma'alumat) Gene therapy and its applied knowledge

8.2.1. اخلاقیات علم النسل (Akhlaiyat-e-Ilmul Nasl) Ethics of Genetics.

8.2.2. اصول علاج جینی واطلاقی معلومات (Usool-e-Ilaj-e-Jeeni wa Itlaqi Ma'alumat) Principles of Gene therapy and its applied knowledge.

8.2.3. نظام مناعت اور دفاعی میکانیہ میں شامل ہونے والے خلیات (Nizam-e-Mana'at aur difa'ei makaniyah men shamil hoane wale khaliyat) Immune system and Cell Types Involved in Defence Mechanism.

8.2.4. توافق انسجہ کبیرہ کی سریریاتی اہمیت (Tawa'fuq-e-Ansija-e- Kabeerah ki Sariryati Ahmiyat) Clinical Significance of major Histocompatibility complex.

References: 86,87,88,89,90,91,92,93

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the Ethics of Genetics, Principles of Gene therapy and its applied knowledge.	2	Lecture	CC	Knows-how	BL,L_VC,L&PPT
CO1,CO4, CO7	Evaluate the ethics of genetics, principles of gene therapy and its applied knowledge, and the immune system and cell types involved in the defense mechanism.	7	Experiential- Learning8.3	AFT- VAL	Does	IBL,CBL,SDL,CD

CO1,CO4, CO7	Evaluate the Ethics of Genetics, analyze the Principles of Gene Therapy, and reflect on its applied knowledge with sensitivity and understanding	5	Practical8.3	CE	Knows-how	PL,SDL,D,C_L
CO1,CO4, CO7	Evaluate the significance of Cell Types in Defence Mechanism, relating their functions to real-world health scenarios	6	Experiential-Learning8.4	CE	Shows-how	PER,FC,SDL,JC
CO1,CO3	Discuss the Immune system and Cell Types Involved in Defence Mechanism and Clinical Significance of major Histocompatibility complex.	3	Lecture	CC	Knows-how	L&GD,BL,L&PPT ,L_VC
CO1,CO4, CO7	Explore of the Immune System, analyze the Cell Types Involved in the Defence Mechanism, and evaluate the Clinical Significance of the Major Histocompatibility Complex.	5	Practical8.4	PSY-GUD	Shows-how	SIM,DL,CBL,D-M,D

Practical Training Activity

Practical Training 8.1 Reproductive Genetics and Infertility.

Total Learning Hours:5:00 Hours

Activity 1: Teacher Demonstration (60 Min)

The teacher will introduce the foundational techniques in reproductive genetics, assisted reproduction, and addressing male and female infertility. This may include showing visual aids, explaining step-by-step processes (e.g., sperm analysis, embryo transfer), and demonstrating laboratory methods like handling gametes or cryopreservation using training equipment.

Activity 2: Interactive Labelling of Reproductive Organs (60 Min)

Students will engage with interactive 4D models or augmented reality to identify and label reproductive system components, exploring structural abnormalities contributing to infertility.

Activity 3: Collaborative Problem-Solving Session (90 Min)

The teacher will divide the students into groups and present them with complex case studies on male or female infertility. Each group brainstorms potential causes, reproductive genetic techniques, and assisted reproduction methodologies applicable to the case. Groups then share their findings with the class for peer feedback and further refinement.

Activity 4: Infertility Case Brainstorm Challenge (90 Min)

Teacher will provide to the students, hypothetical scenarios of infertility (e.g., unexplained infertility or recurrent miscarriages). In small groups, they brainstorm diagnostic approaches, assisted reproduction techniques, and genetic tests that can address the issue. The groups then compare their solutions and collectively evaluate the best approach.

Practical Training 8.2 Comprehensive Genetic Applications

Total Learning Hours:5:00 Hours

Activity 1: Teacher Demonstration (60 Min)

The teacher will introduce the key concepts of preimplantation genetics, prenatal diagnosis, and genetic counseling through a detailed demonstration. This may include the use of models, diagrams, or virtual simulations to explain the processes and their clinical significance. The teacher will also highlight common tools, techniques, and methods used in these practices to set the foundation for student activities.

Activity 2: Prenatal Diagnosis Case Studies (60 Min)

Students will work on anonymized case studies of prenatal diagnosis scenarios (e.g., amniocentesis, chorionic villus sampling) to identify methods, analyze findings, and recommend next steps.

Activity 3: Interactive Seminar/Workshop on Ethical Considerations (90 Min)

The teacher will organize a departmental seminar or Workshop and this will focus on ethical challenges associated with preimplantation genetics and prenatal diagnosis. Students debate real-world cases and present their conclusions.

Activity 4: Counseling Script Writing (90 Min)

Students will write detailed scripts for genetic counseling sessions, covering topics like genetic risks, test results, and patient support.

Practical Training 8.3 Ethics of Genetics and Gene therapy

Total Learning Hours: 5:00 Hours

Activity 1: Teacher Demonstration (60 Min)

The teacher will introduce the foundational concepts of the Ethics of Genetics, Principles of Gene Therapy, and their applied knowledge. This includes presenting real-world examples, using visual aids (e.g., charts, videos, or diagrams), and discussing ethical dilemmas related to genetic advancements. The teacher sets the stage for critical thinking and emotional engagement by framing key questions and scenarios.

Activity 2: Q & A Session (90 Min)

After the teacher's demonstration, students participate in an interactive question-and-answer session. They raise queries about the ethics of genetics, principles of gene therapy, and its applications. The teacher guides the discussion, encouraging students to critically evaluate concepts, consider ethical challenges, and clarify their understanding through dialogue.

Activity 3: Ethics Debate (60 Min)

The Teacher will divide the students into groups and assign each group an ethical dilemma related to genetics or gene therapy (e.g., germline editing, genetic selection, or access to therapy). Groups prepare arguments from different perspectives (e.g., patient, scientist, and policy-maker) and debate their case, fostering critical evaluation and reflection.

Activity 4: Concept Mapping (90 Min)

Students will create a concept map linking key ethical principles, applications, and challenges in genetics and gene therapy. This activity encourages both analysis and thoughtful reflection.

Practical Training 8.4 Defense Dynamics and Immune System

Total Learning Hours: 5:00 Hours

Activity 1: Interactive Demonstration (60 Min)

Teacher will discuss and demonstrate the immune system, cell types involved in the defense mechanism, and the clinical significance of the Major Histocompatibility Complex (MHC) using relevant models and scenarios.

Student will perform a hands-on demonstration using models, interactive 4D tools, or augmented reality to showcase and identify the components of the immune system and defense mechanisms.

Activity 2: Case Study Analysis (90 Min)

Teacher will introduce case studies related to immune system functions and malfunctions, explaining practical modalities.

Student will analyze and present solutions for the given case studies, demonstrating an understanding of the immune system, cell types, and the clinical significance of MHC.

Activity 3: Hands-On Activities (90 Min)

Teacher will explain practical activities such as immune system games, puzzles, and simulations.

Students will engage in hands-on tasks (e.g., games, puzzles, or simulations) to reinforce knowledge of immune system components and mechanisms.

Activity 4: Virtual Reality Simulation (60 Min)

Teacher will demonstrate the immune system and defense mechanisms through virtual reality tools.

Students will explore immune system functionality in a virtual environment and summarize learnings in reports or discussions.

Experiential Learning Activity

Experiential-Learning Learning 8.1: Reproduction Genetics and Male and Female Infertility.

Total Learning Hours: 7:00 Hours

Activity 1: Design a Fertility Treatment Plan (90 Min)

The teacher will provide students with fictional patient profiles containing detailed medical histories, lifestyle factors, and genetic data. Students will independently analyze the provided information and develop a comprehensive fertility treatment plan. They will select the most suitable assisted reproduction techniques and provide a well-reasoned justification for their decisions, demonstrating their understanding of the subject matter.

Activity 2: Online Research and Presentation (120 Min)

The teacher will assign each student a specific topic, such as recent advancements in IVF or ethical considerations in reproductive technology. Students will conduct independent research on the assigned topic and develop a presentation to effectively communicate their findings. They will then share their work with the group, fostering collective learning and discussion.

Activity 3: Problem-Solving Method (120 Min)

The teacher will provide students with real-world problems related to infertility and assisted reproduction, such as interpreting complex genetic test results or developing a step-by-step IVF protocol for a fictional patient. Students will independently analyze the provided scenarios, identify viable solutions, and present their rationale in a structured and logical manner, demonstrating critical thinking and problem-solving skills.

Activity 5: Develop a Patient Education Brochure (90 Min)

Students will design an informational pamphlet or brochure for patients explaining reproduction genetics, infertility causes, and assisted reproduction options.

Experiential-Learning Learning 8.2: Genes and Ethics

Total Learning Hours: 6:00 Hours

Activity 1: Ethical Dilemma Symposium (60 Min)

The Teacher will present real-world ethical dilemmas (e.g., choosing embryos based on genetic traits or making decisions after prenatal testing results). Students will work in groups to discuss their perspectives, consider various viewpoints, and debate the potential impact on patients and society.

Activity 2: Patient Journey Simulation (120 Min)

Students will present a role-playing activity where they act as patients, genetic counselors, and family members navigating the emotional and ethical aspects of preimplantation genetics or prenatal diagnosis.

Activity 3: Problem-Based Learning Scenarios (60 Min)

Students will collaboratively solve problems or questions related to hereditary conditions, providing recommendations and linking findings to genetic concepts.

Activity 4: Journal Club (120 Min)

Students will review and present current scientific articles or research papers related to preimplantation genetics, prenatal diagnosis, or genetic counseling. They critically evaluate the study's objectives, methodology, findings, and ethical implications, followed by a group discussion to reflect on the relevance to clinical practice.

Experiential-Learning Learning 8.3: Applied Gene Therapy and Defense Systems Analysis.

Total Learning Hours :7:00 Hours

Activity 1: Case-Based Ethical Discussions (90 Min)

The teacher will present students with real-world case studies highlighting ethical dilemmas, like genetic modification or experimental gene therapy trials. Students will be instructed to critically evaluate the ethical aspects through structured group discussions or independent written analyses, fostering ethical reasoning and collaborative learning.

Activity 2: Debate on Genetic Ethics (60 Min)

The teacher will organize a formal debate in which students take opposing positions on controversial topics such as gene editing, cloning, or genetic privacy. Students will conduct independent research to prepare their arguments and present them during the debate, promoting critical evaluation, ethical reasoning, and effective communication skills.

Activity 3: Conceptual Role Mapping (90 Min)

Students will create a comprehensive map linking key concepts such as genetic ethics, gene therapy mechanisms, and immune system components. They independently identify relationships and interactions, promoting a deeper understanding of the subject.

Activity 4: Creative Scenario Writing (90 Min)

Students will be tasked with drafting fictional scenarios that explore the implications of advanced gene therapy, addressing both ethical and immunological considerations. They will critically evaluate potential outcomes and societal impacts, fostering creativity and deeper analytical thinking.

Activity 5: Visual Ethics Timeline (90 Min)

Students will research and create a timeline that highlights key ethical milestones in genetic research and gene therapy advancements. They will delve into historical precedents and analyze emerging trends to anticipate future ethical challenges, fostering critical thinking and a deeper understanding of the field.

Experiential-Learning Learning 8.4: Cell Types in Defence Mechanism

Total Learning Hours: 6:00 Hours

Activity 1: Immune Pathway Mapping (90 Min)

Students are instructed to collaboratively create flowcharts or diagrams showing how immune cells interact during an infection. They analyze these pathways, reflecting on the roles of different cell types in protecting the body.

Activity 2: Immune Cell Interviews (90 Min)

Students will be divided into pair, assigning one as a specific immune cell and the other as an interviewer. The interviewer asks questions about the cell's role and importance, encouraging creative and engaging dialogue.

Activity 3: Comparative Exploration (90 Min)

Students will be divided into teams to compare innate versus adaptive immune responses, focusing on the roles of specific immune cells. Teams present their comparisons, highlighting how cell types differ in function and interaction.

Activity 4: Journal Club: Defense Cells and Immunity (90 Min)

Students are divided into small groups, and each group is assigned a recent research article or review paper focusing on cell types involved in the defense mechanism and their roles in immunity.

Modular Assessment

Assessment

Hour

Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep structured marking pattern. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C

Total Marks for this module: 50

1. Short Answer Questions (SAQs) or Multiple choice questions (MCQs)- (Marks: 10)

(Short Answer Questions or Multiple-choice questions will be asked from each unit)

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2. Case Based Assessment or practical performance or Dissection/ virtual dissection or or exploration through virtual reality - (Marks: 15) 3. Viva Voce or Presentation/Demonstration or critical paper reading or Clinical examination - (Marks: 15) 5. Making model or Poster making- (Marks: 10) or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	

Paper No : 2 (تشریح البدن وتشریح اطلاق) (Tashreeh ul Badan wa Tashreeh-e- Itlaqi) Gross and Applied Anatomy)						
Semester No : 3						
Module 9 : (خطہ راس کی ظاہری واطلاقی تشریح) (Khitt'a-e- Ra's ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Head Region.						
Module Learning Objectives (At the end of the module, the students should be able to) 1. Describe the gross and applied anatomy of head region, osteology of head region, arthrology of head region and myology of head region. 2. Conduct presentation, group discussion and clinical examination regarding gross and applied anatomy of head region, osteology of head region, arthrology of head region and myology of head region. 3. Identify the bones, joints, muscles of the head region and clinical presentations of the head region.						
Unit 1 (خطہ راس) (Khitt'a-e- Ra's)Head Region-I 9.1.1. (عظام راس) (Iza'm –e- Ra's) Osteology of Head Region. 9.1.2. (مفاصل راس) (Mafasil –e- Ra's) Arthrology Of Head Region. References: 1,2,3,4,5,6,7,8,9,10,11,16,17,19,21,22,23,24,25,26,27,28,29,30,31,35,38,42,43,44,54,57,60,61,63,103,104						
3A	3B	3C	3D	3E	3F	3G
CO1,CO3	Describe the osteology of Head region.	3	Lecture	CC	Know	L_VC,L&GD,L&PPT
CO1,CO3, CO7	Demonstrate the Arthrology of head region.	3	Practical9.1	PSY- SET	Shows-how	D-M,D,IBL,FC,SDL
CO1,CO3, CO7	Illustrate the osteology of head region.	6	Experiential- Learning9.1	CAP	Does	X-Ray,FC,SDL,D-M,RLE

CO1,CO3, CO7	Illustrate the arthrology of head region.	4	Experiential- Learning9.2	CAP	Does	SDL,D-M,D,FC,IBL
CO1,CO3, CO7	Demonstrate the osteology of head region.	5	Practical9.2	PSY- SET	Does	D-M,FC,SDL,X-Ray
CO1,CO3	Describe the arthrology of head region.	1	Lecture	CK	Know	BL,L_VC,L&GD,L&PPT

Unit 2 خطِ راس (Khitt'a-e- Ra's) Head Region-II

9.2.1. عضلاتِ راس Azla't -e- Ra's (Myology of Head region).

9.2.2. دماغ (Dimagh) Brain.

9.2.3. خطِ راس کی ظاہری واطلاقی تشریح (Khitt'a-e- Ra's ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Head Region.

References: 1,2,3,4,5,6,7,8,9,10,11,16,20,21,22,23,26,27,28,29,30,31,35,38,42,43,44,54,55,57,58,103,104,105

3A	3B	3C	3D	3E	3F	3G
CO1,CO3	Describe the myology of head region.	2	Lecture	CC	Know	L_VC,L&GD,L&PPT ,BL
CO1,CO3, CO7	Demonstrate the myology of head region.	4	Practical9.3	PSY- SET	Shows-how	D,SDL,D-M,IBL,FC
CO1,CO3, CO7	Illustrate the myology of head region.	6	Experiential- Learning9.3	CAP	Does	RP,L_VC,D-M,IBL,D
CO1,CO3	Describe the Anatomy of brain in detail.	2	Lecture	CC	Know	L&GD,L_VC,BL,L&PPT ,L

CO1,CO3, CO5,CO7	Demonstrate the gross and applied anatomy of head region.	4	Practical9.4	PSY- MEC	Shows-how	D,FC,D-M,IBL,SDL
CO1,CO3, CO7	Illustrate the anatomy of brain.	6	Experiential- Learning9.4	PSY- MEC	Shows-how	IBL,D,FC,D-M,SDL
CO1,CO3	Describe the gross and applied anatomy of head region.	2	Lecture	CC	Know	L&GD,L_VC,BL
CO1,CO3, CO7	Demonstrate the anatomy of brain.	4	Practical9.5	PSY- SET	Shows-how	FC,D,SDL,IBL,D-M
CO1,CO3, CO5,CO7	Illustrate the gross and applied anatomy of head region	4	Experiential- Learning9.5	CAP	Does	D,SDL,D-M,FC,IBL

Practical Training Activity

Practical Training 9.1 Arthrology of head region.

Total Learning hours: 3 hours

Activity 1-The teacher will discuss and demonstrate/prosect the joints of head region emphasismg on the movements and the muscles producing these movements. The teacher will focus on the blood supply and nerve supply of the joints through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/Simulator/ Demonstration on Models/ 4D interactive Anatomical Models.(45 mins)

Activity 2-The student will appreciate the different movements produced by joints of the head region and also interpret the muscles involved in the movements (45 mins).

Activity 3 - The student will differntiate the various types of joint present in the head region.(45mins)

Activity 4 -The student will understand the different stages of ossification of the joints in the head region through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/Simulator/ Demonstration on Models/ 4D interactive Anatomical Models (45mins)

Practical Training 9.2 The head region.
Total learning hours : 5 hours Activity 1-The teacher will discuss and demonstrate the different bones present in the head region using specimens/models/virtual models of bones. . The important bony landmarks of the skull will be identified and their relevance will be emphasised.(1hr) Activity 2- The students will identify the individual bones of head region by their characteristic features.(1hr) Activity 3- The student will appreciate the special features such as groove, foramina, ridges, condyles etc in each bone.(1hr) Activity 4- The student will relate the special features to the associated structures. (1 hr) Activity 5- The student will relate the facial bones to their function. The air sinuses present in the head region and their drainage will be examined.(1 hrs)
Practical Training 9.3 Myology of head region.
Total Learning hours: 4 hours Activity 1-The teacher will discuss and demonstrate/prosect the muscles of scalp, auricle, eyelids, nose and mouth. through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/ 3D Anatomy software. The teacher will demonstrate the muscular changes in diseased conditions such as Bell's palsy, infra and supranuclear lesions etc.(1hrs) Activity 2- The student will familiarise himself with the facial muscles and the movements produced by them in normal activities.(60 mins) Activity 3- The students will also familiarise himself with the muscles involved in referred pain of associated structures such as tooth ache, ear pain etc.(60 mins) Activity 4- The students will also familiarise himself with the muscles involved in swelling of muscles due to underlying structure like lymph nodes.(60 mins)
Practical Training 9.4 Gross and applied anatomy of head region.
Total Learning hours:4 hours Activity 1-The teacher will discuss and demonstrate/prosect the gross and applied anatomy of head region in different views, the features present in different views, the interior of base of cranium and craniometry in brief through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs.(1hrs)

Activity 2-The student will make use of measurements and indices of skull in order to learn craniometry.(60 mins) Activity 3-The student will also learn interpret the features in different views in a normal plain X-ray.(60 mins) Activity 4- The student will appreciate the features and division of intra cranial fossa Through dissection/ e- dissection/ speciemens.(60 mins)
Practical Training 9.5 Anatomy of brain.
Total learning hours : 4 hours Activity 1-The teacher will discuss and demonstrate/prosect the anatomy of brain in terms of its cellular architecture, parts of nervous system, meninges of brain and cerebrospinal fluid through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /3D Anatomy software.(2 hr) Acitvity 2-The student will have a indepth understanding of the divisions of Nervous system, classification of neurons, classification of perpheral nerve fibres, myelination, synapses, development of brain, parts of brain, flexures of brainv, blood supply of brain through, dissection, charts, models, videos etc (2 hrs).
Experiential Learning Activity
Experiential-Learning Learning 9.1: Osteology of head region.
Total learning hours: 6 hours he students will engage in the experiential learning by Activity 1- Identifying the difference in features of an adult in comparision to paediatirc bones. (1hr) Activity 2- The students will identify the difference in features of a male to female bones.(1hr) Activity 3- The student will understand the stages of ossification.(1hr) Activity 4- The student will give emphasis to the relevant clinial aspects using specimens or through Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /Anatomy software/case presentation/Clinical Examination.(2hrs) Activity 5- The teacher will analyse the understanding of the student on the topic by Observation, inquiry, case scenarios, common clinical conditions etc (1hrs)
Experiential-Learning Learning 9.2: Arthrology of head region.

Total Learning hours: 4 hours

The student will perform the experiential activity by

Activity 1-The student will learn to interpret the normal bones and suture of head region on a plain X-ray(1hr)

Activity 2-The student will learn to interpret the para nasal sinuses and, Deviated Nasal septum etc on a plain X-ray(1hr)

Activity 3-The student will try to understand the anatomical basis of clinical conditions such as cleft palate on bed side or by using 3D models/ videos etc (60 mins)

Activity 4- The teacher will discuss and help in interpretation of X-ray.(60 mins)

Experiential-Learning Learning 9.3: Myology of head region

Total Learning hours: 6 hours

The student will perform the experiential activity by

Activity 1-The student will enact/ perform the various expressions/ movements and explain the anatomical basis for the same.(90mins)

Activity 2 -The student will identify clinically important deformities in the muscles of facial expression due to conditions such as supranuclear lesions, infranuclear lesions, trigeminal neuralgia etc will be analysed using patients or relevant videos.(90mins)

Activity 3- The student will notice the congenital conditions such as cleft lip etc in association with the paediatric Department (1.5 hrs)

Activity 4-The teacher will enumerate the muscles in different regions of the face and its relevance in facial expression.(1.5 hr)

Experiential-Learning Learning 9.4: Anatomy of brain.

Total Learning hours: 6 hours

The student will perform the experiential activity by

Activity 1-The student will practice and learn the anatomical basis of reflexes and reflex actions in the human body in clinical cases/ simulated environment.(2hrs)

Activity 2-The student will learn the difference of Lower motor neuron paralysis and upper motor neuron lesion paralysis in clinical cases/ simulated environment.(2hrs)

Activity 3-The teacher will discuss the possible tracts involved and differential diagnosis with the help of medical department. (2 hrs)

Experiential-Learning Learning 9.5: Gross and applied anatomy of head region	
Total Learning hours: 4 hours The student will perform the experiential activity by Activity 1- The student will identify the anatomical structures in plain radiogram of skull in both antero-posterior and lateral views.(1.5 hr) Activity 2- The student will practice some common measurements and indices of craniometry and its application using specimens/ mdels/videos.(1.5 hr) Activity 3- The teacher will guide the student in their learning modality .(1hr)	
Modular Assessment	
Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6 C. Multiple choice questions- 5 questions-each question carrying 1 mark form the topics gross anatomy of head and brain Maps- Mapping of vessels of the head and brain by making charts (10marks) Short answer questions- 4 questions- each question carrying 5 marks from the topics osteology, myology, arthrology of head and Brain Skill assessment- 15 marks For identification/p of structures of the brain (10marks) X-ray reading -plain X-ray of skull and paranasal sinuses AP and lateral views and(5marks) or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	4
Module 10 : خطہ عنق کی ظاہری واطلاقی تشریح (khitt'a Unq ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Neck Region.	

Module Learning Objectives

(At the end of the module, the students should be able to)

1. Describe the gross and applied anatomy of neck region and spinal cord, osteology of neck region, arthrology of neck region , myology of neck region and splanchnology of neck region
2. Conduct presentation, group discussion and clinical examination regarding gross and applied anatomy of neck region and spinal cord, osteology of neck region, arthrology of neck region , myology of neck region and splanchnology of neck region
- 3 Identify the bones, joints, muscles and viscera of the neck region and clinical presentation of the neck region.

Unit 1 **خط عنق (khitt'a Unq)- Neck region-I**

10.1.1. **عظام عنق (Izam-e- Unq)** osteology of neck Region.

10.1.2. **مفاصل عنق (Mafasil -e- Unq)** Arthrology Of neck Region.

10.1.3. **عضلات عنق (Azla't -e- Unq)** Myology of neck Region.

References: 1,2,3,4,5,6,7,8,9,10,11,16,17,19,20,21,22,23,24,25,26,27,28,29,30,31,35,38,42,43,44,54,55,57,60,61,63,103,104

3A	3B	3C	3D	3E	3F	3G
CO1,CO3	Describe the osteology of neck region.	2	Lecture	CC	Know	BL,L_VC,L&GD,L&PPT
CO1,CO3, CO7	Illustrate the osteology of neck region.	5	Experiential- Learning10.1	PSY- SET	Knows-how	D,SDL,D-M,IBL,FC
CO1,CO3, CO7	Illustrate the arthrology of neck region.	3	Experiential- Learning10.2	PSY- SET	Knows-how	D,SDL,D-M,IBL,FC
CO1,CO3, CO7	Illustrate the myology of neck region.	3	Experiential- Learning10.3	CAN	Does	D-M,IBL,FC,SDL,PT

CO1,CO3	Describe the arthrology of neck region.	1	Lecture	CC	Know	BL,L&PPT ,L&GD,L_VC
CO1,CO3, CO7	Demonstrate the osteology of neck region.	4	Practical10.1	PSY- MEC	Shows-how	D,FC,D-M,SDL,IBL
CO1,CO3	Describe the myology of neck region.	1	Lecture	CC	Knows-how	BL,L_VC,L&PPT ,L&GD
CO1,CO3, CO7	Demonstrate the arthrology of neck region.	3	Practical10.2	PSY- MEC	Shows-how	D-M,IBL,FC,D,SDL
CO1,CO3, CO7	Demonstrate the myology of neck region.	3	Practical10.3	PSY- SET	Shows-how	D,D-M,SDL,FC,IBL

Unit 2 **خطہ عنق (khitt'a Unq)- Neck region-II**

10.2.1. احشاء عنق (Ahsh'a -e-Unq) Splanchnology of neck Region.

10.2.2. خطہ عنق کی ظاہری واطلاقی تشریح (khitt'a Unq ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Neck Region.

References: 1,2,3,4,5,6,7,8,9,10,11,16,17,19,20,21,22,23,24,25,26,27,28,29,30,31,35,38,42,43,44,54,55,56,57,58,59,63,103,104

3A	3B	3C	3D	3E	3F	3G
CO1,CO3, CO7	Demonstrate the splanchnology of neck region.	3	Practical10.4	PSY- MEC	Shows-how	D,SDL,D-M,IBL,FC
CO1,CO3, CO7	Illustrate the splanchnology of neck region.	6	Experiential- Learning10.4	CAN	Does	IBL,FC,SDL,D,D-M
CO1,CO3, CO5,CO7	Illustrate the gross and applied anatomy of neck region.	5	Experiential- Learning10.5	CAN	Does	SDL,D-M,FC,IBL,D

CO1,CO3	Describe the gross anatomy and applied anatomy of neck region.	2	Lecture	CC	Know	BL,L_VC,L&PPT ,L&GD
CO1,CO3, CO7	Illustrate the anatomy of the spinal cord.	4	Experiential- Learning10.6	PSY- SET	Does	IBL,D,D-M,FC,SDL
CO1,CO3	Describe the splanchnology of neck region.	2	Lecture	CC	Know	L&PPT ,L&GD,BL,L_VC
CO1,CO3, CO7	Demonstrate the gross and applied anatomy of neck region.	4	Practical10.5	PSY- SET	Shows-how	D,SDL,FC,D-M,IBL
CO1,CO3	Describe the anatomy of spinal cord.	2	Lecture	PSY- ADT	Knows-how	SIM,D-M
CO1,CO3, CO7	Illustrate and demonstrate the anatomy of the spinal cord.	3	Practical10.6	PSY- MEC	Does	SDL,D-M,FC,D,IBL

Practical Training Activity

Practical Training 10.1 Osteology of neck region.

Total hours: 4 hrs

The teacher will discuss and demonstrate the different bones present in the neck region using specimens/models/virtual models of bones. . The important bony landmarks of the vertebrae and bones of neck region will be identified and their relevance will be emphasised.(1hrs)

Activity 1-The students will identify the individual bones of neck region by their characteristic features(45mins)

Activity 2-The student will appreciate the special features such as groove, foramina, processes and their attachments etc in each bone.(45mins)

Activity 3-The student will relate the bones and special features to the associated structures.(45mins)

Activity 4 -The blood vessels and nerves related to osteology of neck will be examined using specimens/models/virtual models of bones(45mins)

Practical Training 10.2 Arthrology of neck region.
Total Learning hours: 3 hours Activity 1-The teacher will discuss and demonstrate/prosect the joints of neck region emphasismg on the movements and the muscles producing these movements. The teacher will focus on the blood supply and nerve supply of the joints through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/Simulator/ Demonstration on Models/ 4D interactive Anatomical Models.(1hrs) Activity 2-The student will appreciate the different movements produced by joints of the neck region (30mins) Activity 3-The student wil interpret the muscles involved in the movements.(30mins) Activity 4-The student will differntiate the various types of joint present in the neck region.(30mins) Activity 5-The student will also understand the blood supply, nerve supply and the related structures of the joints of neck region (30mins) The abvoe activities will be cinducted through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/Simulator/ Demonstration on Models/ 4D interactive Anatomical Models
Practical Training 10.3 Myology of neck region.
Total Learning hours: 3 hours Activity 1-The teacher will discuss and demonstrate/prosect the muscles of neck region. The teacher will demonstrate the muscles of vertebral area, triangles of the neck, the subcutaneous muscles in the neck region through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/ /3D Anatomy software.(60 minss) Activity 2-The student will familiarise himself with the Nuscles of the neck (60 mins) Activity 3-The student wil identiy the structures present in the triangles of the neck, root of the neck and the structures passing through the thoracic inlet. (60 mins)
Practical Training 10.4 Splanchnology of neck region.
Total learning hours - 3 hrs Activity 1-The teacher will discuss and demonstrate/prosect the visceral structures of neck region including the glands, blood vessels, nerves, lymphatics(30 mins)

Activity 2-The student will trace the course of blood vessels, nerves, lymphatics and their branches in the neck region.(60 mins) Activity 3-The student will note the placement of structures in neck region. (30 mins) The above mentioned activities through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /3D Anatomy software.(1 hr)
Practical Training 10.5 Gross and applied anatomy of neck region.
Total Learning hours: 4 hours Activity 1-The teacher will discuss and demonstrate/prosect the gross and applied anatomy of neck region in different views, the normal lordosis, the important surgical areas for incision etc by Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs.(90ms) Activity 2-The student will make use of X-ray to understand the normal and altered lordosis.(1hr) Activity 2-The student will learn the surface marking of important surgical areas for incision by Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs.(90mins)
Practical Training 10.6 Spinal Cord.
Total learning hours - 3 hrs Activity 1-The teacher will discuss and demonstrate/prosect the anatomy of spinal cord in terms of its internal architecture, tracts of spinal cord and their relation to associated structure through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /3D Anatomy software.(1hr) Activity 2-The student will have an in-depth understanding of the tracts of spinal cord with their location, the spinal meninges, the differences between cerebral and spinal dura mater.blood supply of spinal cord through, dissection, charts, models, videos etc (2hrs).
Experiential Learning Activity
Experiential-Learning Learning 10.1: Osteology of neck region.

The students will engage in the experiential learning by (Total 5hrs) Activity 1- identifying the difference in features of typical and atypical bones of neck..(2hrs) The student will give understand the relevant clinical aspects based on attachments and relations using specimens or through Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /Anatomy software/case presentation/Clinical Examination.(2hrs) Activirt 2-The teacher will analyse the understanding of the student on the osteology of neck by Observation, inquiry, case scenarios, common clinical conditions etc (1hrs)
Experiential-Learning Learning 10.2: Arthrology of neck region.
The student will perform the experiential activity by (Total 3hrs) Activity 1-The student will learn to interpret the normal vertebral column, craniovertebral joints, intervertebral joints, intervertebral disc spaces etc on a plain X-ray.(1hr) Activity 2-The student will try to understand the anatomical basis of clinical conditions such as cervical rib, disc prolapse etc on OPD/IPD patients or by using models/ videos etc (1hr) Activity 3-The teacher will discuss and help in interpretation of X-ray.(1hr)
Experiential-Learning Learning 10.3: Myology of neck region.
The student will engage in experiential activity by (Total 3hrs) Activity1-The student will enact/ perform and explain the various movements and the muscles producing them in the neck region.(45mins) Activity 2-The student will explain the anatomical basis for clinically common conditions restricting and painful movements of the neck region.(45mins) Activity 3-The student will notice the congenital conditions such as torticollis etc (30mins) Activity 4-The teacher will recollect the muscles in different regions of the neck and ittheir relevance in movements of the neck.(1hr)
Experiential-Learning Learning 10.4: Splanchnology of neck region.
The student will perform the experiential activity by (Total 6 hrs)

Activity 1- The student will learn to palpate the superficial structures of the neck. (90mins) Activity 2- The student will learn to appreciate common clinical swellings and enlargements such as lymphadenopathy, tonsillitis, thyroid enlargement etc.(90mins) Activity 3- The student will gain knowledge of emergency procedures like tracheostomy, Carotid massage etc.(90mins) Activity 4-The teacher will guide the students in the above activity.(90mins) The above mentioned activities will be performed on clinical cases/ maniquins/ 3Dmodels etc	
Experiential-Learning Learning 10.5: Gross and applied anatomy of neck region.	
Total Learning hours: 5 hours The student will perform the experiential activity by Activity 1 -The student will outline the spread of septic embolus from pelvis, malignant cells from prostate, mammary glands and thyroid up through the plexus into cranial bones and brain using drawings/ maps.(3hrs) Activity 2-The student will appreciate and present the spinal cord and its related structures on a CT/MRI .(1hrs) Activity 3-The teacher guide and monitor the students in this activity (1hr)	
Experiential-Learning Learning 10.6: Spinal cord.	
The student will perform the experiential activity by (Total 4hrs) Activity 1- The student will outline the functional tracts with its classification.(1hr) Activity 2- Effects of transverse section of spinal cord and the anatomical basis will be explained by the student with the help of models, charts, videos. (1hr) Activity 3-The student will learn the location and technique of lumbar puncture paralysis in a model. (1hrs) Activity 4-The teacher will discuss the possible tracts involved and differential diagnosis. (1hr)	
Modular Assessment	
Assessment	Hour

Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6 C. Multiple choice questions- 10 questions- each question carrying 1 mark form the topics gross anatomy of Neck and Spinal Cord Maps- Mapping of important vessels of the neck and spinal cord by making charts (10marks) Short answer questions- 4 questions- each question carrying 5 marks from the topics osteology, myology, arthrology of Neck and Spinal cord skill assessment- 15 marks- For identification/surface projection of thyroid gland, parotid gland, pterion, common carotid artery, internal jugular vein, subclavian vein, jugular vein etc., (10marks) X-ray reading (5marks) or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	4
Semester No : 4	
Module 11 : طرف اعلیٰ کی ظاہری واطلاقی تشریح (Tarafe-e-A'ala ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Upper limbs.	
Module Learning Objectives (At the end of the module, the students should be able to) 1. Describe the gross and applied anatomy of upper limb, osteology of upper limb ,arthrology of upper limb and myology of upper limb. 2 Conduct presentation, group discussion and clinical examination regarding the gross and applied anatomy of upper limb, osteology of upper limb, arthrology of upper limb and myology of upper limb.	

3 Identify the bones, joints, muscles of the upper limb and clinical presentations of the upper limb .

Unit 1 طرف اعلیٰ (Taraf-e-A'ala) upper limb-I

11.1.1. عظام طرف اعلیٰ (Iza'am-e-Taraf-e-A'ala) Osteology of upper limb.

11.1.2. مفاصل طرف اعلیٰ (Mafasil -e- Taraf-e-A'ala) Arthrology of upper limb.

References: 1,2,3,4,5,6,7,8,9,10,14,16,17,19,21,22,23,24,25,26,27,28,29,30,31,33,38,42,43,45,54,55,57,60,61,63,100,104

3A	3B	3C	3D	3E	3F	3G
CO1,CO3	Describe the osteology of upper limb.	3	Lecture	CC	Know	L&GD,L_VC,D-M,L&PPT
CO1,CO3,CO7	Demonstrate the osteology of upper limb	5	Practical11.1	PSY-SET	Shows-how	D-M,D,L_VC,SDL,IBL
CO1,CO3,CO7	Demonstrate the arthrology of upper limb	5	Practical11.2	PSY-SET	Shows-how	D,SDL,IBL,D-M,FC
CO1,CO3,CO7	Illustrate the osteology of upper limbs.	7	Experiential-Learning11.1	CAN	Does	D,D-M,FC,IBL,SDL
CO1,CO3	Describe the arthrology of upper limb.	2	Lecture	CK	Know	D-M,BL,L&PPT,L_VC,L&GD
CO1,CO3,CO7	Illustrate the arthrology of upper limbs.	6	Experiential-Learning11.2	CAN	Does	SDL,D,IBL,TPW,FC

Unit 2 طرف اعلیٰ (Taraf-e-A'ala) upper limb-II

11.2.1. عضلات طرف اعلیٰ (Azla't-e- Taraf-e-A'ala) Myology of upper limb.

11.2.2. طرف اعلیٰ کی ظاہری واطلاقی تشریح (Taraf-e-A'ala ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Upper limbs.

References: 1,2,3,4,5,6,7,8,9,10,14,16,20,21,22,23,24,25,26,27,28,29,30,31,33,38,42,43,45,54,55,56,57,58,59,63,100,104

3A	3B	3C	3D	3E	3F	3G
CO1,CO3	Describe the gross anatomy and applied anatomy of upper limbs.	2	Lecture	CC	Knows-how	D-M,BL,L_VC,L&PPT ,L&GD
CO1,CO3, CO7	Demonstrate the myology of upper limbs.	5	Practical11.3	PSY-SET	Knows-how	D-M,SDL,D,IBL,L_VC
CO1,CO3, CO5,CO7	Demonstrate the gross and applied anatomy of upper limbs.	5	Practical11.4	PSY-SET	Knows-how	IBL,FC,SDL,D-M,D
CO1,CO3, CO7	Illustrate the myology of upper limbs.	7	Experiential-Learning11.3	CAN	Does	SDL,IBL,D,D-M,FC
CO1,CO3	Describe the Myology of Upper limbs	3	Lecture	CC	Know	L_VC,L&GD,D-M,L&PPT ,BL
CO1,CO3, CO4,CO7	Illustrate the gross and applied anatomy of upper limbs.	6	Experiential-Learning11.4	CAN	Does	SDL,D,IBL,FC,D-M

Practical Training Activity

Practical Training 11.1 Osteology of upper limb

Total Teaching Hours- 5 hrs

Activity 1- The teacher will discuss and demonstrate/prosect the osteology of upper limb using specimens/models. The teacher will enumerate the attachments and the related structures of the bones of upper limb.(2 hr)

Activity 2- The students will identify the individual bones of the upper limb by their characteristic features. The student will appreciate the special features such as groove, foramina, ridges, condyles etc in each bone. The student will relate the special features to the associated structures ligaments and tendons by dissection/ specimens/models. (3 hrs).

Practical Training 11.2 Arthrology of upper limb

Total Learning Hours- 5 hrs

Activity 1- The teacher will discuss and demonstrate/prosect the joints of upper limb emphasizing on the movements and the muscles producing these movements. The teacher will focus on the blood supply and nerve supply of the joints through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/Simulator/ Demonstration on Models/ 4D interactive Anatomical Models.(1hr)

Activity 2- The student will appreciate the different movements produced by joints of the upper limb and also interpret the muscles involved in the movements. The student will differentiate the various types of joint present in the upper limb. The student will also understand the different stages of ossification of the joints in the upper limb through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/Simulator/ Demonstration on Models/ 4D interactive Anatomical Models/ X-ray.(4hrs)

Practical Training 11.3 Myology of upper limbs.

Total learning hours : 5 hours

Activity 1-The teacher will discuss and demonstrate/prosect the muscles of the upper limb through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/ /3D Anatomy software. The teacher will demonstrate the changes in muscular movements in diseased conditions such as paralysis of upper limb, fractures/ dislocation of .(2hrs)

Activity 2-The student will familiarise himself with the muscles of upper limb and the movements produced by them in normal activities. The students will also familiarise himself with the muscles involved in painful conditions of joints of upper limb. The students will also familiarise himself with the compartments of muscles of upper limb. (3hrs)

Practical Training 11.4 Anatomy of upper limbs.

Total learning hours : 5 hours

Activity 1- The teacher will discuss and demonstrate/prosect the gross and applied anatomy of upper limbs emphasising on parts like axilla, cubital fossa, anatomical snuff box, thenar eminence etc., through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /3D Anatomy software.(2hr)

Activity 2- The students will perform practical activity related to the gross and applied anatomy of upper limbs by understanding the boundaries, contents of the parts like axilla, cubital fossa, anatomical snuff box, thenar eminence etc., through Dissection of cadaver/ artificial cadaver/ e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /3D Anatomy software.(3hrs)

Experiential Learning Activity

Experiential-Learning Learning 11.1: Osteology of upper limbs.

Total Learning hours: 7 hours

The student will perform the experiential activity by

Activity 1- The students will learn to identify the difference in features of different bones of the upper limbs. The student will identify and demonstrate the bony landmarks of upper limb such as acromial angle, spine of scapula etc.,(3 hrs)

Activity 2- The student will understand the stages of ossification. The student will give emphasis to identify the relevant clinical aspects such as carpal tunnel syndrome, Colles' fracture, displacement of head of humerus etc using specimens or through Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /Anatomy software/case presentation/Clinical Examination.(3 hrs)

Activity 3- The teacher will analyse the understanding of the student on the topic by Observation, inquiry, case scenarios, common clinical conditions etc., (1hr)

Experiential-Learning Learning 11.2: Arthrology of upper limbs.
Total Learning hours: 6 hours The student will perform the experiential activity by Activity 1- The student will learn to interpret the plain X-ray of Joints of upper limb. The student will try to understand the anatomical basis of clinical conditions such as fractures, dislocation, deformities on OPD/IPD patients with the help of X-rays or by using 3D models/ videos etc., (4hrs) Activity 2- With the help of radiology department the teacher will discuss and help in interpretation of X-ray. The student will practice X-Ray interpretations and its application using specimens/ models/videos.(1 hr) Activity 3- The teacher will guide the student in their learning modality .(1hr)
Experiential-Learning Learning 11.3: Myology of upper limbs.
Total Learning hours: 7 hours The student will perform the experiential activity by Activity 1- The student will enact/ perform the various movements and explain the anatomical basis for the same.(3hr) Activity 2- The student will visit OPD/IPD patients or observe relevant videos and discussed in group discussion/ presentation of clinically common conditions like rotatory cuff injury, Tennis elbow, ganglion etc., (2hr) Activity 3-The teacher will summarise/ enumerate the muscles in different regions of the upper limb and its relevance in normal / diseased conditions followed by the students (2 hrs)
Experiential-Learning Learning 11.4: Gross and applied anatomy of upper limbs.
Total Learning hours: 6 hours The student will perform the experiential activity by Activity 1- The student will identify the anatomical structures in plain radiogram of upper limbs in both antero-posterior and lateral views.(1 hr)

Activity 2-The student will study brachial plexus, its roots, cords, trunks, branches and supply on models, charts, maps. The student will learn to identify Erb`s paralysis, Klumpke`s paralysis, crutch paralysis, winging of scapula radial nerve injury, ulnar nerve injury and the anatomical basis for the same. The student will identify and demonstrate surface projection of cephalic and basilic veins, palpation of brachial artery, radial artery. (4 hr)

Activity 3- The teacher will guide the student in their learning modality .(1hr)

Modular Assessment

Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6 C. Model making- (10 marks) making models from the topics of osteology, myology, arthrology of upper limb Long answer questions- 1 questions- each question carrying 10 marks from the topics osteology, myology, arthrology of upper limb Short answer question- 1 question- each question carrying 5 marks from topics opics osteology, myology, arthrology of upper limb skill assessment- 5 marks For Demonstration/identification of important bony landmarks such as jugular notch, sternal angle, acromial angle, spine of scapula, inferior angle of scapula etc, the joints, movements and the muscles involved (10m) X-ray reading(10m) or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	4
Module 12 : طرف اسفل کی ظاہری واطلاقی تشریح : (Taraf-e-Asfal ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Lower limbs.	

Module Learning Objectives

(At the end of the module, the students should be able to)

1. Describe the gross and applied anatomy of lower limb, osteology of lower limb ,arthrology of lower limb and myology of lower limb.
- 2 Conduct presentation, group discussion and clinical examination regarding the gross and applied anatomy of upper limb, osteology of lower limb, arthrology of lower limb and myology of lower limb.
- 3 Identify the bones, joints, muscles of the lower limb and clinical presentations of the lower limb.

Unit 1 طرف أسفل (Taraf-e-Asfal) Lower limb-I

12.1.1. عظام طرف أسفل (Iza'm -e- Taraf-e- Asfal) Osteology of Lower limbs.

12.1.2. مفاصل طرف أسفل (Mafasil -e- Taraf-e-Asfal) Arthrology of Lower limbs.

References: 1,2,3,4,5,6,7,8,9,10,15,16,17,19,21,22,23,24,25,26,27,28,29,30,31,34,38,42,43,44,54

3A	3B	3C	3D	3E	3F	3G
CO1,CO3	Describe the osteology of lower limbs.	3	Lecture	CC	Know	D-M,L&GD,L&PPT ,BL,L_VC
CO1,CO3, CO7	Demonstrate the osteology of lower limbs.	5	Practical12.1	PSY- SET	Knows-how	IBL,D-M,FC,SDL,D
CO1,CO3, CO7	Illustrate the osteology of lower limbs.	6	Experiential- Learning12.1	CAN	Knows-how	D,D-M,SDL,IBL,FC
CO1,CO3, CO7	Demonstrate the arthrology of lower limbs.	5	Practical12.2	PSY- SET	Shows-how	D,D-M,IBL,SDL

CO1,CO3, CO7	Illustrate the arthrology of lower limbs	7	Experiential- Learning12.2	CAN	Knows-how	SDL,FC,D-M,PrBL,IBL
CO1,CO3	Describe the arthrology of lower limbs.	2	Lecture	CAP	Knows-how	L_VC,L&GD,BL,SY,D-M
CO1,CO3, CO7	Illustrate the myology of lower limbs.	6	Experiential- Learning12.3	CAN	Knows-how	FC,SDL,D,D-M,IBL

Unit 2 طرف اسفل (Taraf-e-Asfal) Lower limb-II

12.2.1. عضلات طرف اسفل (Azla't-e- Taraf-e-Asfal) Myology of Lower limbs.

12.2.2. طرف اسفل کی ظاہری واطلاقی تشریح (Taraf-e-Asfal ki Zahiri wa Atlaqi Tashreeh) Gross and Applied Anatomy of Lower limbs.

References: 1,2,3,4,5,6,7,8,9,10,15,16,20,21,22,23,24,25,26,27,28,29,30,31,34,38,42,43,45,54

3A	3B	3C	3D	3E	3F	3G
CO1,CO3, CO7	Demonstrate the myology of lower limbs.	5	Practical12.3	PSY- SET	Shows-how	D,D-M,SDL,FC
CO1,CO3, CO4,CO7	Demonstrate the gross and applied anatomy of lower limbs.	5	Practical12.4	PSY- SET	Shows-how	FC,IBL,SDL,D-M,D
CO1,CO3, CO4,CO7	Illustrate the gross and applied anatomy of lower limbs.	7	Experiential- Learning12.4	CAN	Does	X-Ray,D-M,IBL,SDL,FC
CO1,CO3	Describe the myology of lower limbs.	3	Lecture	CC	Know	D-M,BL,L_VC,L&PPT ,L&GD

CO1,CO3, CO4	Describe the gross anatomy and applied anatomy of lower limbs.	2	Lecture	CK	Knows-how	L&PPT ,L&GD,BL,D- M,L_VC
Practical Training Activity						
Practical Training 12.1 Osteology of lower limbs.						
Total Learning Hours-5 hrs Activity 1- The teacher will discuss and demonstrate/prosect the osteology of lower limb using specimens/models. The teacher will ennumerate the attachments and the related structures of the bones of lower limb.(2.5 hr) Activity 2- The students will identify the individual bones of the lower limb by their characteristic features. The student will appreciate the special features such as groove, foramina, ridges, condyles etc in each bone. The student will relate the special features to the associated structures like ligaments and tendons by dissection/ specimens/models.(2.5 hr).						
Practical Training 12.2 Arthrology of lower limbs.						
Total learning Hours- 5 hrs Activity 1- The teacher will discuss and demonstrate/prosect the joints of lower limb emphasismg on the movements and the muscles producing these movements. The teacher will focus on the blood supply and nerve supply of the joints through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/Simulator/ Demonstration on Models/ 4D interactive Anatomical Models.(1hr) Activity 2-The student will appreciate the different movements produced by joints of the lower limb and also interpret the muscles involved in the movements. The student will differntiate the various types of joint present in the lower limb. The student will also understand the different stages of ossification of the joints in the lower limb through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/Simulator/ Demonstration on Models/ 4D interactive Anatomical Models/ X-ray.(4hrs)						
Practical Training 12.3 Myology of lower limbs.						

Total Learning Hours- 5 hrs Activity 1- The teacher will discuss and demonstrate/prosect the muscles of the lower limb through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/ /3D Anatomy software. The teacher will demonstrate the changes in muscular movements in diseased conditions such as paralysis of lower limb, fractures/ dislocation .(2hrs) Activity 2- The student will familiarise himself with the muscles of lower limb and the movements produced by them in normal activities. The students will also familiarise himself with the muscles involved in painful conditions of joints of lower limb. The students will also familiarise himself with the compartments of muscles of lower limb.(3hrs)
Practical Training 12.4 Gross and applied anatomy of lower limbs.
Total Learning Hours- 5 hrs Activity 1- The teacher will discuss and demonstrate/prosect the gross and applied anatomy of lower limbs emphasising on parts like inguinal region, popliteal fossa,femoral triangle, adductor canal etc., (2hrs) Activity 2- The students will perform practical activity related to the gross and applied anatomy of upper limbs by understanding the boundaries, contents of the parts like inguinal region, popliteal fossa,femoral triangle, adductor canal etc through Dissection of cadaver/ artificial cadaver/ e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /3D Anatomy software.(3hrs)
Experiential Learning Activity
Experiential-Learning Learning 12.1: Osteology of lower limbs.
Total Learning Hours- 6 hrs Activity 1- The students will engage in the experiential learning by identifying the difference in features of different bones of the lower limbs. (2 hr) Activity 2 -The student will identify and demonstrate the bony landmarks of lower limb such as condyles, tuberosities, malleolus,spines etc. using specimens or through demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /Anatomy software/case presentation/Clinical Examination.The student will understand the stages of ossification.(2hrs)

Activity 3- The teacher will analyse the understanding of the student on the topic by Observation, inquiry, case scenarios, common clinical conditions etc (2hrs)
Experiential-Learning Learning 12.2: Arthrology of lower limbs
Total Learning Hours- 7 hrs Activity 1-The student will learn to interpret the plain X-ray of Joints of lower limb seen in anteroposterior and lateral views of various regions of lower limb. (1.5 hr) Activity 2- The student will try to understand the anatomical basis of clinical conditions such as fractures, dislocation, deformities on OPD/IPD patients with the help of X-rays or by using 3D models/ videos etc (4 hrs) Activity 3- With the help of radiology department the teacher will discuss and help in interpretation of X-ray.(1.5 hr)
Experiential-Learning Learning 12.3: Myology of lower limbs.
Total Learning Hours- 6 hrs Activity 1- The student will enact/ perform the various movements and explain the anatomical basis for the same. Also clinically common conditions like hamstring injury, achilles tendinitis, ganglion etc will be analysed in OPD/IPD patients or relevant videos and discussed in group discussion/ presentation. (3 hrs) Activity 2-The teacher will summarise/ enumerate the muscles in different regions of the upper limb and its relevance in normal / diseased conditions followed by the students activity(3 hrs)
Experiential-Learning Learning 12.4: Gross and applied anatomy of lower limbs.
Total Learning Hours- 7 hrs Activity 1- The student will study lumbar plexus, its roots, cords, trunks, branches and supply on models, charts, maps. (2 hr) Activity 2- The student will learn to identify foot drop, sciatica, Talipes equino valgu/varus sciatic nerve injury, popliteal nerve injury and the anatomical basis for the same. The student will identify and demonstrate palpation of femoral, popliteal, post tibial, ant tibial and dorsalis pedis blood vessels in a simulated environment. (2 hrs) Activity 3- The student will identify and demonstrate surface projection of femoral nerve, sciatic, tibial, common peroneal, deep peroneal nerve in a simulated environment. (1hrs)

Activity 4- The teacher will discuss and summarise the student activity of gross and applied anatomy of low limbs related to the brachial plexus, its roots, cords, trunks, branches and vascular supply.(2hrs)	
Modular Assessment	
Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6 C. Model making- (10 marks) making models from the topics of osteology, myology, arthrology of lower limb Long answer questions- 1 questions- each question carrying 10 marks from the topics osteology, myology, arthrology of lower limb Short Answer question- 1 question- each question carrying 5 marks from topics osteology, myology, arthrology of lower limb skill assessment- 5 marks For Demonstration/identification of structures such as femoral, popliteal, posterior tibial, anterior tibial, dorsalis pedis, mid inguinal point etc., the joints, movements and the muscles involved of the lower limb (10m) X-ray reading(10m) or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	4
Semester No : 5	
Module 13 : صدر کی ظاہری، جراحی و سریری تشریح (Sadr ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Thorax.	

Module Learning Objectives

(At the end of the module, the students should be able to)

1. Describe the gross anatomy of the thorax, osteology of thorax, arthrology of thorax and myology of thorax and Splanchnology of Thorax.
- 2 Conduct presentation, group discussion and clinical examination regarding the gross and applied anatomy of the thorax, osteology of thorax, arthrology of thorax and myology of thorax and Splanchnology of Thorax.
- 3 Identify the bones, joints, muscles, viscera of the thorax. and mediastinum and clinical presentation of the thorax.

Unit 1 صدر (Sadr) Thorax-I

13.1.1. عظام صدر (Iza'm -e-Sadr) Osteology of Thorax.

13.1.2. مفاصل صدر (Mafasil-e-Sadr) Arthrology of Thorax.

References: 1,2,3,4,5,6,7,8,9,10,13,16,17,18,19,21,23,24,25,26,27,28,29,30,31,33,37,38,42,43,44,45,46,54,55,56,57,59,60,61,63,100,104

3A	3B	3C	3D	3E	3F	3G
CO1,CO3	Describe the osteology of thorax.	2	Lecture	CC	Knows-how	L&PPT ,D-M,L_VC,L,BL
CO1,CO3, CO7	Illustrate the osteology of thorax.	5	Experiential- Learning13.1	CAN	Does	FC,SDL,D-M,IBL,D
CO1,CO3, CO7	Demonstrate the osteology of thorax.	4	Practical13.1	PSY- SET	Does	FC,D-M,X-Ray,SDL,IBL
CO1,CO3, CO7	Illustrate the arthrology of thorax.	4	Experiential- Learning13.2	CAN	Does	IBL,D-M,PT,SDL,D
CO1,CO3, CO7	Demonstrate the arthrology of thorax.	3	Practical13.2	PSY- SET	Shows-how	SDL,IBL,D,D-M,SIM

CO1,CO3	Describe the arthrology of thorax.	2	Lecture	CC	Knows-how	BL,D-M,L&GD,L_VC,L
CO1,CO3, CO7	Demonstrate the splanchnology of thorax.	4	Practical13.3	PSY- SET	Shows-how	IBL,SIM,D,SDL,D-M
Unit 2 صدر(Sadr) Thorax-II 13.2.1. عضلات صدر (Azlat-e-Sadr) Myology of Thorax. 13.2.2. احشاء صدر (Ahsh'a-e- Sadr) Splanchnology of Thorax. 13.2.3. صدر کی ظاہری، جراحی و سریری تشریح (Sadr ki Zahiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical anatomy of thorax. References: 1,2,3,4,5,6,7,8,9,10,13,16,20,21,22,24,25,26,27,28,29,30,31,33,37,38,42,43,44,45,46,54,55,56,57,63						
3A	3B	3C	3D	3E	3F	3G
CO1,CO3, CO4	Describe the gross anatomy, surgical and clinical anatomy of thorax.	2	Lecture	CC	Knows-how	L&GD,L,L_VC,BL,L&PP T
CO1,CO3, CO7	Illustrate the myology of thorax.	5	Experiential- Learning13.3	CAN	Does	IBL,SDL,SIM,D,D-M
CO1,CO3, CO7	Illustrate the splanchnology of thorax.	7	Experiential- Learning13.4	CAN	Does	D,SDL,D-M,IBL
CO1,CO3	Describe the Myology of Thorax.	2	Lecture	CC	Knows-how	L&GD,D-M,L&PPT ,L,BL
CO1,CO3	Demonstrate the myology of thorax.	5	Practical13.4	CAN	Shows-how	D,SDL,D-M,IBL,SIM

CO1,CO3	Describe the Splanchnology of Thorax.	2	Lecture	CC	Knows-how	FC,L,L_VC,L&GD,L&PP T
CO1,CO3, CO4,CO7	Demonstrate the gross anatomy, surgical and clinical anatomy of thorax.	4	Practical13.5	PSY- SET	Shows-how	IBL,SDL,D,SIM,D-M
CO1,CO3, CO4,CO7	Illustrate the gross anatomy, surgical and clinical anatomy of thorax.	5	Experiential- Learning13.5	CAN	Does	D-M,SIM,SDL,IBL,D
Practical Training Activity						
Practical Training 13.1 Osteology of thorax.						
Total Learning Hours- 4 hrs Activity 1- The teacher will discuss and demonstrate/prosect the osteology of thorax related to anatomical features of sternum, typical and atypical ribs, thoracic vertebrae with their attachments using models, specimens, charts etc.,(1 hr) Activity 2- The student will appreciate the characteristic features of the bones of the thorax and their associated structures such as structures passing in front of the neck of the first rib, structures lying behind manubrium sterni, events occurring at sternal angle etc., using dissection of cadaver/ artificial cadaver/ e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /3D Anatomy software. (3 hrs)						
Practical Training 13.2 Arthrology of thorax.						
Total Learning Hours- 3 hrs Activity 1-The teacher will discuss and demonstrate/prosect the arthrology of thorax related to sterno costal joints, sternovertebral joints, inter vertebral joints, sternoclavicular joints with their ligaments, muscles etc., using Dissection of cadaver/ artificial cadaver/ e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /3D Anatomy software. (1 hr)						

Activity 2- The student will classify the different types of joints in thorax. the student will identify the range and movements produced by the joints of thorax using dissection of cadaver/ artificial cadaver/ e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /3D Anatomy software. (2 hrs)
Practical Training 13.3 Splanchnology of thorax.
Total Learning Hours- 4 hrs Activity1- The teacher will demonstrate the location and features of visceral structures present in the thorax including mediastinum through models, simulators, dissection of cadaver/ artificial cadaver/ e-dissection. (1 hr) Activity2 -The student should identify and demonstrate surface markings of lines of plural reflection, lung borders and fissures, trachea, cardiac borders, apex beat and surface projections of valves of the heart through models, simulators, dissection of cadaver/ artificial cadaver/ e-dissection. (3 hrs)
Practical Training 13.4 Myology of thorax.
Total Learning Hours- 5 hrs Activity 1- The teacher will demonstrate the coverings of the thoracic wall such as skin, superficial fascia, deep fascia and the muscles through Dissection/e-dissection/ simulator and demonstrating using Specimen. (2 hrs) Activity 2- The student will identify and locate the intrinsic muscles of the thoracic wall and the extrinsic muscles of the thoracic wall. The student will try to understand the mechanism of respiration involving the joints and muscles through Dissection/e- dissection/ simulator and demonstrating using Specimen. (3 hrs)
Practical Training 13.5 Gross anatomy, surgical and clinical anatomy of thorax.
Total Learning Hours- 4 hrs Activity 1-The teacher will describe the arch of aorta its course, relations and branches, superior vena cava its formation, course, and its tributaries, pulmonary trunk its formation, course, branches and its tributaries, thoracic duct termination, tributaries, applied anatomy and relations. (1 hr) Activity 2- The student will trace the thoracic duct, azygous and hemi azygous vein, thoracic sympathetic trunks through Dissection of cadaver/ artificial cadaver/ e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/3D Anatomy software. (1 hr)

The teacher will assign the topic(s) or scenario(s) to the students. The students will perform practical activity related to the gross anatomy, surgical and clinical anatomy of thorax through Dissection of cadaver/ artificial cadaver/ e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/3D Anatomy software. (2 hrs)
Experiential Learning Activity
Experiential-Learning Learning 13.1: Osteology of thorax.
Total Learning Hours- 5 hrs Activity 1- The student will identify the structures seen on a plain X-Ray chest PA view. The student will learn to interpret the normal structures on a chest X-Ray. The student will learn counting of the ribs, costal margins, sub costal angles in simulated environment. The student will learn to identify mid sternal line anterior axillary line, posterior axillary line, mid axillary line. The student will appreciate the bony landmarks such as suprasternal notch, sternal angle, xiphoid process in simulated environment. (4 hrs) Activity 2- The teacher will guide the students in understanding, identifying, locating the bony landmarks of thorax. (1 hr)
Experiential-Learning Learning 13.2: Arthrology of thorax.
Total Learning Hours- 4 hrs Activity 1- The student will identify the clinically important landmarks such as mid sternal line for sternotomy, 3rd intercostal space for access to trachea, 5th to 7th intercostal space for access to oesophagus and lower lobes of lungs etc., in models, simulator, videos. (3 hrs) Activity 2- The teacher will monitor and guide the student in experiential learning activities. (1 hr)
Experiential-Learning Learning 13.3: Myology of thorax.
Total Learning Hours- 5 hrs Activity 1- The student will learn to locate the site for paracentesis thoracis, coarctation of aorta, locate the site for thoracotomy, intercostal nerve block in a model, simulators, 3D Anatomy software and 4D interactive Anatomical Models. (4 hrs)

Activity 2- The teacher will monitor and guide in student activity. (1 hr)	
Experiential-Learning Learning 13.4: Splanchnology of thorax.	
Total Learning Hours- 7 hrs Activity 1-The student will learn to appreciate the radiological appearance of plural effusion, hilar shadow, cardiac shadow, retrosternal shadow, retro cardiac shadow etc., in chest X-ray in department of radiology. The student will identify the sites of extensions of the plura beyond the thoracic cage, identify the sites of auscultation in simulated environment. (5 hr) Activity 2- The teacher will emphasize the practical importance to appreciate the sites on thorax helpful in diagnosis in diseases. The teacher will guide the student in learning the precise sites of auscultation in simulated environment. (2 hrs)	
Experiential-Learning Learning 13.5: Gross anatomy, surgical and clinical anatomy of thorax.	
Total Learning Hours- 5 hrs Activity 1-The student will identify the aortic knuckle in chest X-Ray. The student will identify and locate the site for pulmonary artery catheterization, sites of obstruction of superior vena cava, site for thoraco-abdominal sympathectomy, sites of referred pain of diaphragm through Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiogy/ case presentation/Clinical Examination. (4 hrs) Activity 2- The teacher will emphasize on the clinical importance of the gross anatomy, surgical and clinical anatomy of thorax. the teacher will monitor and guide the student in experiential learning activity. (1 hr)	
Modular Assessment	
Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6 C.	4

Clinical scenario - (10 marks) to identify the auscultatory points, of cardiovascular system and Respiratory system Long answer questions- 1 question , each question carrying 10 marks each from the topics osteology, myology, arthrology, splanchnology of thorax Short answer questions- 2 questions each question carrying 5 marks each from the topics osteology, myology, arthrology, splanchnology of thorax skill assessment- 5 marks For Demonstration/surface marking of lines of structures such as pleural reflection, lung borders and fissures, trachea, heart borders, apex beat, etc (5 m) X-ray reading (5marks) charts- (5 marks) making charts of major vessels of thorax or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	
Module 14 : بطن کی ظاہری، جراحی و سریری تشریح (Batan ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Abdomen. Module Learning Objectives (At the end of the module, the students should be able to) 1. Describe the gross anatomy, Surgical and Clinical Anatomy of Abdomen, Osteology of Lumbar spine, Arthrology of Lumbar region, Myology of Abdominal wall, Anatomy of Inguinal Canal, Splanchnology of Adomen. 2 Conduct presentation, group discussion and clinical examination regarding the gross anatomy, Surgical and Clinical Anatomy of Abdomen, Osteology of Lumbar spine, Arthrology of Lumbar region, Myology of Abdominal wall, Anatomy of Inguinal Canal, Splanchnology of Adomen.	

3 Identify the bones, joints, muscles, viscera of the abdomen and clinical presentation of abdomen.

Unit 1 بطن (Batan) Abdomen-I

14.1.1. قطن کے سنان کی تشریح (Qutn ke sanasin ki Tashreeh) Osteology of Lumbar spine.

14.1.2. مفاصل قطن (Mafasil-e-Qutn) Arthrology of Lumbar region.

14.1.3. عضلات دیوار بطن (Azlat-e- Diwar-e-Batan) Myology of Abdominal wall.

References: 1,2,3,4,5,6,7,8,9,10,12,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,34,37,38,42,43,44,45,46,54,56,57,58,60,61,63,102,104,105

3A	3B	3C	3D	3E	3F	3G
CO1,CO3	Describe the osteology of lumbar spine	2	Lecture	CC	Knows-how	L&PPT ,L,L_VC,FC,D
CO1,CO3, CO7	Demonstrate the osteology of lumbar spine.	3	Practical14.1	PSY- GUD	Shows-how	SDL,D-M,IBL,SIM,D
CO1,CO3, CO7	Illustrate the osteology of lumbar spine	4	Experiential- Learning14.1	CAN	Does	CBL,SIM,D,IBL,SDL
CO1,CO3, CO7	Demonstrate the arthrology of lumbar spine.	3	Practical14.2	PSY- GUD	Shows-how	SIM,SDL,IBL,D-M,D
CO1,CO3	Illustrate the arthrology of lumbar spine	4	Experiential- Learning14.2	PSY- SET	Does	SIM,D-M
CO1,CO3, CO7	Demonstrate the myology of abdomen.	4	Practical14.3	PSY- GUD	Shows-how	IBL,D,SIM,SDL,D-M

CO1,CO3	Describe the arthrology of lumbar spine.	1	Lecture	CC	Knows-how	L,FC,L_VC,L&GD,L&PPT
CO1,CO3,CO7	Demonstrate the anatomy of inguinal region.	3	Practical14.4	PSY-GUD	Shows-how	D-M,D,SIM,SDL,IBL
CO1,CO3,CO7	Illustrate the myology of abdomen.	5	Experiential-Learning14.3	CAN	Does	D,D-M,L_VC,SDL,FC
CO1,CO3	Describe the myology of abdomen.	2	Lecture	CC	Knows-how	BL,L&GD,L,L&PPT,L_VC

Unit 2 بطن (Batan) Abdomen-II

14.2.1. قناة آربي کی تشریح (Qan'at-e-Urbi ki Tashreeh) Anatomy of Inguinal Canal.

14.2.2. احشاء بطن (Ahsh'a-e-batan) Splanchnology of Abdomen.

14.2.3. بطن کی ظاہری، جراحی و سریری تشریح (Batan ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Abdomen.

References: 1,2,3,4,5,6,7,8,9,10,16,22,24,25,26,27,28,29,30,31,37,38,42,43,44,45,46,54,55,56,57,58,59,63,102,104

3A	3B	3C	3D	3E	3F	3G
CO1,CO3,CO7	Illustrate the anatomy of inguinal region.	3	Experiential-Learning14.4	CAN	Does	IBL,D-M,SDL,SIM,D
CO1,CO3,CO7	Demonstrate the splanchnology of abdomen.	4	Practical14.5	PSY-SET	Shows-how	SIM,IBL,SDL,D-M,D
CO1,CO3,CO4,CO7	Illustrate the gross, surgical and clinical anatomy of abdomen.	4	Experiential-Learning14.5	PSY-SET	Does	SIM,SDL,D-M,D,IBL

CO1,CO3, CO4,CO7	Demonstrate the gross, surgical and clinical anatomy of abdomen.	3	Practical14.6	PSY- SET	Does	IBL,FC,D-M,SDL,D
CO1,CO3, CO7	Illustrate the splanchnology of abdomen.	6	Experiential- Learning14.6	CAN	Does	D-M,D,SDL,IBL
CO1,CO3	Describe the anatomy of inguinal region.	1	Lecture	CC	Knows-how	BL,L&PPT ,FC,L,L&GD
CO1,CO3	Describe the splanchnology of abdomen.	2	Lecture	PSY- MEC	Knows-how	L&PPT ,FC,L&GD,L,BL
CO1,CO3, CO4	Describe the gross, surgical and clinical anatomy of abdomen.	2	Lecture	CAP	Knows-how	L_VC,FC,L,L&PPT ,L&GD

Practical Training Activity

Practical Training 14.1 Osteology of lumbar spine.

Total Learning hours: 3 hours

Activity 1-The teacher will discuss and demonstrate the different bones present in the lumbar region using specimens/models/virtual models of bones. The important bony landmarks of the bones of lumbar region will be identified and their relevance will be emphasised.(1hrs)

Activity 2-The students will identify the individual bones of lumbar region by their characteristic features(30mins)

Activity 3-The student will appreciate the special features such as groove, foramina, processes and their attachments etc in each bone.(30mins)

Activity 4-The student will relate the bones and special features to the associated structures.(30mins)

Activity 5-The blood vessels and nerves related to osteology of lumbar will be examined(30mins)

The above activities will be done using specimens/models/virtual models of bones

Practical Training 14.2 Arthrology of lumbar spine.

Total Learning hours: 3 hours

Activity 1-The teacher will discuss and demonstrate/prosect the joints of lumbar region emphasising on the movements and the muscles producing these movements. The teacher will focus on the blood supply and nerve supply of the joints (45mins)

Activity 2-The student will appreciate the different movements produced by joints of the lumbar region and also interpret the muscles involved in the movements.(45mins)

Activity 3-The student will differentiate the various types of joint present in the lumbar region.(45mins)

Activity 4-The student will also understand the blood supply, nerve supply and the related structures of the joints of lumbar spine (45mins)

The above activities will be done through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/Simulator/ Demonstration on Models/ 4D interactive Anatomical Models

Practical Training 14.3 Myology of abdominal wall.

Total Learning hours: 4 hours

Activity 1-The teacher will discuss and demonstrate/prosect the muscles of abdominal walls. The teacher will demonstrate the muscles of anterior abdominal, posterior abdominal walls and the associated structures.umbilicus, fascia, inguinal region.(1hr)

Activity 2-The student will demonstrate the surface marking of regions of abdomen,superficial inguinal ring,deep inguinal ring,McBurney's point, renal angle, Murphy's point etc(3hrs)

Practical Training 14.4 Anatomy of inguinal region

Total Learning hours: 3 hours

Activity 1-The teacher will discuss and demonstrate/prosect the anatomy of inguinal region related to inguinal canal,femoral canal, inguinal triangle,femoral sheath etc (1hr)

Activity 2 -The student will identify, locate the boundaries, contents of inguinal canal,femoral canal, inguinal triangle,femoral sheath etc(2hr)

The above activities will be done through simulated environment/ Dissection of cadaver/ artificial cadaver/ e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /3D Anatomy software.
Practical Training 14.5 Splanchnology of abdomen.
Total Learning hours: 4 hours Activity 1-The teacher will discuss and demonstrate/prosect the visceral structures of abdomen including the glands, blood vessels, nerves, lymphatics.(1hrs) Activity 2-The student will trace the course of blood vessels, nerves, lymphatics and their branches in the abdomen region(1hr30mns). Activity 3-The student will note the placement of structures in abdomen (1hr30mns) The above activities will be performed through simulated environment/Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /3D Anatomy software.
Practical Training 14.6 Gross, surgical and clinical anatomy of abdomen.
Total Learning Hours:3:00 Hours Activity1: The teacher will discuss and demonstrate/prosect the gross, surgical and clinical anatomy of abdomen using plain and special radiographs.(1hr) Activity2: The student will describe and identify features of plain X-ray abdomen, special radiographs of abdominopelvic region such as barium meal, barium enema, cholecystography etc(2hrs)
Experiential Learning Activity
Experiential-Learning Learning 14.1: Osteology of lumbar spine
Total Learning hours: 4 hours Activity 1-The students will engage in the experiential learning by identifying the difference in features of typical and atypical bones of lumbar region.(1hr30mins) Activity 2-The student will give emphasis to the relevant clinical aspects such as low back ache, loss of normal lordosis etc based on attachments and relations(1hr30mins)

Activity 3-The teacher will analyse the understanding of the student on the osteology of lumbar region by Observation, inquiry, case scenarios, common clinical conditions etc (1hrs) The above activities will be performed using specimens or through Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /Anatomy software/case presentation/Clinical Examination.
Experiential-Learning Learning 14.2: Arthrology of lumbar spine
Total Learning hours: 4 hours Activity 1-The student will learn to interpret the normal vertebral column, costovertebral joints, intervertebral joints, intervertebral disc etc spaces etc on a plain X-ray in the radiology department and using CT and MRI images where ever necessary. The student will try to understand the anatomical basis of clinical conditions such as Low backache, disc prolapse etc on OPD/IPD patients or by using models/ videos etc (3hrs) Activity 2- The teacher will discuss and help in interpretation of X-ray.(1hr)
Experiential-Learning Learning 14.3: Myology of abdomen.
Total Learning hours: 5 hours Activity 1-The teacher will recall the muscles in different regions of the abdomen and their relevance in movements of the trunk.(1hr) Activity 2-The student will enact/ perform the various movements and explain the anatomical basis for the same.(1hr30mins) Activity 3-The student will analyse the clinically common conditions restricting and painful movements of the trunk will be studied involving the joint and muscles of trunk region.(1hr30mins) Activity 4-The student will notice the congenital conditions such as congenital hernia, urinary and fecal fistula etc (1hrs) The above activity will be done in simulated environment/ 3D models/ Maniquins/ etc
Experiential-Learning Learning 14.4: Anatomy of inguinal region.
Total Learning hours: 3 hours

Activity 1-The student will appreciate the anatomical basis of femoral hernia and its types and differences, the spermatic cord and its coverings, femoral sheath in simulated environment/ models/ videos (2hrs) Activity 2-The teacher in association with department of jarahat monitor and mentor the student in their experiential learning activity.(1 hr)	
Experiential-Learning Learning 14.5: Gross, surgical and clinical anatomy of abdomen.	
Total Learning hours: 4 hours Activity 1-The student will identify and demonstrate the anatomical basis of surgical incisions in abdomen, caput medusae, cremasteric reflex, paramedian incision. simulated environment/ models/ clinical cases(1 hr30mins) Activity 2-The student will demonstrate the anatomical basis and role of ERCP, CT abdomen, MRI, arteriography in radiodiagnosis of abdomen in radiology department/ simulated environment, case presentation/ videos(1 hr30mins) Activity 3 -The teacher guide and monitor the student in the experiential activity(1 hr)	
Experiential-Learning Learning 14.6: Splanchnology of abdomen.	
Total Learning hours: 6 hours Activity 1-The student will learn to palpate the structures of the abdomen.(1 hr30mins) Activity 2-the student will demonstrate the surface projections of stomach, liver, fundus of gall bladder, spleen, duodenum, pancreas, ileocecal junction, kidneys and root of mesentery(1 hr30mins) Activity 3-The student will learn to appreciate common clinical swellings and enlargements such as lymphadenopathy, hernia, enlargement of organs etc.(1 hr) Activity 4- The student will understand the Gut-brain axis through maps(30mins) Activity 4-The teacher will guide the students in association with department of jarahat and emergency medicine.(1 hr30mins)	
Modular Assessment	
Assessment	Hour

Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6 C. Clinical scenario - (10 marks) to identify the planes of abdomen, regions of abdomen, palpation and auscultatory points of abdomen and important clinical and surgical landmarks of abdomen. Long answer questions- 1 question-each question carrying 10 marks from the topics of Osteology of lumbar spine, arthrology of lumbar spine, myology of abdominal walls, anatomy of inguinal canal and splanchnology of abdomen Short answer questions- 2 questions-each question carrying 5 marks from the topics Osteology of lumbar spine, arthrology of lumbar spine, myology of abdominal walls, anatomy of inguinal canal and splanchnology of abdomen Skill assessment- 10 marks- For Demonstration/surface projection of structures such as stomach, liver, fundus of gall bladder, spleen, duodenum, pancreas, ileocecal junction etc (5 marks) X-ray reading (5 marks) Short Video making- Explaining the anatomical basis of common clinical conditions like low back ache, pain abdomen and its radiating area in different diseases etc (10 marks) or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	4
Semester No : 6	
Module 15 : خارجی اعضائے تناسلیہ (Aanah wa ujan ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Pelvis, Perineum, مردانہ و زنانہ کی تشریح (Kharji Aaz'a-e- Tanasuliyah, Mardanah wa zananah ki Tashreeh) Anatomy of Male and female external genitalia.	

Module Learning Objectives

(At the end of the module, the students should be able to)

1. Describe the Gross anatomy, Surgical and Clinical Anatomy of Pelvis and perineum, Osteology of Pelvis and perineum, Arthrology of Pelvis and perineum, Myology of Pelvis and perineum, Splanchnology of Pelvis and perineum and anatomy of male and female external genitalia.
- 2 Conduct presentation, group discussion and clinical examination regarding the gross anatomy, Surgical and Clinical Anatomy of Pelvis and perineum, Osteology of Pelvis and perineum, Arthrology of Pelvis and perineum, Myology of Pelvis and perineum, Splanchnology of Pelvis and perineum and anatomy of male and female genitalia.
- 3 Identify the bones, joints, muscles, viscera of the Pelvis and perineum and clinical presentation of Pelvis and perineum and anatomy of male and female genitalia

Unit 1 نظام تناسلی (Nizam-e-Tanasuliya) Reproductive System-I

15.1.1. عظام عانہ و بجان (Izam_e Aanah wa ujan) Osteology of Pelvis and perineum.

15.1.2. مفاصل عانہ و بجان (Mafasil-e- Aanah wa ujan) Arthrology of Pelvis and perineum.

15.1.3. عضلات عانہ و بجان (Azlat-e- Aanah wa ujan) Myology of Pelvis and perineum.

References: 1,2,3,4,5,6,7,8,9,10,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,37,38,42,43,45,54,56,57,60,61,63

3A	3B	3C	3D	3E	3F	3G
CO1,CO3	Describe the osteology of pelvis and perineum.	2	Lecture	CC	Knows-how	FC,L&GD,L&PPT ,BL,L_VC
CO1,CO3, CO7	Demonstrate the osteology of Pelvis and perineum.	3	Practical15.1	PSY- SET	Shows-how	IBL,D-M,SIM,SDL,D
CO1,CO3, CO7	Illustrate the osteology of pelvis and perineum.	5	Experiential- Learning15.1	CAN	Does	D,D-M,SDL,SIM,IBL

CO1,CO3, CO7	Demonstrate the arthrology of Pelvis and perineum.	2	Practical15.2	PSY- GUD	Shows-how	SDL,SIM,D,D-M,IBL
CO1,CO3, CO7	Illustrate the arthrology of Pelvis and perineum.	3	Experiential- Learning15.2	CAN	Does	SIM,D-M,IBL,SDL,D
CO1,CO3, CO7	Demonstrate the myology of Pelvis and perineum.	4	Practical15.3	PSY- GUD	Shows-how	SIM,D-M,SDL,IBL,D
CO1,CO3	Describe the arthrology of Pelvis and perineum.	1	Lecture	CC	Knows-how	FC,L&PPT ,BL,L&GD,L
CO1,CO3	Describe the myology of Pelvis and perineum.	2	Lecture	CC	Knows-how	BL,L_VC,FC,L&GD,L&P PT
CO1,CO3, CO7	Illustrate the myology of pelvis and perineum.	4	Experiential- Learning15.3	CAN	Does	SIM,SDL,D-M,D

Unit 2 نظام تناسلیہ (Nizam-e-Tanasuliya) Reproductive System-II

15.2.1. احشاء عانہ و عجان (Ahsh'a-e- Tashreeh-e- Aanah wa ujan) Splanchnology of Pelvis and perineum.

15.2.2. خارجی اعضائے تناسلیہ مردانہ و زنہ کی تشریح (Kharji Aaz'a-e- Tanasuliyah, Mardanah wa zananah ki Tashreeh) Anatomy of Male and female external genitalia.

15.2.3. کمانہ و عجان کی ظاہری، جراحی و سریری تشریح (Aanah wa ujan ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Pelvis, Perineum.

References: 1,2,3,4,5,6,7,8,9,10,16,21,22,24,25,26,27,28,29,30,31,37,38,42,43,45,54,55,56,57,58,59,62,63,64

3A	3B	3C	3D	3E	3F	3G
CO1,CO3, CO5,CO7	Illustrate the gross, surgical and clinical anatomy of Pelvis and perineum.	3	Experiential- Learning15.4	CAN	Does	SIM,D-M,IBL,SDL,D

CO1,CO3, CO7	Illustrate the splanchnology of Pelvis and perineum.	7	Experiential- Learning15.5	CAN	Does	D-M,D,SIM,SDL,IBL
CO1,CO3, CO7	Demonstrate the anatomy of male and female, internal and external genitalia.	3	Practical15.4	PSY- GUD	Shows-how	SIM,D-M,D,IBL,SDL
CO1,CO3, CO7	Demonstrate the splanchnology of Pelvis and perineum.	5	Practical15.5	PSY- GUD	Shows-how	D-M,IBL,D,SIM,SDL
CO1,CO3, CO7	Illustrate the anatomy of male and female, internal and external genitalia.	4	Experiential- Learning15.6	CAN	Does	PrBL,SDL,D,D-M,IBL
CO1,CO3	Describe the splanchnology of Pelvis and perineum.	2	Lecture	CC	Knows-how	L,FC,L&PPT ,L_VC,L&GD
CO1,CO3, CO5,CO7	Demonstrate the gross,surgical and clinical anatomy of Pelvis and perineum.	3	Practical15.6	PSY- GUD	Shows-how	SDL,D-M,D,IBL
CO1,CO3	Describe the anatomy of male and female, internal and external genital organs.	1	Lecture	CC	Knows-how	L,L&GD,L_VC,L&PPT ,FC
CO1,CO3, CO4	Describe the gross, surgical and clinical anatomy of Pelvis and perineum.	2	Lecture	CC	Knows-how	BL,L&PPT ,L,L_VC,L&GD
Practical Training Activity						
Practical Training 15.1 Osteology of Pelvis and perineum.						
Total Learning hours: 3 hours						

Activity 1-The teacher will discuss and demonstrate the different bones present in the pelvis and perineum using specimens/models/virtual models of bones.
(30mins)

Activity 2-The important bony landmarks of the bones of pelvis and perineum will be identified and their relevance will be emphasised.(1hrs)

Activity 3-The students will identify the individual bones of pelvis and perineum by their characteristic features.(30mins)

Activity 4 The student will appreciate the special features such as groove, foramina, processes and their attachments etc in each bone.(30mins)

Activity 5 The student will relate the bones and special features to the associated structures. The blood vessels and nerves related to osteology of pelvis and perineum(30mins)

The above activity will be done using specimens/models/virtual models of bones(30 mins)

Practical Training 15.2 Arthrology of Pelvis and perineum.

Total Learning hours:2 hours

Activity 1-The teacher will discuss and demonstrate/prosect the joints of Pelvis and perineum. emphasising on the movements and the muscles producing these movements. The teacher will focus on the blood supply and nerve supply of the joints through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/Simulator/ Demonstration on Models/ 4D interactive Anatomical Models.(30mins)

Activity 2-The student will appreciate the different movements produced by joints of the Pelvis and perineum. and also interpret the muscles involved in the movements.(30mins)

Activity 3-The student will differentiate the various types of joint present in the Pelvis and perineum.(30mins).

Activity 4-The student will also understand the blood supply, nerve supply and the related structures of the joints of Pelvis and perineum (30mins)

The above practical activity will be done using Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/Simulator/ Demonstration on Models/ 4D interactive Anatomical Models(30mins)

Practical Training 15.3 Myology of Pelvis and perineum.

Total Learning hours:4 hours

The teacher will discuss and demonstrate/prosect the muscles of Pelvis and perineum.(1 hr)

The teacher will demonstrate the walls of the pelvis and their formation muscles of anterior abdominal, posterior abdominal walls(1 hr)

The teacher will demonstrate the associated structures.umbilicus, fascia, inguinal region,(1hr)

The student will demonstrate the important features like pelvic diaphragm, pelvic fascia, peritoneum of the pelvis etc (1 hr)

The above activity will be done using Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/ /3D Anatomy software.

Practical Training 15.4 Anatomy of male and female, internal and external genitalia.

Total Learning hours: 3 hours

Activity 1-The teacher will guide the students in learning and interpreting the anatomy of male and female genitalia through Dissection of cadaver/ artificial cadaver/ e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /3D Anatomy software/ Virtual reality. (1 hr30 mins)

Activity 2-The student will learn the anatomy of male and female genitalia, their structures, external features, parts, relations, vascular supply, course, branches and tributaries of blood vessels through Dissection of cadaver/ artificial cadaver/ e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /3D Anatomy software/ Virtual reality. (1 hr30 mins)

Practical Training 15.5 Splanchnology of Pelvis and perineum.

Total Learning hours: 5 hours

Activity 1-The teacher will discuss and demonstrate/prosect of the visceral structures of Pelvis and perineum including the glands, blood vessels, nerves, lymphatics through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /3D Anatomy software.(1hrs30mins)

Activity 2-The student will identify the location, external features, relations,(1hrs30mins)

Activity 3-The student will trace the course of blood vessels, nerves, lymphatics and their branches in the Pelvis and perineum.(1hr)

Activity 4-The student will note the placement of structures in Pelvis and perineum(1hr) The above activity will be done through Dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /3D Anatomy softwarer.
Practical Training 15.6 Gross,surgical and clinical anatomy of Pelvis and perineum.
Total Learning hours: 3 hours The teacher will discuss and demonstrate the gross, surgical and clinical anatomy of Pelvis and perineum through plain and special radiographs / models/ specimens/ vides.(1hr) The student will learn to identify features impotant clinical and surgical landmarks on models/ specimens/simulated environment(1hr) The student will learn to identify features of plain X-ray pelvis, pyelography, barium enema etc., (1hrs)
Experiential Learning Activity
Experiential-Learning Learning 15.1: Osteology of Pelvis and perineum.
Total Learning hours:5 hours The students will engage in the experiential learning by identifying the difference in features of bones of Pelvis and perineum .(1hr) The student will give detailed demonsration to the differnces in male and female pelvis, obstetric pelvic measurements,(90mins) The students will engage in the experiential learning the boundaries and divisions of perinneum etc (90mins) The teacher will analyse the understanding of the student on the osteology of Pelvis and perineum by Observation, inquiry, case scenarios, common clinical conditions etc (1hrs) The above activity will be done usingspecimens or through Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /Anatomy software/case presentation/Clinical Examination.
Experiential-Learning Learning 15.2: Arthrology of Pelvis and perineum.

Total Learning hours:3 hours Activity 1-The student will learn to interpret the normal joints of Pelvis and perineum , spaces etc on a plain X-ray(1hr) Activity 2-The student will understand the anatomical basis of clinical conditions such as fracture of pelvis etc on OPD/IPD patients or by using models/ videos etc (1hrs) Activity 3-The teacher will discuss and help in interpretation of X-ray.(1hr)
Experiential-Learning Learning 15.3: Myology of pelvis and perineum.
Total Learning hours:4 hours Activity 1-The teacher will recall the muscles in different regions of Pelvis and perineum their relevance in obstetrics and surgery.(1hr) Activity 2-The student will analyse and present the anatomical basis in obstetrics and surgery. procedures by making short videos(1hr) Activity 3-The student will analyse and explain the clinically common painful conditions of the Pelvis and perineum in simulated environment(1hr) Activity 4-The student will notice the structures within the perineal pouches both in males and females using manikins/ models/ specimens etc (1hrs)
Experiential-Learning Learning 15.4: Gross, surgical and clinical anatomy of Pelvis and perineum
Total Learning hours:3 hours The student will identify the surgically important landmarks of the pelvis and perineum(1hr) The student will do the surface projection of sacral plexus, and its branches,(30mins) The student will present the anatomical basis of injuries/damages during clinical conditions such as episiotomy, ischiorectal abscess, pudendal nerve block, suprapubic aspiration in simulated environment (1hr) The teacher will guide, monitor the experiential learning activity of the student. (30 minutes)
Experiential-Learning Learning 15.5: Splanchnology of Pelvis and perineum.
Total Learning hours:7 hours Activity 1-The student will learn to identify the structures, relations, vascular supply of the Pelvis and perineum.(2hrs)

Activity 2-The student will demonstrate the surface projections of urinary bladder, urethra, sigmoid colon, rectum, anal canal (2hrs) Activity 3-The student will evaluate the anatomical basis of colonoscopy/proctoscopy etc., (2hrs) Activity 4-he teacher will guide followed by inquiry about the utility and need of the experiential activity. (1hrs) The above activity will be done through dissection of cadaver/ artificial cadaver/ online e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/Analysis of Radiographs /3D Anatomy software	
Experiential-Learning Learning 15.6: Anatomy of male and female, internal and external genitalia.	
Total Learning hours: 4 hours Activity 1-The student will learn the anatomical basis of per rectal examination, per vaginal examination, hysterosalpingography, pyelography .(1 hr 30 mins) Activity 2-The student will learn the anatomical basis of common clinical conditions such as prolapse of uterus, culdocentesis, tubectomy, BPH, vasectomy etc., (1 hr 30 mins) Activity 3-The teacher will guide, monitor the student in his experiential activity (1 hr)	
Modular Assessment	
Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6 C. Long answer questions- 1 question , each question carrying 10 marks from the topics osteology of pelvis and perineum, arthrology of pelvis and perineum, myology of pelvis and perineum, splanchnology of pelvis and perineum and anatomy of male and female internal and external genitalia. Short answer questions- 2 questions, each question carrying 5 marks from the topics osteology of pelvis and perineum, arthrology of pelvis and perineum, myology of pelvis and perineum, splanchnology of pelvis and perineum and anatomy of male and female genitalia.	4

Skill assessment - 10 marks For Demonstration on the topics of boundaries of pelvic inlet, pelvic outlet, perineum, obstetric pelvic measurements, walls of pelvis, fossa and pouches of perineum , clinically and surgically important landmarks of pelvis and perinium etc (10 marks) Viva voce on the topics of boundaries of pelvic inlet, pelvic outlet, perineum, obstetric pelvic measurements, walls of pelvis, fossa and pouches of perineum etc (10 marks) Short Video making- Explaining the anatomical basis of common clinical conditions like pain in the pelvis and its radiating area in different diseases etc (10 marks) or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	
Module 16 : عمومی تشریح بدن (Umoomi Tashreeh-e-Badan) General Anatomy of Human Body and cadaver care یونانی تدابیر کے لیے اطلاقی تشریح (Unani Tadabeer ke liye itlaqi tashreeh) Applied Anatomy for Unani Procedural Management.	
Module Learning Objectives (At the end of the module, the students should be able to) 1. Describe the general anatomy of the human body, applied anatomy for unani procedure of treatment/ management, different embalming procedures, embalming of cadaver, preservation of cadaver and specimen and museum preparation. 2 Conduct the presentation, group discussion/doing procedure, regarding the general anatomy of the body, applied anatomy for unani procedural management and different embalming procedures, embalming of cadaver, preservation of cadaver and specimen, museum preparation 3 Identify the general anatomy of the body, appropriate anatomical sites for unani procedure of treatment/ management, embalming procedures of different type, embalmed cadaver, preservation of cadaver and specimen, techniques of museum preparation and exhibition.	

Unit 1 عمومی تشريح بدن (Umoomi Tashreeh-e-Badan) General Anatomy of Human Body يونانی تدابير کے لیے اطلاقی تشريح (Unani Tadabeer ke liye itlaqi tashreeh) Applied Anatomy for Unani Procedural Management, مختلف تخنيطي اعمال کا بيان (Mukhtalif Tahneeti Ama'al ka bayan) Descriptions Of Different Embalming Procedures.

16.1.1. عمومی تشريح بدن (Umoomi Tashreeh-e-Badan) General Anatomy of Human Body.

16.1.2. يونانی تدابير کے لیے اطلاقی تشريح (Unani Tadabeer ke liye itlaqi tashreeh) Applied Anatomy for Unani Procedural Management.

16.1.3. مختلف تخنيطي اعمال کا بيان (Mukhtalif Tahneeti Ama'al ka bayan) Descriptions Of Different Embalming Procedures.

References: 1,2,3,4,5,6,7,8,9,10,16,17,18,21,22,23,24,25,26,27,28,29,30,31,32,38,39,40,41,47,48,49,50,51,52,53

3A	3B	3C	3D	3E	3F	3G
CO1,CO3, CO7	Demonstrate the General Anatomy of Human Body	5	Practical16.1	PSY- GUD	Shows-how	SDL,SIM,IBL,D,D-M
CO1,CO3, CO5,CO7	Illustrate the Applied Anatomy for Unani Procedures of treatment/Management.	5	Experiential- Learning16.1	CAN	Does	SIM,IBL,D,D-M,SDL
CO1,CO3, CO5,CO7	Demonstrate the Applied Anatomy for Unani Procedures and its treatment/Management.	4	Practical16.2	PSY- GUD	Shows-how	SDL,D,D-M,SIM,IBL
CO1,CO3, CO7	Illustrate the Different Embalming Procedures in detail.	5	Experiential- Learning16.2	AFT- SET	Does	DL,D,IBL,SIM,SDL
CO1,CO3, CO7	Demonstrate the Different Embalming Procedures in detail.	4	Practical16.3	PSY- GUD	Shows-how	SDL,D-M,SIM,DL,IBL
CO1,CO3	Describe the General Anatomy of Human Body.	3	Lecture	CE	Knows-how	L_VC,L&PPT ,L,FC,L&GD

CO1,CO3, CO7	Illustrate the General Anatomy of Human Body.	6	Experiential- Learning16.3	CAN	Does	SDL,IBL,FC,D-M
CO1,CO3, CO4	Describe the Applied Anatomy for Unani Procedures of treatment/Management.	2	Lecture	CC	Knows-how	FC,L_VC,L,L&GD,L&PP T
CO1,CO3	Describe the Embalming Procedures.	2	Lecture	CC	Knows-how	FC,L&GD,L_VC,L,L&PP T
CO1,CO3, CO5,CO7	Demonstrate the steps of Museum preparation for the display of anatomical structures.	2	Practical16.4	PSY- GUD	Shows-how	DL,IBL,D,FC,SDL
Unit 2 تحنيط الميت (Tahneetul maiyit) Embalming of Cadaver, تحفظ نعش وعينه (Tahaffuz-e-N'ash wa Einah-e-Tashreeh) Preservation of Cadaver and specimen, تحذير متحف (Tahzeer-e-Mat-haf) Museum preparation. 16.2.1. تحنيط الميت (Tahneetul maiyit) Embalming of Cadaver. 16.2.2. تحفظ نعش وعينه (Tahaffuz-e-N'ash wa Einah-e-Tashreeh) Preservation of Cadaver and specimen. 16.2.3. تحذير متحف (Tahzeer-e-Mat-haf) Museum preparation. References: 47,48,49,50,51						
3A	3B	3C	3D	3E	3F	3G
CO1,CO3, CO5,CO7	Illustrate Embalming of Cadaver.	3	Experiential- Learning16.4	PSY- SET	Does	IBL,D-M,SIM,SDL,D
CO1,CO3, CO7	Demonstrate Embalming of Cadaver.	2	Practical16.5	PSY- GUD	Shows-how	D,DL,SDL,SIM,IBL

CO1,CO3, CO5,CO7	Illustrate the Preservation of Cadaver and specimen	4	Experiential- Learning16.5	CAN	Does	IBL,DL,D,SIM,D-M
CO1,CO3	Describe Embalming of Cadaver.	1	Lecture	CC	Knows-how	L&PPT ,L_VC,FC,L&GD,L
CO1,CO7	Describe the Preservation of Cadaver and specimen	1	Lecture	CC	Knows-how	L&GD,FC,L_VC,L,L&PP T
CO1,CO3	Describe the Museum preparation for the display of anatomical structures.	1	Lecture	CC	Knows-how	L&PPT ,L,L&GD,L_VC,FC
CO1,CO3, CO5,CO7	Demonstrate the Preservation of Cadaver and specimen	3	Practical16.6	PSY- GUD	Shows-how	IBL,D,DL,SIM,SDL
CO1,CO3, CO5,CO7	Explain and analyse the steps of Museum preparation for the display of anatomical structures.	3	Experiential- Learning16.6	AFT- RES	Does	SIM,IBL,D,DL,SDL

Practical Training Activity

Practical Training 16.1 General Anatomy of Human Body

Total Learning hours: 5 hours

Activity 1-The teacher will discuss and demonstrate/prosect the General Anatomy of Human Body related to the introduction to anatomy, levels of organization and tissues of the body, skin and fascia,(1hr15mins)

Activity 2-The teacher will discuss and demonstrate/prosect the skeletal system, muscular system, arthrology,vascular system, lymphatic system, nervous system, splachnology, radiology, surface anatomy.(1hr15mins)

Activity 3-The student will perform the practical activity of general Anatomy of Human Body related to types of anatomy, types of tissues, dermatomes, types of fascia, (1 hr 15 mins) Activity 4-The student will perform the practical activity of types of bones, muscles, joint, nerves, blood vessels, lymphatics etc (1 hr 15 mins) The above activity will be done through Dissection of cadaver/ artificial cadaver/ e-dissection/ virtual dissection/ Demonstration on Models/ 4D interactive Anatomical Models/ Analysis of Radiographs / 3D Anatomy software/ Group Discussion/ case presentation/ Clinical Examination / 3D model making/ Illustrations / Augmented Reality/ Virtual reality and will summarise the practical activity to the teacher.
Practical Training 16.2 Applied Anatomy for Unani Procedures and its treatment/Management.
Total Learning hours: 4 hours Activity 1-The teacher will discuss and demonstrate the anatomical points/surface projections and landmarks for the procedures such as hijama, fasad, nutool, dalak etc., in a simulated environment/ department of Ilaj bil tadbeer. (1 hr) Activity 2-The students will learn to identify the anatomical points/surface projections and landmarks for the procedures such as hijama, fasad, nutool, dalak etc., in a simulated environment/ department of Ilaj bil tadbeer. (3 hrs)
Practical Training 16.3 Embalming Procedures
Total Learning hours: 4 hours Activity 1-The teacher will discuss and demonstrate the different embalming procedures / the Dry Embalming / cold Embalming / Plastination / Simulated Embalming Procedures / related to the students and related teaching learning method of practical (2 hrs) Activity 2-The students will perform practical activity related to the different different embalming procedures / the Dry Embalming / cold Embalming / Plastination / Simulated Embalming Procedures and will summarise to the teacher. (2 hrs)
Practical Training 16.4 Museum preparation for the display of anatomical structures.
Total Learning hours: 2 hours

Activity 1-The teacher will discuss and demonstrate the different techniques of Museum preparation for the display of anatomical structures / Skinning and Evisceration of the cadaver/ Skeletal preparation/ Taxidermy / Simulated activity. (1hr) Activity 2-The students will perform practical activity related to different techniques of Museum preparation for the display of anatomical structures / Skinning and Evisceration of the cadaver/ Skeletal preparation/ Taxidermy / Simulated activity and will summarise to the teacher.(1hr)
Practical Training 16.5 Embalming of Cadaver.
Total Learning hours: 2 hours Activity 1-The teacher will discuss the basic requirements for embalming and demonstrate the steps of embalming of Cavity, Surface Embalming/ Simulated Embalming activity(1hr) Activity 2-he students will perform practical activity related to the Arterial, Cavity and Surface Embalming/ Simulated Embalming activity and will summarise to the teacher.(1hr) The above activity will be done in simulated environment/ by visit to other colleges
Practical Training 16.6 Preservation of Cadaver and specimen
Total Learning hours: 3 hours Activity 1-The teacher will discuss and demonstrate the different techniques of Preservation of cadaver such as freezing, plastination and refrigeration of the cadaver and specimen. (1 hr) Activity 2-The students will perform practical activity techniques of Preservation of cadaver such as freezing, plastination and refrigeration of the cadaver and specimen. (2 hr) The above activity will be performed in simulated environment/ by visit to other colleges/ departments
Experiential Learning Activity
Experiential-Learning Learning 16.1: Applied Anatomy for Unani Procedures of treatment/Management.

Total Learning hours: 5 hours Activity 1-The student will identify the associated structures affected by the unani treatment procedures of IBT and prepare a catalogue of the landmarks, associated structures and the changes observed over the surface. (4 hrs) Activity 2-The teacher will monitor and guide the student. (1 hr)
Experiential-Learning Learning 16.2: Embalming Procedures
Total Learning hours: 5 hours Activity 1-The students will engage in the experiential learning through the different embalming procedures / Dry Embalming / cold Embalming / Plastination and will summarise to the teacher. (4 hrs) Activity 2-The teacher will guide and mentor the student in experiential activity and arrange for guest lecture/ hands on training on the different embalming procedures. (1 hr)
Experiential-Learning Learning 16.3: General Anatomy of Human Body.
Total Learning hours: 6 hours The student will practice and demonstrate the anatomical positions, various planes, relation, comparison and movements of the body in simulated environment. (2hrs30ins) The student will demonstrate the different systems of human body using maps/ posters/ chart/ models. (2hrs30mins) The teacher will discuss and summarise the General anatomy of Human body related to the topic(s) or system(s) done by the students in experiential learning method by group discussion/ inquiry based learning/ quiz/puzzles etc. (1hr)
Experiential-Learning Learning 16.4: Embalming of Cadaver.
Total Learning hours: 3 hours Activity 1-The student use the embalming terminologies, the embalming chemicals, embalming instruments for cavity embalming, arterial embalming, surface embalming in simulated environment. (2hrs)

The teacher will monitor and guide /arrange for the visits/ to other Departments/medical colleges for the experiential activity of the students. (1 hr)	
Experiential-Learning Learning 16.5: Preservation of Cadaver and specimen	
Total Learning hours: 4 hours Activity 1-The student will analyse the difference between ancient and modern techniques of preservation of cadaver/ specimen through extensive review of literature, journals, search engines and present it in group discussion/ seminars/ PPT/Videos. (3 hrs) Activity 2-The teacher will monitor the experiential learning activity of the students. (1 hr)	
Experiential-Learning Learning 16.6: Museum preparation for the display of anatomical structures.	
Total Learning hours: 3 hours Activity 1-The students will engage in the experiential learning related to the different techniques of Museum preparation such as preparation of dry specimens of bones, preparation of wet specimens, preparation of opaque specimens, preparation of transparent specimens, technique of plastination in the anatomy lab/visit to other medical colleges/ forensic departments,(2hrs30mins) Activity 2-The teacher will co ordinate with other departments/college for the visit/posting for the student activity.(30mins)	
Modular Assessment	
Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per Table 6 C. Multiple choice questions- 5 questions, each question carrying 1 mark from the topics embalming of Cadaver, Preservation of Cadaver and specimen, Museum preparation. Demonstration of specimen preparation, museum preparation (10 marks)	4

Short answer questions- 2 questions, each question carrying 5 marks from the topics of general anatomy of the human body, anatomy of aging, Applied Anatomy for Unani procedures of treatment/ management. catalogue making - 10 marks for preparing a catalogue of different methods of embalming/preservation/ preparation cadaver/ specimen, types of chemicals, instruments used for embalming/preservation/ preparation cadaver/ specimen. Short video making- Applied Anatomy for Unani procedures of treatment/ management, (15 marks) or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	

Paper No : 3 (تشریح اعصابی) (Tashreeh-e-A'sabi) Neuroanatomy)						
Semester No : 3						
Module 17 : نظام عصبی کا تعارف (Nizam -e-A'sabi ka ta'aruf) Introduction of Nervous System						
Module Learning Objectives (At the end of the module, the students should be able to) 1 Describe the Nervous system, Neuron, Synapses, Neurotransmitter and Neuroglial Cell. 2 Conduct group Discussion and Presentation or Clinical Examination on Nervous System 3 Identify the various types of Neurons.						
Unit 1 (Asab wa Aqsam-e Asab) عصب و اقسام عصب (Markazi, Nizam e A'sabi wa Muheeti ka ta.aruf) Introduction of Central and Peripheral Nervous System. (Mashabik) مشابک Synapses. (Naqlaat –e-As'abi) نقلات عصبی Neurotransmitters. (khalaya-e-Dabqiya) خلا یا دبقیہ Neuroglia. 17.1.1. (Markazi, Nizam e A'sabi wa Muheeti ka ta.aruf) Introduction of Central and Peripheral Nervous System. 17.1.2. (Asab wa Aqsam-e Asab) Neurons and classification of Neurons. (Mashabik) مشابک Synapses. 17.1.3. (Naqlaat –e-As'abi) Neurotransmitters. 17.1.4. (khalaya-e-Dabqiya) Neuroglia. References: 1,2,3,5,6,10,11,16,18,21,23,24,25,27,28,31,32,35,38,39,41,42,46,53,54,58,62,65,66,69,71,82,95,100,101,103,105						
3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the Synapses, Neurotransmitters and Neuroglia.	3	Lecture	CC	Knows-how	D-M,L&PPT ,L_VC,L&GD,BL
CO1,CO3, CO7	Demonstrate the Neurons and classification of Neurons	5	Practical17.1	PSY- GUD	Shows-how	CBL,PSM,D

CO1,CO3, CO7	Analyze the Synapses, Neurotransmitters and Neuroglia.	7	Experiential- Learning17.1	CAN	Shows-how	PL,DIS,PrBL,JC
CO1,CO3, CO7	Analyze the Neurons and classification of Neurons.	6	Experiential- Learning17.2	CAN	Does	DIS,SDL,CD,JC
CO1,CO4	Discuss the Introduction of Central and Peripheral Nervous System and Describe the Neurons and classification of Neurons.	2	Lecture	CK	Knows-how	D-M,L&GD,L&PPT ,L_VC,BL
CO1,CO3, CO7	Demonstrate the Synapses, Neurotransmitters and Neuroglia.	5	Practical17.2	PSY- GUD	Shows-how	PSM,SDL,D,PER,CBL
Unit 2 (Ghair Shirkee Nizam e A'sabi Ghair Iradi) Autonomic nervous system. (Shirkee Nizam e A'sabi) sympathetic nervous system. (Ghair Shirkee Nizam e A'sabi) para sympathetic nervous system. (Nizam e A'sabi Mew) enteric nervous system. (Nizam e A'sabi Jasdi) Somatic nervous system. 17.2.1. (Nizam e A'sabi Ghair Iradi) Autonomic nervous system. 17.2.2. (Nizam e A'sabi Mewi) Enteric nervous system. 17.2.3. (Nizam e A'sabi Jasdi) Somatic nervous system. References: 1,2,3,4,5,6,10,11,18,21,23,24,25,26,28,31,32,35,38,39,40,41,42,46,53,54,58,62,65,66,67,75,82,101,103,105						
3A	3B	3C	3D	3E	3F	3G
CO1,CO3, CO7	Demonstrate the Enteric nervous system.	3	Practical17.3	PSY- GUD	Shows-how	PL,PSM,D,SDL,PER
CO1,CO3, CO7	Demonstrate the Autonomic nervous system.	3	Practical17.4	PSY- GUD	Shows-how	PBL,SIM,RP,D,PER

CO1,CO3, CO7	Analyze the Autonomic nervous system.	4	Experiential- Learning17.3	CAN	Does	SIM,SDL,LS,JC
CO1,CO3, CO7	Analyze the Enteric nervous system.	4	Experiential- Learning17.4	CAN	Does	SDL,DIS,CD
CO1,CO4	Describe the Somatic Nervous System.	2	Lecture	CC	Knows-how	L&GD,BL,L&PPT ,L_VC
CO1,CO4	Describe the Autonomic nervous system.	2	Lecture	CC	Knows-how	BL,L&GD,L&PPT ,L_VC
CO1,CO4	Describe the Enteric nervous system.	1	Lecture	CC	Knows-how	L&GD,L_VC,L&PPT
CO1,CO3, CO7	Demonstrate the Somatic Nervous System.	4	Practical17.5	PSY- GUD	Shows-how	L&PPT ,SIM,DIS,CBL,D
CO1,CO3, CO7	Analyze the Somatic Nervous System.	5	Experiential- Learning17.5	CAN	Does	CBL,JC,IBL,PER

Practical Training Activity

Practical Training 17.1 Neurons and Classification of Neurons

Total Learning Hours: 5 Hours

Activity 1: Teacher Demonstration (60 Min)

The teacher will use a diagram or model to visually demonstrate the anatomy of a neuron, including the cell body, dendrites, axon, and more. Functional types (sensory, motor, interneurons) and structural types (unipolar, bipolar, multipolar neurons) will be explained, emphasizing their roles in the nervous system.

Students will replicate the neuron diagram or model on paper or with craft materials, label all parts, and write brief descriptions of each classification.

Activity 2: Problem-Solving Simulation (60 Min)

The teacher will present scenarios or case studies involving neurons, such as neural pathways in reflex actions, and assign neuron classifications to groups for detailed study.

Students will collaborate to map out pathways involving sensory neurons (detecting stimuli), interneurons (processing), and motor neurons (generating responses). They will present their analysis to the class.

Activity 3: Hands-On Experimental Activity (60 Min)

The teacher will conduct a simple simulation (digital or physical) or experiment to demonstrate neuron signal transmission and functional classifications in neural circuits.

Students will actively participate in the experiment, record their observations, and connect the activity to both the structural and functional classifications of neurons. Findings will be summarized in reports or discussions.

Activity 4: Concept Mapping (60 Min)

The teacher will facilitate a guided brainstorming session to construct a concept map of neuron types, structures, and functions, using collaborative input from students.

Students will create individual or group concept maps, organizing and connecting key information about neurons visually.

Activity 5: Hands-On Crafting (60 Min)

The teacher will introduce a craft activity using materials like pipe cleaners, beads, and clay to create 3D neuron models representing various structural types. Students will design and construct models, label the parts, and explain how the models represent the structural and functional classifications of neurons.

Practical Training 17.2 Synapses, Neurotransmitters and Neuroglia.

Total Learning Hours: 5 Hours

Activity 1: Teacher Demonstration with Models/Animations (60 Min)

The teacher will demonstrate synaptic transmission, types of synapses, neurotransmitter release and the role of neuroglia using 3D models or animations.

Students will observe the demonstration, note key points and identify the structures and functions of each component.

Activity 2: Histology Lab / Virtual Microscopy (60 Min)

The teacher will demonstrate the microscopic features of neuroglia cells (astrocytes, oligodendrocytes, microglia) using slides or virtual microscopy tools.

Students will examine and sketch the microscopic structures of neuroglia cells, noting their distinct roles in the nervous system.

Activity 3: Clinical Case Discussion / Problem-Based Learning (90 Min)

The teacher will present clinical cases involving neurotransmitter imbalances or neuroglial dysfunctions, such as Parkinson's disease or multiple sclerosis.

Students will analyze the cases, discuss the roles of neurotransmitters, answer questions and relate the findings to synaptic physiology.

Activity 4: Group Activity – Flowchart/Pathway Illustration (90 Min)

The teacher will guide students in creating detailed diagrams to visualize synaptic transmission and neuroglia functions.

Students will illustrate neurotransmitter pathways, label synapse types and present their understanding to peers, facilitating an interactive Q&A session.

Practical Training 17.3 Enteric nervous system.

Total Learning Hours:- 3 Hours

Activity 1: Teacher Demonstration (30 Min)

The teacher will conduct a live demonstration of the Enteric Nervous System using anatomical models, diagrams, or multimedia presentations. The focus will be on explaining the structure and functions of components like the myenteric and submucosal plexuses.

Based on the demonstration, students will create their own models or diagrams, labeling all components and providing written or oral explanations of their functions.

Activity 2: Interactive Peer Teaching (60 Min)

The teacher will divide students into small groups, assigning each group a specific aspect of the Enteric Nervous System (e.g., gastrointestinal motility, secretion processes, or reflex actions) to study. Initial guidance will be provided.

Students will collaboratively research their assigned topic and then teach their peers by explaining key concepts using simple diagrams or short presentations.

Activity 3: Problem-Solving Simulation (30 Min)

The teacher will present real-world problems or case studies related to the Enteric Nervous System, such as disruptions impacting digestion or gut health, and guide the analysis through probing questions.

Students will work in teams to analyze the problem, propose solutions, and present their findings supported by logical reasoning and examples of the Enteric Nervous System's role.

Activity 4: Hands-On Experimental Activity (60 Min)

The teacher will set up a simulation or visual lab experiment, such as demonstrating the effects of neurotransmitters or stimuli on gut motility using animations or lab apparatus.

Students will perform the experiment, record observations, analyze data, and relate the results to the structure and function of the Enteric Nervous System.

Practical Training 17.4 Autonomic Nervous System.

Total Learning Hours :- 3Hours

Activity 1: Teacher Demonstration (30 Min)

The teacher will explain the anatomy and divisions of the autonomic nervous system (ANS) using charts, models, and animations.

Students will observe the demonstration, note key points, and clarify concepts by engaging in discussions.

Activity 2: Interactive Simulation / Virtual Physiology Lab (60 Min)

The teacher will guide students through an interactive simulation showcasing ANS responses, such as changes in heart rate during stress and rest phases.

Students will interact with the simulation, observe ANS responses in real-time, and record their observations for discussion.

Activity 3: Clinical Case / Problem-Based Learning (30 Min)

The teacher will present clinical cases highlighting autonomic dysfunctions, like orthostatic hypotension, and guide problem-based analysis.

Students will analyze the cases, identify the involved ANS pathways, and collaboratively discuss potential solutions.

Activity 4: Group Activity – Role Play / Scenario-Based Discussion (60 Min)

The teacher will assign roles to students, such as enacting sympathetic and parasympathetic responses during scenarios like 'Fight or Flight'.

Students will role-play the scenario, explain physiological effects, and engage in a dynamic Q&A session with peers to reinforce their understanding.

Practical Training 17.5 Somatic Nervous System

Total Learning Hours : 4:00 Hours

Activity 1: Teacher Demonstration (60 Min)

The teacher will demonstrate the structure and pathway of the somatic nervous system using anatomical models, charts and diagrams, focusing on sensory and motor neuron pathways.

Students will observe the demonstration, take detailed notes and identify key components for further discussion.

Activity 2: Dissection or Virtual Lab Activity (60 Min)

The teacher will guide students through the exploration of nerve pathways and connections using animal models or virtual dissection tools.

Students will perform guided dissection or virtual exploration to trace somatic nerve pathways and examine skeletal muscle innervation.

Activity 3: Case-Based Learning (CBL) with Q&A Session (60 Min)

The teacher will present clinical cases of somatic nerve injuries or disorders like sciatic nerve injury or carpal tunnel syndrome, engaging students in problem-solving.

Students will analyze cases, participate in Q&A and explain how somatic nervous system involvement leads to clinical symptoms.

Activity 4: Group Activity - Interactive Diagram Drawing & Presentation (60 Min)

The teacher will facilitate group work by guiding students in drawing detailed flowcharts of somatic pathways.

Students will collaborate in groups to create and present diagrams of somatic nerve circuits, emphasizing sensory and motor components and answering peer questions.

Experiential Learning Activity

Experiential-Learning Learning 17.1: Structure and function of synapses

Total Learning Hours: 7:00 Hours

Activity 1: Peer Teaching (90 Min)

Students will *research* synapses, neurotransmitters, and neuroglia, then *create and present* visual aids (e.g., diagrams, flowcharts) to teach peers.

They will *engage* in interactive discussions and *respond* to peer questions to reinforce learning.

Activity 2: Journal Club (90 Min)

Students will *read* research articles on topics like synaptic plasticity or neuroglia functions.

They will *present* findings, *critique* methodologies, and *discuss* clinical relevance in group sessions.

Activity 3: Project-Based Learning (90 Min)

They will *design and construct* models of synapses and neuroglia, integrating neurotransmitter mechanisms.

They will *apply* their knowledge to real-world cases (e.g., neurodegenerative disorders) and *present* their projects, explaining physiological and clinical connections

Activity 4: Investigate Neurotransmitter Function (90 Min)

The student will study various neurotransmitters, their types (e.g., excitatory and inhibitory), and their role in neural communication. They will analyze how neurotransmitters affect synaptic transmission and how imbalances can lead to neurological disorders.

Activity 5: Explore the Role of Neuroglia in the Nervous System (60 Min)

The student will learn about neuroglial cells (e.g., astrocytes, oligodendrocytes, microglia) and their support functions in the nervous system. They will explain how neuroglia maintain homeostasis, support neurons, and contribute to neural signaling and protection.

Experiential-Learning Learning 17.2: Neuron structure, classification neurons

Total Learning Hours: 6:00 Hours

Activity 1: Exploration and Identification (60 Min)

Students will explore neuron structure using anatomical models, histological slides, and interactive digital simulations. They will identify key components such as the cell body, dendrites, axon and synapses, understanding their roles in neural communication.

Activity 2: Peer Teaching (90 Min)

Students will research, collaborate, and teach neuron structure and classification using models and interactive presentations, followed by peer Q&A.

Activity 3: Journal Club (90 Min)

Students will analyze research articles on neuronal diversity, present key findings and evaluate their relevance to clinical and functional aspects of neurons.

Activity 4: Comparative Analysis of Neuron Types (60 Min)

Students will classify neurons based on structure (unipolar, bipolar, multipolar) and function (sensory, motor, interneurons). Through guided discussions and case studies, they will analyze how different neurons contribute to sensory input, motor control and reflex pathways.

Activity 5: Application in Clinical Context (60 Min)

Students will apply their knowledge by evaluating real-world scenarios where neuronal dysfunction leads to neurological disorders. They will engage in discussions on conditions such as multiple sclerosis, neuropathies and spinal cord injuries, proposing diagnostic approaches and possible interventions.

Experiential-Learning Learning 17.3: Autonomic Nervous System (ANS)

Total Learning Hours: 4:00 Hours

Activity 1: Clinical Shadowing Simulations (60 Min)

Students will engage in role-play as healthcare professionals, *diagnosing* autonomic nervous system disorders using detailed patient scenarios. They will analyze symptoms, *correlate* them with affected pathways, and *propose* diagnostic or therapeutic interventions.

Activity 2: Journal Club (90 Min)

Students will *read* and critically *analyze* research articles related to the autonomic nervous system, such as studies on autonomic dysfunction or stress responses. They will *present* key findings, *evaluate* methodologies, and *discuss* the clinical relevance in a collaborative setting.

Activity 3: Library Session (90 Min)

Students will utilize library resources, such as textbooks, journals, and online databases, to *research* key topics about the autonomic nervous system. They will compile findings into short reports or summaries to *share* with their peers, fostering independent study and resource usage skills.

Experiential-Learning Learning 17.4: Enteric Nervous System

Total Learning Hours: 4:00 Hours

Activity 1: Investigation and Analyzation–(60 Min)

Students will explore the anatomical organization and physiological functions of the enteric nervous system (ENS) through models, interactive digital resources, and case-based learning. They will examine how the ENS regulates digestive processes independently of the central nervous system.

Activity 2: Compare and Discuss –(90Min)

Students will analyze real-world clinical cases of ENS dysfunction, such as Hirschsprung's disease or irritable bowel syndrome (IBS). They will discuss the impact of these disorders on gut motility, secretion, and overall digestive health, comparing normal and pathological conditions.

Activity 3: Application of Knowledge –(90 Min)

Based on their analysis, students will propose evidence-based diagnostic approaches and potential treatment strategies for ENS-related disorders, considering pharmacological, surgical, and lifestyle interventions. They will also evaluate the role of emerging research in improving ENS-related healthcare outcomes.

Experiential-Learning Learning 17.5: Somatic Nervous System.

Total Learning Hours: 5:00 Hours

Activity 1: Exploration (60 Min)

Students will study the structure and function of the somatic nervous system, including its role in voluntary movements and sensory processing. They will analyze case studies or real-life scenarios where somatic nervous system dysfunction affects motor control or sensation.

Activity 2: Inquiry-Based Learning (60 Min)

Students will work collaboratively to analyze clinical scenarios involving somatic nerve injuries, focusing on identifying affected pathways and understanding the physiological impact.

Students will trace somatic neural pathways using provided diagrams or simulations, pinpointing the origin of injuries. They will then propose diagnostic methods or therapeutic approaches supported by anatomical and clinical principles.

Groups will take on specific roles such as neurologists, physiotherapists, or patients to simulate diagnostic and treatment sessions, fostering deeper understanding and teamwork.

Activity 3: Journal Club (90 Min)

Students will be assigned research articles on topics such as somatic reflex arcs, motor neuron disorders, or clinical advancements in rehabilitation.

Groups or individuals will present a summary of the article's key findings, explaining its relevance to the somatic nervous system and clinical practice.

Students will evaluate research methodologies and limitations, connecting the study's insights to real-world clinical applications, such as diagnosing or managing somatic nerve disorders.

Activity 4: Hands-on Application (60 Min)

Students will engage in interactive activities, such as tracing neural pathways, mapping dermatomes, or conducting reflex tests to understand sensory and motor responses. They will document observations and compare normal and abnormal nervous system functions.

Activity 5: Discussion and Case-Based Analysis (30 Min)

Students will present their findings, discuss the implications of somatic nervous system impairments, and debate real-world clinical cases. They will collaborate to propose diagnostic or treatment approaches based on their knowledge.

Modular Assessment

Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Total Hours of the Assessment: 4:00 Hours 1. Multiple-Choice Questions (MCQs) – 15 Marks 2. Diagram Labeling & Short Explanation – 10 Marks Label key structures on a diagram of a neuron, synapse, or autonomic nervous system pathways (5 Marks) Provide a brief explanation of their functions (5 Marks) 3. Case-Based Analysis – 15 Marks Students analyze a case scenario and answer structured questions 4. Reflex Experiment & Self-Reflection – 10 Marks	4

Each student performs a simple reflex test (e.g., knee-jerk reflex) on themselves or a peer and writes a reflection including: Description of the reflex pathway (2 Marks) Explanation of the role of neurons involved (4 Marks) Discussion of what happens if the reflex arc is damaged (4 Marks) or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)							
Module 18 : نظام اعصاب کی بالیدگی (Nizam-e- A'asab ki Baleedgi) Development of the Nervous System.							
Module Learning Objectives (At the end of the module, the students should be able to) 1. Describe the Development of central nervous system, peripheral nervous system, Autonomic nervous system, Enteric nervous system. 2. Conduct the presentation, group discussion regarding the development of central nervous system, peripheral nervous system, autonomic nervous system, enteric nervous system. 3. Identify the different stages of the development of central nervous system, peripheral nervous system, autonomic nervous system, enteric nervous system.							
Unit 1 نظام عصبی مرکزی کی بالیدگی (Nizam e A'sabi Markazi ki Baleedgi) Development of central nervous system. نظام عصبی محیطی کی بالیدگی (Nizam e A'sabi Muheeti ki Baleedgi) Development of peripheral nervous system. 18.1.1. نظام عصبی مرکزی کی بالیدگی (Nizam e A'sabi Markazi ki Baleedgi) Development of central nervous system. 18.1.2. نظام عصبی محیطی کی بالیدگی (Nizam e A'sabi Muheeti ki Baleedgi) Development of peripheral nervous system. References: 1,2,3,5,6,8,10,11,16,21,24,25,27,30,31,35,42,53,54,58,62,64,75,77,79,101,105							
3A	3B		3C	3D	3E	3F	3G

CO1,CO4	Describe the Development of central nervous system.	3	Lecture	CC	Knows-how	L&PPT ,L_VC
CO1,CO3, CO7	Demonstrate the development of central nervous system	5	Practical18.1	PSY- GUD	Shows-how	BS,D-M,PER,CBL,PBL
CO1,CO4, CO7	Analyze the development of the central nervous system.	7	Experiential- Learning18.1	CAN	Does	DIS,PrBL,PL,CBL,PER
CO1,CO4	Describe the Development of peripheral nervous system	2	Lecture	CC	Knows-how	L_VC,EDU,L&PPT
CO1,CO3, CO7	Demonstrate the development of the peripheral nervous system.	5	Practical18.2	PSY- GUD	Shows-how	CD,D-M,CBL
CO1,CO4, CO7	Analyze the development of peripheral nervous system.	6	Experiential- Learning18.2	CAN	Does	DIS,PL,SDL,CD

Unit 2 نظام عصبي معوي کی بالیدگی (Nizam e A'sabi Mewi ki Baleedgi) Development of Autonomic nervous system. نظام عصبي غیر ارادی کی بالیدگی (Nizam e A'sabi Ghair Iradi ki Baleedgi) Development of Autonomic nervous system.

Development of Enteric nervous system.

18.2.1. نظام عصبي غیر ارادی کی بالیدگی (Nizam e A'sabi Ghair Iradi ki Baleedgi) Development of Autonomic nervous system.

18.2.2. نظام عصبي معوي کی بالیدگی (Nizam e A'sabi Mewi ki Baleedgi) Development of Enteric nervous system.

References:

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the development of autonomic nervous system	3	Lecture	CC	Knows-how	ML,L&PPT ,L_VC
CO1,CO3, CO7	Demonstrate the development of the autonomic nervous system.	5	Practical18.3	PSY- GUD	Shows-how	DIS,FC,D-M

CO1,CO4, CO7	Evaluate the development of autonomic nervous system.	7	Experiential- Learning18.3	CE	Does	PER,JC,IBL,DIS,SDL
CO1,CO4	Describe the development of enteric nervous system	2	Lecture	CC	Know	L_VC,L&PPT
CO1,CO3, CO7	Demonstrate the development of enteric nervous system.	5	Practical18.4	PSY- GUD	Shows-how	FC,PER,CBL,D,PL
CO1,CO4, CO7	Evaluate the development of enteric nervous system.	6	Experiential- Learning18.4	CE	Does	SDL,CBL,DIS,JC

Practical Training Activity

Practical Training 18.1 Development of Central Nervous System

Total Learning Hours : 5 Hours

Activity 1: 3D Model Demonstration (60 Min)

The teacher will use 3D embryology models to explain the formation of the neural tube, brain vesicles, and spinal cord, illustrating the progression of CNS development and its anatomical milestones.

Students will observe and engage in discussions to clarify concepts, enhancing their understanding of embryological processes.

Activity 2: Microscopic Slide Analysis (60 Min)

The teacher will guide students through histological slides of developing neural tissue at various stages of development, emphasizing cellular differentiation and anatomical changes.

Students will analyze slides to correlate microscopic observations with the gross anatomical development of the CNS.

Activity 3: Embryological Staging Chart Preparation (60 Min)

Teacher will outline the timeline of CNS development stages and provide resources for chart creation.

Students will create charts summarizing embryological stages, including neural tube formation, brain vesicle differentiation, and spinal cord development, integrating time frames and critical features.

Activity 4: Problem-Based Learning (PBL) with Clinical Cases (60 Min)

The teacher will present clinical cases of neural tube defects such as spina bifida and anencephaly.

Students will analyze the cases, connecting developmental abnormalities to clinical outcomes and proposing diagnostic and therapeutic strategies.

Activity 5: Brainstorming Session (60 Min)

The teacher will facilitate group brainstorming to explore factors affecting CNS development, including nutrition, teratogens, and genetic influences.

Students will discuss these factors collaboratively, developing insights into preventive and therapeutic approaches for developmental disorders.

Practical Training 18.2 Development of the Peripheral Nervous System

Total Learning Hours: 5:00 Hours

Activity 1: Demonstration (60 Min)

The Teacher will present an overview of the peripheral nervous system (PNS) development, explaining neural crest cell migration, differentiation, and formation of peripheral nerves and ganglia. Anatomical models and diagrams will be used for visual understanding.

Activity 2: Student Hands-On Illustration (90 Min)

Students will create detailed illustrations or flowcharts depicting the developmental stages of the PNS, highlighting key structures such as spinal nerves, cranial nerves, and autonomic ganglia.

Activity 3: Practical Application and Case Analysis (90 Min)

Students will analyze case studies of congenital PNS disorders (e.g., peripheral neuropathies, Hirschsprung's disease) to understand developmental anomalies and their clinical implications.

Activity 4: Discussion and Q&A Session (60 Min)

Students will present their findings and illustrations, engage in peer discussions, and participate in a Q&A session to reinforce learning and clarify concepts.

Practical Training 18.3 Development of the Autonomic Nervous System

Total Learning Hours : 5 Hours

Activity 1: Demonstration (60 Min)

Teacher will use 3D models to explain the embryological origin of sympathetic and parasympathetic components of the autonomic nervous system (ANS) from the neural crest. This includes the formation of sympathetic ganglia, adrenal medulla, and parasympathetic neurons.

Students will observe the demonstration and engage in discussions to clarify the developmental processes.

Activity 2: Histology Slide Review (60 Min)

Teacher will guide students in analyzing histological slides depicting developing sympathetic ganglia, adrenal medulla, and parasympathetic neurons.

Students will examine the slides, connecting microscopic structures to their developmental origins and functional roles.

Activity 3: Flipped Classroom Activity (90 Min)

Teacher will assign preparatory materials on ANS embryology for students to review independently, such as videos or readings.

Students will come prepared to class, participate in interactive discussions, and present their insights on key embryological milestones.

Activity 4: Clinical Correlation Discussion (90 Min)

Teacher will facilitate discussions on how developmental defects in the ANS lead to clinical conditions like adrenal hyperplasia, neuroblastoma, or autonomic failure.

Students will analyze cases and explain the anatomical and embryological basis of these conditions, linking theory to clinical practice.

Practical Training 18.4 Development of the Enteric Nervous System

Total Learning Hours: 5:00 Hours

Activity 1: Instructor Demonstration (60 min)

The teacher will present an overview of the enteric nervous system (ENS) development, explaining neural crest cell migration, differentiation and organization within the gastrointestinal tract using anatomical models and diagrams.

Activity 2: Identification (90 Min)

Students will sketch and label the key stages of NS development, identifying critical structures such as the myenteric and submucosal plexuses. They will analyze histological slides or 3D models to visualize ENS formation.

Activity 3: Case-Based Discussion (90 min)

Students will examine clinical cases involving ENS abnormalities (e.g., Hirschsprung's disease), correlating developmental defects with functional implications and discussing diagnostic and treatment approaches.

Activity 4: Peer Review & Q&A Session (60 Min)

Students will present their findings, compare insights, and engage in peer discussions. The session will conclude with a Q&A segment to clarify concepts and reinforce understanding.

Experiential Learning Activity

Experiential-Learning Learning 18.1: Development of the Central Nervous System

Total Learning Hours: 7:00 Hours

Activity 1: Review and Analyze CNS Development (90 Min)

The student will begin by reviewing the stages of central nervous system (CNS) development, including the formation of the neural tube, which gives rise to the brain and spinal cord, and the subsequent differentiation of neural progenitor cells into various types of neurons and glial cells. This will include an in-depth analysis of the key milestones in CNS development such as the closure of the neural tube, the development of the forebrain, midbrain, and hindbrain, and the maturation of brain structures. The student will also explore the factors influencing CNS development, such as genetic signals, environmental factors, and disruptions that may lead to neurological conditions.

Activity 2: Peer Teaching Activity (90 Min)

Students will work in groups to research specific aspects of ANS development, such as neural crest migration, formation of sympathetic/parasympathetic components, or plexus development. Each group will teach their findings to peers using diagrams, models, or case-based examples, followed by an interactive Q&A session for knowledge reinforcement.

Activity 3: Project-Based Learning (90 Min)

Students will research ANS development, create 3D models or visuals depicting neural crest migration and formation of sympathetic/parasympathetic components, and include clinical cases like neuroblastoma or autonomic neuropathies. They will present findings and receive peer feedback, connecting theory to clinical applications.

Activity 2: Apply Knowledge to Case Studies (90 Min)

The student will apply their theoretical knowledge to real-life case studies or hypothetical clinical scenarios where developmental issues in the CNS are present. This may involve analyzing conditions such as spina bifida, anencephaly, or hydrocephalus, understanding the embryological causes, and discussing the impact of these disorders on the patient's health. They will assess the clinical implications of CNS malformations, explore the underlying genetic or environmental causes, and discuss possible prevention strategies and therapeutic interventions. This hands-on application will deepen their understanding of the practical aspects of CNS development in a clinical context.

Activity 3: Discussion and Q&A (60 Min)

In this final step, the student will engage in a group discussion or Q&A session where they will have the opportunity to ask questions, clarify concepts, and share insights gained from the case study analysis. The facilitator will guide the discussion to emphasize the clinical relevance of CNS development and its implications for diagnosing and managing neurological disorders. The discussion will foster critical thinking, enabling students to integrate their theoretical knowledge with real-world clinical challenges.

Experiential-Learning Learning 18.2: Development of Peripheral Nervous System

Total Learning Hours: 6:00 Hours

Activity 1: Conceptual Understanding (1.5 Hours)

The student will explain the stages of the development of the peripheral nervous system (PNS), covering key processes such as neural crest formation, migration, differentiation, and synaptogenesis.

Activity 2: Peer Teaching Activity (1.5 Hours)

Students will collaborate in groups to research the development of the PNS, focusing on neural crest migration, differentiation, and nerve formation. Each group will teach a specific aspect, using visuals and clinical correlations such as neural crest disorders. Interactive Q&A sessions will follow to reinforce concepts and deepen understanding.

Activity 3: Analysis and Case Studies (1.5 Hours)

The student will analyze the molecular and genetic factors influencing PNS development, discussing how disruptions during these stages can lead to congenital disorders, using real or hypothetical case studies to illustrate these concepts.

Activity 4: Clinical Implications and Q&A (1.5 Hours)

The student will discuss the clinical implications of PNS development, particularly in relation to peripheral neuropathies and other disorders, and engage in a Q&A session to address any questions regarding the development process and its impact on health.

Experiential-Learning Learning 18.3: Development of Autonomic Nervous System

Total Learning Hours: 7:00 Hours

Activity 1: Review Developmental Stages (90 Min)

The student will review and explain the key stages in the development of the enteric nervous system, highlighting the role of neural crest cells and molecular signaling pathways.

Q&A: Students will answer questions related to the stages of development and the factors influencing the process.

Activity 2: Journal Club (90 Min)

Students will review and present research articles or case studies on the embryological development of the autonomic nervous system (ANS), focusing on neural crest cell migration, differentiation into sympathetic and parasympathetic components and plexus formation. Discussions will emphasize clinical correlations, such as autonomic neuropathies or congenital anomalies like Hirschsprung's disease, to connect theory with clinical practice.

Activity 3: Inquiry-Based Learning (90 Min)

Students will engage in inquiry-based learning by formulating questions related to ANS development, They will research queries, analyze their findings and collaboratively present conclusions, integrating theoretical and clinical insights.

Activity 4: Analyze Genetic and Molecular Factors (90 Min)

The student will analyze the genetic and molecular factors involved in the formation and differentiation of enteric neurons, focusing on key genes and regulatory proteins.

Q&A: Students will be asked to discuss how specific genetic mutations or disruptions can impact the development of the enteric nervous system.

Activity 5: Apply Knowledge to Case Studies (60 Min)

The student will apply their knowledge to examine clinical case studies that illustrate disorders related to the enteric nervous system, discussing how developmental anomalies affect gastrointestinal function and health.

Q&A: The session will involve a discussion on case study analysis, where students will propose potential diagnoses and relate them to developmental issues in the enteric system.

Experiential-Learning Learning 18.4: Development of Enteric Nervous System

Total Learning Hours: 6:00 Hours

Activity 1: Analyze the Developmental Stages (90 Min)

The student will explore the embryological origins and stages of development of the enteric nervous system, identifying key milestones such as neural crest cell migration and differentiation.

Activity 2: Journal Club (90 Min)

Students will review and present research articles or case studies focused on the embryological development of the enteric nervous system. Discussions will include topics such as the migration of neural crest cells, the formation of plexuses (Auerbach's and Meissner's), and genetic or environmental factors influencing development. Clinical correlations, such as Hirschsprung's disease and its developmental basis, will be emphasized to bridge theoretical knowledge and applied science.

Activity3: Investigate Molecular and Genetic Factors (90 Min)

The student will investigate the molecular signaling pathways, genes, and factors involved in the development of the enteric nervous system, including RET and GDNF signaling.

Activity 4: Case Study Analysis (90 Min)

The student will analyze case studies or research articles related to developmental disorders of the enteric nervous system (e.g., Hirschsprung's disease) to understand the clinical implications of developmental issues in the enteric system. They will present their findings and discuss potential treatment options based on the developmental process.

Modular Assessment

Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Total Hours of the Assessment: 4:00 Hours 1.Viva Voce – 10 Marks Students answer oral questions about the embryological development of the CNS and PNS, discussing critical processes and their disorders 2. Research-Based Essay – 20 Marks Students write a structured essay (1000–1200 words) on a topic related to nervous system development. 3. Histological & Developmental Stage Identification – 10 Marks Microscopic slide identification of embryonic neural tissues under a virtual/digital microscope or histology images. Students must identify key structures (e.g., neural plate, neural tube, neural crest migration) and explain their roles. 4. Critical Appraisal of a Research Paper – 10 Marks Students are given a recent research paper on nervous system development and must critically analyze: • Study hypothesis and methodology (4 Marks) • Key findings and their significance (8 Marks)	4

Limitations and future directions (8 Marks) or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	

Semester No : 4

Module 19 : طريق حسي مخصوصه (Tariq-e- Hissi Makhsoosa) Special Sensory Pathways

Module Learning Objectives

(At the end of the module, the students should be able to)

1 Describe the olfactory, optic pathways, cochleovestibular and gustatory pathways.

2 Conduct the presentation, group discussion and clinical examination regarding the olfactory, optic pathways, cochleovestibular and gustatory pathways.

3 Identify the different structures of olfactory, optic pathways, cochleovestibular and gustatory pathways.

Unit 1 شمى طريق (Tariq-e- Shammi) Olfactory pathway. بصري طريق (Tariq-e- Basari) optic pathway.

19.1.1. شمى طريق (Tariq-e- Shammi) Olfactory pathway.

19.1.2. بصري طريق (Tariq-e- Basari) optic pathway.

References: 1,2,3,5,6,8,10,11,16,21,24,25,27,30,31,35,42,53,54,58,62,64,75,77,79,101,105

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the Olfactory Pathway.	3	Lecture	CC	Know	L&GD,L&PPT ,L_VC,BL

CO1,CO4, CO7	Demonstrate the olfactory pathways.	5	Practical19.1	PSY- GUD	Shows-how	D-M,D,CBL
CO1,CO3, CO4,CO7	Analyze the olfactory pathway.	6	Experiential- Learning19.1	CAN	Shows-how	CBL,CD,PrBL
CO1,CO4	Describe the optic pathway.	2	Lecture	CC	Know	L_VC,L&PPT ,L&GD,BL
CO1,CO4, CO7	Demonstrate the optic pathways.	5	Practical19.2	PSY- GUD	Shows-how	D,PSM,RP,SIM
CO1,CO3, CO4,CO7	Analyze the optic pathway.	7	Experiential- Learning19.2	CAN	Shows-how	PL,X-Ray,JC,IBL

Unit 2 طريق قوتى (Tariq-e- Qauqa'ei) Cochleovestibular Pathway. طريق ذوقى (Tariq-e- Zawaqa) Gustatory pathway.

19.2.1. طريق قوتى (Tariq-e- Qauqa'ei) Cochleovestibular Pathway. 19.2.2. طريق ذوقى (Tariq-e- Zawaqa) Gustatory pathway.

References: 1,2,3,5,6,8,10,11,16,21,24,25,27,30,31,35,42,53,54,58,62,64,75,77,79,101,105

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the Cochleovestibular pathway.	3	Lecture	CC	Know	L&PPT ,BL,L_VC,L&GD
CO1,CO3, CO4,CO7	Demonstrate the cochleovestibular pathways	5	Practical19.3	PSY- GUD	Shows-how	SIM,CBL,RP,D
CO1,CO3, CO4,CO7	Analyze the Cochleovestibular Pathway.	6	Experiential- Learning19.3	CAN	Does	SIM,RP,DIS,LS,CD
CO1,CO4	Describe the gustatory pathway.	2	Lecture	CC	Know	L&GD,L&PPT ,L_VC

CO1,CO3, CO4,CO7	Demonstrate the gustatory pathway.	5	Practical19.4	PSY- GUD	Shows-how	D,CBL,PrBL,PER
CO1,CO3, CO4,CO7	Analyze the gustatory pathway.	7	Experiential- Learning19.4	CAN	Does	SDL,PL,CBL,LS,DIS
Practical Training Activity						
Practical Training 19.1 Olfactory Pathways.						
Total Learning Hours: 5 Hours Activity 1: Teacher Demonstration (60 Min) The teacher will use anatomical models, diagrams, or multimedia to illustrate the olfactory pathway, covering structures like the olfactory epithelium, bulb, tract and cortex. Emphasis will be placed on olfactory nerves and limbic system connections. Students will replicate the pathway using labeled diagrams or craft models, identify each structure and explain their roles in signal relay. Activity 2: Clinical Correlation with Disorders (90 Min) The teacher will present case studies of olfactory disorders, such as anosmia or hyperosmia, incorporating imaging or diagrams showing affected pathway areas. Students will analyze the cases, pinpoint disruptions in the olfactory pathway and propose interventions or treatments based on their understanding of anatomy and physiology. Activity 3: Creative Diagramming (60 Min) The teacher will encourage students to create artistic representations of the olfactory pathway, such as flowcharts, cartoons or infographics. Students will design diagrams to depict the flow of olfactory signals, highlighting both anatomical structures and functional processes. Activity 4: Historical Perspective (90 Min) The teacher will discuss key discoveries of the olfactory pathway, including early studies on olfactory receptors or limbic system connections. Students will research and present brief histories of discoveries or scientists, linking them to current knowledge of olfactory processing.						

Practical Training 19.2 Optic Pathways.

Total Learning Hours: 5 Hours

Activity 1: Teacher Demonstration (60 Min)

The teacher will use a detailed diagram or anatomical model to demonstrate the structure of the optic pathways, including the retina, optic nerve, optic chiasma, optic tract, lateral geniculate nucleus (LGN) and visual cortex. The explanation will highlight the pathway of visual signals from the eye to the brain, emphasizing decussation at the optic chiasma.

Students will replicate the diagram in notebooks or create a visual representation with modeling materials, label key parts, and describe how visual signals are processed.

Activity 2: Problem-Solving Simulation (60 Min)

The teacher will present clinical scenarios related to optic pathway lesions, such as damage to the optic nerve, optic chiasma, or visual cortex and explain their impact on visual perception.

Students will analyze case studies in groups, identify the lesion location and explain the corresponding visual field defects using diagrams and logical reasoning.

Activity 3: Role-Playing the Pathway (60 Min)

The teacher will assign roles to students, representing different components of the optic pathway (e.g., retina, optic nerve, LGN, visual cortex) and provide props like arrows or colored balls to symbolize signal transmission.

Students will act out the optic pathways, demonstrating signal flow and explaining the function of each component in visual processing.

Activity 4: 3D Pathway Creation (60 Min)

The teacher will supply craft materials like wires, clay, or thread for students to construct 3D models of the optic pathways.

Students will collaboratively create the models, label key structures and present their work to the class, explaining the functional significance of each part.

Activity 5: Flowchart and Mapping (60 Min)

The teacher will assist students in designing a detailed flowchart or map of the optic pathways, illustrating how visual signals move through different regions.

Students will develop the flowchart individually or in groups, marking critical points like decussation at the optic chiasma and lateralized processing in the visual cortex.

Practical Training 19.3 Cochleovestibular Pathways

Total Learning Hours : 5 Hours

Activity 1: Teacher Demonstration (60 Min)

Teacher will use a detailed model or diagram to demonstrate the cochleovestibular pathways, including cochlear and vestibular nerves, and their connections to the brainstem and cortex. The explanation will focus step-by-step on anatomy and function, highlighting auditory and balance components.

Students will replicate the diagram in notebooks or using digital drawing tools, labeling key structures like cochlear nuclei, vestibular nuclei, inferior colliculus, and auditory cortex.

Activity 2: Role-Playing (60 Min)

Teacher will organize a role-play where students act as different components of the cochleovestibular pathways (e.g., cochlea, vestibular nerve, brainstem, auditory cortex). A scenario will be set to simulate auditory and balance signal transmission.

Students will perform the role-play, demonstrating the flow of signals and explaining the role of each "component" in the process.

Activity 3: 3D Pathway Modeling (60 Min)

Teacher will provide crafting materials like clay, wires, and labels for students to create a 3D model of the cochleovestibular pathways.

Students will collaborate to construct the model, label key parts, and use it to explain how signals flow from the cochlea and vestibular apparatus to the brain.

Activity 4: Experimental Simulation (60 Min)

Teacher will conduct a digital simulation or virtual lab to illustrate real-time generation and processing of cochleovestibular signals. Auditory and vestibular stimuli responses will be demonstrated.

Students will interact with the simulation, observe and analyze responses, and connect findings to the anatomy and physiology of the pathways.

Activity 5: Flowchart Creation (60 Min)

Teacher will guide students in breaking down the sequence of signal transmission through the cochleovestibular pathways, explaining how auditory and balance signals move from the cochlea and vestibular apparatus to the brainstem and higher centers. Key nuclei and signal integration points will be emphasized. Students will create a detailed flowchart that visually maps the pathways, labeling all key components, including cochlear nuclei, vestibular nuclei, inferior colliculus, and auditory cortex, to demonstrate their understanding.

Practical Training 19.4 Gustatory Pathway.

Total Learning Hours: 5 Hours

Activity 1: Teacher Demonstration (60 Min)

The teacher will explain the anatomy of taste buds, cranial nerves, and the gustatory pathway with visual aids like charts, 3D models, and diagrams. Students will observe the demonstration, identify key structures and pathways, and clarify concepts during the Q&A session.

Activity 2: Virtual Simulation / Interactive Digital Tool (90 Min)

The teacher will guide students through a digital simulation that illustrates nerve conduction from taste receptors to the brain. Students will engage in the virtual experiments, observe neural responses, and document their findings for review.

Activity 3: Case-Based Learning / Problem-Solving Activity (90 Min)

The teacher will present clinical cases, such as loss of taste due to nerve damage, and lead an interactive discussion. Students will analyze the cases, trace the gustatory pathway implicated, and discuss potential diagnoses and implications collaboratively.

Activity 4: Group Activity – Taste Testing and Sensory Mapping (60 Min)

The teacher will supervise a taste test where students identify distinct taste zones (sweet, salty, sour, bitter, umami) on the tongue. Students will perform the taste test, map sensory regions, and connect their observations to the gustatory pathway, participating in an engaging Q&A session.

Experiential Learning Activity

Experiential-Learning Learning 19.1: Structure and function of the olfactory pathway

Total Learning Hours: 6:00 Hours

Activity 1: Understand the Olfactory Pathway (60 Min)

The student will explain the anatomical structure of the olfactory system, identifying the key components such as the olfactory receptors, olfactory bulb and olfactory cortex. They will analyze how sensory information is processed along the pathway from the nose to the brain.

Activity 2: Library Session (90 Min)

Students will utilize library resources such as textbooks, journals, and online databases to study the anatomy and physiology of the olfactory pathway, gather information on olfactory receptors, neural pathways and connections to the limbic system, emphasizing sensory and emotional integration and compile their findings into concise summaries, annotated diagrams, or reports to share with peers in a collaborative learning environment.

Activity 3 :Project-Based Learning (90 Min)

Students will design a detailed model of the olfactory pathway, illustrating key structures such as the olfactory epithelium, bulb, tracts, and cortical areas, incorporate clinical aspects, such as anosmia or changes in olfactory function in neurological disorders and present their models, explaining the physiological significance and clinical relevance of each component and propose diagnostic or therapeutic solutions.

Activity 4: Analyze Olfactory Pathway in Action (60 Min)

The student will explore case studies or real-world examples where olfactory dysfunction occurs (e.g., anosmia) and analyze how disruptions along the olfactory pathway can impact the sense of smell.

Activity 5: Application to Clinical Diagnosis (60 Min)

The student will apply their understanding of the olfactory pathway to diagnose potential olfactory disorders, identifying possible causes of dysfunction based on anatomical and physiological knowledge. They will discuss the clinical significance of each stage of the olfactory pathway.

Experiential-Learning Learning 19.2: Optic pathway

Total Learning Hours: 7:00 Hours

Activity 1: Understanding the Anatomy of the Optic Pathway (90 Min)

Students will explain the anatomy of the optic pathway, including the structure and function of the optic nerve, optic chiasm, optic tract, and visual cortex. They will analyze how light signals are processed from the retina to the brain.

Activity 2: Inquiry-Based Learning (60 Min)

Students will investigate real-world scenarios such as hearing impairments or balance disorders. They will formulate questions about the cochleovestibular pathway's role in these conditions, conduct collaborative research, and propose solutions based on their findings. Groups will present their answers, emphasizing the physiological and clinical relevance of their discoveries.

Activity 3: Journal Club (90 Min)

Students will read selected research articles on cochlear functions, vestibular balance mechanisms, or related disorders like vertigo.

Groups will analyze key findings, evaluate methodologies, and present how these studies advance understanding of the cochleovestibular pathway.

A class discussion will follow, focusing on connections between research and clinical applications (e.g., vestibular rehabilitation techniques).

Activity 4: Peer Teaching (60 Min)

Groups will study specific components of the cochleovestibular pathway. Each group will prepare visual aids like diagrams, presentations, or role-play sessions to teach their peers about their assigned topic. After teaching, students will engage in discussions to clarify concepts and reinforce learning.

Activity 5: Visual Pathway Function and Disorders (60 Min)

Students will analyze the role of the optic pathway in visual perception and discuss common disorders that affect this pathway, such as optic neuropathy and visual field defects. They will connect theoretical knowledge with clinical applications through case studies.

Activity 6: Practical Application and Clinical Scenarios (60 Min)

Students will apply their understanding by assessing clinical cases involving visual impairments linked to damage in the optic pathway, proposing diagnostic approaches and treatment options based on their analysis of the pathway.

Experiential-Learning Learning 19.3: Cochleovestibular Pathway

Total Learning Hours : 6 Hours

Activity 1: Role-Playing Diagnosis (90 Min)

Students will collaborate in groups, role-playing as audiologists, neurologists and patients in simulated diagnostic sessions.

Each group will analyze presented symptoms, such as dizziness, hearing loss, or vertigo and identify affected parts of the cochleovestibular pathway.

Students will propose diagnostic techniques (e.g., audiometric tests, balance assessments) and outline possible treatment strategies or rehabilitation plans.

Activity 2: Library Research (90 Min)

Students will utilize library resources, including anatomy textbooks, medical journals and online databases, to study the structure and function of the cochleovestibular pathway.

They will synthesize their findings into concise summaries or visual aids (e.g., flowcharts or annotated diagrams).

Each student will share their research with peers, fostering collaborative learning and enhancing resource usage skills.

Activity 3: Journal Club (90 Min)

Students will read assigned research articles on cochlear and vestibular function, including studies on signal transmission and neural disorders.

Groups will critically analyze methodologies, results and conclusions, focusing on how the research contributes to understanding the cochleovestibular pathway.

Students will present their findings and lead discussions on the clinical relevance of the research (e.g., implications for hearing aids or balance therapy).

Activity 4: Project-Based Learning (90 Min)

Students will design and construct detailed models or presentations illustrating the cochleovestibular pathway, including anatomical structures and neural connections.

They will integrate examples of clinical applications, such as auditory prosthetics or vestibular rehabilitation techniques.

Projects will culminate in group presentations where students demonstrate the models and explain their significance.

Activity 5: Case Study Analysis (60 Min)

Students will evaluate patient case studies featuring conditions like Ménière's disease or vestibular neuritis.

They will identify affected components of the cochleovestibular pathway, analyze how the dysfunction impacts hearing or balance and propose suitable interventions.

Groups will present their analysis and discuss diverse approaches to diagnosis and treatment.

Experiential-Learning Learning 19.4: Gustatory pathway

Total Learning Hours: 7:00 Hours

Activity 1: Peer Teaching (90 Min)

Students will research sections of the gustatory pathway (e.g., taste receptor mechanisms, cranial nerves involved and brain regions for processing), prepare visual aids (e.g., flowcharts of the pathway) and teach their peers with interactive presentations that emphasize sensory mechanisms and neural connections and collaborate through discussions and answer questions to reinforce understanding of the pathway's complexity.

Activity 2: Library Session (120 Min)

Students will explore library resources like textbooks, journals and online databases to deepen their understanding of the gustatory pathway, compile relevant information into concise summaries or diagrams for class sharing and apply their findings to explain physiological and clinical implications (e.g., taste disorders).

Activity 3: Review and Understand the Gustatory Pathway (90)

Students will review the anatomy and physiology of the gustatory pathway, focusing on the structures involved in taste perception, such as taste buds, cranial nerves (VII, IX, X) and the brain's gustatory cortex.

Activity 4: Analyze the Process of Taste Sensation (60 Min)

Students will analyze the process through which taste stimuli are received, transmitted and processed, identifying any disruptions in the pathway that may lead to taste disorders.

Activity 5: Apply Knowledge to Case Studies and Clinical Scenarios (60 Min)

Students will discuss and evaluate real-world clinical cases where taste perception is affected by neurological conditions or damage, proposing potential diagnostic approaches and treatment strategies.

Modular Assessment

Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Total Hours of Assessment: 4:00 Hours	4

Diagnostic Imaging Quiz – 20 Marks Provide images (e.g., MRI/CT) of brain lesions affecting sensory pathways (olfactory bulb, optic tract, cochlea) and identify the location of the lesion and associated deficits. 2. Short Answer Questions – 10 Marks Answer short questions on the function and anatomy of each pathway (olfactory, optic, gustatory, cochleovestibular). 3. Pathway Mapping Exercise – 10 Marks Students draw and label a pathway diagram for each sensory pathway (olfactory, optic, gustatory, cochleovestibular), indicate key structures involved and the flow of information. 4. Interactive Scenario Simulation – 10 Marks Provide an interactive scenario where students simulate a diagnosis based on symptoms related to one or more sensory pathways (e.g., patient with vision loss or hearing difficulty). or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	
Module 20 : طرائق حسی (Tariq-e- A'sabi) Neural Pathways	
Module Learning Objectives (At the end of the module, the students should be able to) 1 Describe the motor and sensory pathways, central autonomic pathway. 2 Conduct the presentation, group discussion and clinical examination regarding the motor, sensory pathways and central autonomic pathway. 3 Identify the motor, sensory pathways and central autonomic pathway.	
Unit 1 طرائق حركي (Tariq-e- Harki) Motor Pathways. طرائق حسي (Tariq-e- Hissi) Sensory Pathways.	

20.1.1. طریق حرکتی (Tariq-e- Harki) Motor Pathways. 20.1.2. طریق حسی (Tariq-e- Hissi) Sensory Pathways. References: 1,2,3,5,6,7,8,9,10,11,21,24,25,27,30,31,35,42,53,54,58,62,64,75,77,79,101,105						
3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the motor pathways.	3	Lecture	CC	Know	L_VC,L&GD,L,L&PPT
CO1,CO3, CO4,CO7	Demonstrate the sensory pathway.	5	Practical20.1	PSY-GUD	Shows-how	D-BED,RP,CBL,D-M,SIM
CO1,CO3, CO4,CO7	Analyze the motor pathway.	7	Experiential-Learning20.1	CAN	Does	SDL,CBL,PER,RP
CO1,CO3, CO4,CO7	Demonstrate the motor pathway.	5	Practical20.2	PSY-GUD	Shows-how	CD,CBL,RP,SIM
CO1,CO3, CO7	Analyze the sensory pathway	6	Experiential-Learning20.2	CAN	Does	SDL,RLE,BS,CBL
CO1,CO4	Describe the sensory pathways.	2	Lecture	CC	Knows-how	BL,L&GD,L_VC,L&PPT
Unit 2 طریق مرکزی غیر ارادی کا تعارف (Tariq-e- Markazi Ghair iradi ka Ta'aruf) Introduction of Central Autonomic Pathways. محور کظری نخاعی تختانی (Mehwar-e-Kuzri tahtani) Hypothalamic-pituitary-adrenal (HPA) axis. طریق شری تختانی (Tareeq-e- shirki Tahtani) Hypothalamic-sympathetic pathway. طریق ساقی جاد شری (Tareeq-e-saqi jar shirki) Brainstem-parasympathetic .pathway. انعکاس شری نخاعی (Ine'ikas-e-shirki nukhae'i) Spinal-sympathetic reflex. 20.2.1. طریق مرکزی غیر ارادی کا تعارف (Tariq-e- Markazi Ghair iradi ka Ta'aruf) Introduction of Central Autonomic Pathways. 20.2.2. محور کظری نخاعی تختانی (Mehwar-e-Kuzri tahtani) Hypothalamic-pituitary-adrenal (HPA) axis. 20.2.3. طریق شری تختانی (Tareeq-e- shirki Tahtani) Hypothalamic-sympathetic pathway.						

20.2.4. طریق ساقی جارشرکی (Tareeq-e-saqi jar shirki) Brainstem-parasympathetic .pathway.

20.2.5. انعکاس شرکی نخاعی (Ine'ikas-e-shirki nukhae'i) Spinal-sympathetic reflex.

References: 1,2,3,4,5,6,7,8,10,11,16,21,24,25,27,30,31,35,42,53,54,58,62,64,75,77,79,101,105

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Discuss the introduction of the central autonomic pathways and Describe the Hypothalamic-pituitary-adrenal (HPA) axis and Hypothalamic-sympathetic pathway.	3	Lecture	CC	Knows-how	L&PPT ,L_VC,L&GD,BL
CO1,CO3, CO4,CO7	Demonstrate the Hypothalamic-pituitary-adrenal (HPA) axis and Hypothalamic-sympathetic pathway.	5	Practical20.3	PSY-GUD	Shows-how	D-M,CBL,DIS,PL,RP
CO1,CO3, CO4,CO7	Analyze the hypothalamic-pituitary-adrenal (HPA) axis and Hypothalamic-sympathetic pathway.	7	Experiential-Learning20.3	CAN	Does	JC,PL,W,CBL
CO1,CO3, CO4,CO7	Demonstrate the Brainstem-parasympathetic pathway and Spinal-sympathetic reflex.	5	Practical20.4	PSY-GUD	Does	PL,D-M,CBL,RP,DIS
CO1,CO3, CO4,CO7	Analyze the Brainstem-parasympathetic pathway and Spinal-sympathetic reflex.	6	Experiential-Learning20.4	CAN	Shows-how	SDL,SIM,D-M,IBL,FC
CO1,CO4	Describe the Brainstem-parasympathetic pathway and Spinal-sympathetic reflex.	2	Lecture	CC	Knows-how	L_VC,L&PPT ,BL,L&GD
Practical Training Activity						

Practical Training 20.1 The Sensory Pathway

Total Learning Hours: 5 Hours

Activity 1: Teacher Demonstration (60 Min)

The Teacher will provide an overview of the sensory pathway, illustrating key components such as sensory receptors, ascending tracts (dorsal column-medial lemniscus, spinothalamic, and spinocerebellar tracts), and their role in transmitting sensory information to the brain. Live or digital anatomical models may be used.

Activity 2: Sensory Mapping with Hands-On Models (60 Min)

The teacher will provide models or 3D simulations, explain the key structures involved in the sensory pathway, and demonstrate how a stimulus travels through the pathway.

The student will use the models to trace the pathway themselves, labeling structures and explaining the flow of sensory input from receptors to the brain.

Activity 3: Role-Playing (60 Min)

The teacher will designate roles (e.g., receptor, sensory neuron), set up the classroom to represent different parts of the pathway, and guide the students on how information is relayed step-by-step.

The student will act out their assigned roles, passing along "signals" or "stimuli" with props or verbal cues, and collaboratively demonstrate the sensory pathway in action.

Activity 4: Interactive Simulation with Technology (60 Min)

The teacher will set up and introduce digital or VR simulations, explain how to interact with the technology, and highlight the visualization of the sensory pathway.

The student will engage with the simulation, applying different stimuli inputs, and observe or report on how the pathway reacts in real-time.

Activity 5: Experimental Activity: Reflexes and Perception (60 Min)

The teacher will set up experiments like the knee-jerk reflex test and provide tools for perception tests while explaining their connection to the sensory pathway.

The student will conduct the reflex and perception experiments in pairs or groups, record their observations, and link their findings back to theoretical concepts.

Practical Training 20.2 The Motor Pathway

Total Learning Hours: 5:00 Hours

Activity 1: Teacher Demonstration (60 Min)

The Teacher will illustrate the motor pathway using anatomical models, diagrams, and digital simulations, and explain the corticospinal and extrapyramidal tracts.

Activity 2: Anatomical Mapping with Models (60 Min)

The teacher will use anatomical models or diagrams of the central and peripheral nervous system to highlight structures involved in the motor pathway.

Students will trace the pathway from the motor cortex, through the brainstem and spinal cord, to the peripheral nerves and muscles, labeling each part and explaining its role in movement.

Activity 3: Role-Playing the Pathway (60 Min)

The teacher will assign students roles such as the motor cortex, upper motor neurons, lower motor neurons, and target muscles.

Students will act out the transmission of motor signals, demonstrating how instructions from the brain result in muscle contractions.

Activity 4: Hands-On Reflex Activity (60 Min)

The teacher will set up reflex experiments, like testing the stretch reflex (e.g., knee-jerk reflex) or withdrawal reflex.

Students will perform the experiments and discuss how motor signals are transmitted via the spinal cord for automatic movement responses.

Activity 5: Simulated Motor Tasks (60 Min)

The teacher will design activities like throwing a ball or gripping an object, while guiding students to analyze the movement.

Students will break down the process into steps, identifying the involvement of the motor cortex, spinal cord, peripheral nerves, and muscles in executing the task.

Practical Training 20.3 The HPA Axis and Hypothalamic-Sympathetic Pathway

Total Learning Hours: 5:00 Hours

Activity 1: Demonstration (60 min)

The teacher will illustrate the HPA axis and hypothalamic-sympathetic pathway using anatomical models, diagrams, and multimedia presentations. Key hormonal interactions, neural circuits, and physiological responses to stress will be highlighted.

Activity 2: Flowchart Modeling with Interactive Props (60 Min)

The teacher will create a flowchart representing the sequential activation of the HPA axis and hypothalamic-sympathetic pathway on a large board or screen. The students will use labeled props (e.g., cortisol for adrenal glands, CRH for the hypothalamus, ACTH for the pituitary) to place them on the flowchart in the correct sequence. They can also use arrows to trace the signaling flow between these structures.

Activity 3: Case Study and Problem-Solving (60 Min)

The teacher will present real-world or hypothetical scenarios, such as stress responses in athletes or patients with adrenal disorders.

The students will analyze these cases in groups, map out the involvement of the HPA axis and hypothalamic-sympathetic pathway, and discuss the physiological outcomes. They can also brainstorm clinical implications or treatments.

Activity 4: Simulation or Role Play (60 Min)

The teacher will assign roles to students, such as the hypothalamus, pituitary, adrenal glands, and sympathetic ganglia.

Students will act out the activation of the pathways by "releasing" hormones or neurotransmitters (represented by cards or props) and passing them to the next step in the sequence. This role play will demonstrate how stress stimuli lead to coordinated physiological responses.

Activity 5: Experimental Activity: Stress Response Measurement (60 Min)

The teacher will set up stress-response experiments, like measuring heart rate, blood pressure, and skin conductivity in response to mild stimuli (e.g., solving puzzles under time pressure).

Students will record their data and link their findings to the activation of the hypothalamic-sympathetic pathway and HPA axis, discussing the role of cortisol and autonomic changes.

Practical Training 20.4 The Brainstem-parasympathetic pathway and Spinal-sympathetic reflex.

Total Learning Hours: 5:00 Hours

Activity 1: Teacher Demonstration (90 Min)

The teacher will use anatomical models, diagrams, and digital simulations to illustrate the brainstem-parasympathetic pathway and spinal-sympathetic reflex.

They will explain the functional roles and interactions of these pathways in autonomic regulation.

Activity 2: Guided Hands-on Identification (60 Min)

Students will identify key structures related to these pathways on anatomical models, cadaveric specimens, or virtual dissection tools. They will trace the neural connections involved in autonomic reflexes.

Activity 3: Case-Based Application (90 Min)

Students will analyze clinical scenarios involving dysfunctions of the parasympathetic and sympathetic pathways, discussing their impact on physiological responses. They will propose diagnostic approaches based on their understanding.

Activity 4: Discussion & Peer Learning (60 Min)

Students will present their findings, engage in peer discussions, and receive feedback from the instructor. A Q&A session will reinforce key concepts and clarify doubts.

Experiential Learning Activity

Experiential-Learning Learning 20.1: The Motor Pathway

Total Learning Hours:7:00 Hours

Activity 1: Case-Based Analysis (60 Min)

Students will analyze clinical cases involving motor pathway dysfunctions (e.g., stroke, spinal cord injury).

They will identify affected components of the motor pathway (e.g., upper and lower motor neurons) and propose diagnostic strategies and treatment plans.

Activity 2: Simulation Experiments (90 Min)

Students will engage with interactive simulations that demonstrate motor pathway functions, such as voluntary and reflex movements.

They will manipulate variables (e.g., lesion sites) to observe how disruptions in the motor pathway impact muscle activity.

Activity 3: Role-Playing Neurological Examination (90 Min)

Students will role-play as neurologists and patients, performing neurological exams like reflex testing and muscle strength assessments.

They will interpret findings and correlate symptoms with specific motor pathway disruptions.

Activity 4: Motor Circuit Mapping (90 Min)

Students will create detailed diagrams or flowcharts of the motor pathway, including corticospinal and extrapyramidal tracts.

They will highlight key structures and illustrate clinical correlations, such as how damage to the basal ganglia affects motor control.

Activity 5: Literature Review and Presentation (90 Min)

Students will research recent studies on motor pathway function or dysfunction (e.g., advancements in neuroplasticity or motor rehabilitation).

They will present their findings, discussing the research implications for clinical practice and motor recovery techniques.

Experiential-Learning Learning 20.2: The Sensory Pathway

Total Learning Hours:6:00 Hours

Activity 1: Brainstorming and Group Discussion (90 Min)

Students will collaboratively brainstorm in small groups to identify the significance of specific sensory pathways.

They will discuss clinical scenarios related to each pathway, such as loss of pain or vibration sensation and share their insights with the class, ensuring diverse perspectives.

Activity 2: Clinical Case-Based Discussion (90 Min)

Students will analyze real patient cases involving sensory impairments (e.g., loss of touch or pain sensation).

Through group discussions, they will relate symptoms to disruptions in specific sensory pathways and propose diagnostic strategies or interventions.

Activity 3: Literature Search (90 Min)

Students will research rare sensory disorders (e.g., congenital insensitivity to pain) or recent advances in sensory pathway studies.

Findings will be summarized and presented to peers, highlighting clinical implications and current scientific understanding.

Activity 4: Real-Life Sensory Testing / Experiment (90 Min)

Students will conduct sensory tests on peers, such as light touch, vibration and proprioception assessments.

They will document observations, correlate findings with pathway anatomy and reflect on their understanding of sensory processing and potential dysfunctions

Experiential-Learning Learning 20.3: The hypothalamic-pituitary-adrenal (HPA) axis and Hypothalamic-sympathetic pathway

Total Learning Hours: 7:00 Hours

Activity 1: Case Study Analysis (90 Min)

Students will analyze detailed patient cases involving stress-related disorders such as chronic stress or adrenal insufficiency.

They will identify affected components of the HPA axis or hypothalamic-sympathetic pathway and develop diagnostic strategies.

Students will propose tailored treatment plans, including lifestyle modifications, medication, or stress management techniques.

Activity 2: Reflective Writing (90 Min)

Students will write reflections on how the HPA axis and hypothalamic-sympathetic pathway contribute to acute and chronic stress responses.

They will connect concepts to clinical relevance, discussing implications for health issues like hypertension, anxiety, or adrenal dysfunction.

Reflections may include personal insights or hypothetical scenarios for broader exploration.

Activity 3: Journal Club Presentation (90 Min)

Students will select journal articles on the HPA axis or hypothalamic-sympathetic pathway, focusing on studies examining stress responses or adrenal function.

They will present findings to peers, including research outcomes and experimental methodologies.

Collaborative discussions will highlight the relevance of these studies to clinical applications, such as advancements in stress management therapies.

Activity 4: Clinical Correlation Workshop (90 Min)

Students will participate in workshops presenting clinical cases like stress-related hypertension or adrenal dysfunction.

They will trace pathways involved in these disorders, illustrating connections between hormonal imbalances and symptoms.

Groups will create flowcharts demonstrating feedback loops, neural control, and proposed interventions, enhancing visual comprehension.

Activity 5: Evaluate Clinical Applications (60 Min)

Students will explore clinical scenarios where dysregulation of these pathways is involved, such as in stress-related disorders, adrenal insufficiency, or autonomic dysfunction and suggest potential therapeutic interventions.

Experiential-Learning Learning 20.4: Brainstem-parasympathetic pathway and Spinal-sympathetic reflex

Total Learning Hours: 6 Hours

Activity 1: Clinical Case-Based Discussion (90 Min)

Students will analyze clinical cases such as autonomic dysreflexia or vagal overactivity.

They will identify the affected autonomic pathways (sympathetic or parasympathetic) and explain the underlying mechanisms.

Students will propose diagnostic approaches and treatment strategies

Activity 2: Problem-Based Learning (90 Min)

A problem such as orthostatic hypotension will be presented.

Students will investigate the cause, apply their knowledge of autonomic pathways and propose diagnostic and therapeutic solutions (e.g., compression stockings, medications).

Each group will present and justify their solutions, fostering critical thinking.

Activity 3: Video/Animation Review and Reflection (90 Min)

Students will watch medical animations or videos explaining autonomic pathways and reflex mechanisms.

They will then write reflective summaries, connecting the visual content to clinical relevance

Group discussions will follow to share and compare insights.

Activity 4: Journal Club Presentation (90 Min)

Students will select and analyze a scientific article related to autonomic reflexes or brainstem parasympathetic pathways.

Groups will present their findings, evaluate methodologies and discuss how the research enhances understanding of theoretical and clinical aspects.

Peer discussions will allow students to reflect on the research relevance and share perspectives.

Modular Assessment

Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C.	4

Total Hours of the Assessment: 4:00 Hours Case-Based Scenario with Pathway Mapping – 15 Marks Analyze a clinical case (e.g., motor/sensory/autonomic dysfunction), map affected pathways, and discuss pathophysiology and diagnosis. 2. Objective Structured Practical Examination (OSPE) – 15 Marks Stations: Motor Reflex Testing Sensory Pathway Testing Autonomic Reflex Testing HPA Axis Understanding 3. Concept Map & Pathway Integration – 10 Marks Create a concept map linking motor, sensory, and autonomic pathways, including the HPA axis and reflex arcs. 4. Clinical Case Discussion (Viva) – 10 Marks Discuss a clinical case involving pathway dysfunction (e.g., stroke or autonomic disorder) and propose diagnostic tests and treatment. or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	
Semester No : 5	
Module 21 : نظام تحت السری، جونی، قاعدی اور شکی (Nizam-e-Tahataassareeri, Jaufi, Qa'edi and Shabki) Hypothalamo-Hypophyseal System, Limbic system	

Module Learning Objectives (At the end of the module, the students should be able to) 1 Describe the hypothalamo-hypophyseal system, limbic system, basal nuclei, reticular system. 2 Conduct the presentation, group discussion and clinical examination regarding hypothalamo-hypophyseal system, limbic system, basal nuclei, reticular system. 3 Identify the different structures of Hypothalamo-Hypophyseal System, Limbic system, Basal Nuclei, Reticular System.						
Unit 1 نظام تحت السري و تحت النخاع (Nizam-e-Tahataassareeri wa Tahtan-Nukha,ei) Hypothalamo-Hypophyseal System. نظام جوفى (Nizam e Jaufi) Limbic system. 21.1.1. نظام تحت السري و تحت النخاع (Nizam-e-Tahataassareeri wa Tahtan-Nukha,ei) Hypothalamo-Hypophyseal System. نظام جوفى (Nizam e Jaufi) Limbic system. References: 1,2,3,4,5,6,7,8,10,11,16,21,24,25,27,30,31,35,42,53,54,58,62,64,75,77,79,101,105						
3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe hypothalamo-hypophyseal system in detail.	3	Lecture	CC	Know	BL,L_VC,L&PPT ,L&GD
CO1,CO3, CO4,CO7	Demonstrate the hypothalamo-hypophyseal system.	5	Practical21.1	PSY- GUD	Shows-how	CBL,DIS,D-M,FC
CO1,CO4, CO7	Analyze the hypothalamo-hypophyseal system.	7	Experiential- Learning21.1	CAN	Does	JC,RP,PER,DIS,PL
CO1,CO4	Describe the limbic system in detail.	2	Lecture	CC	Knows-how	BL,L&GD,L_VC,L&PPT
CO1,CO3, CO4,CO7	Demonstrate the limbic system.	5	Practical21.2	PSY- GUD	Shows-how	DIS,BS,D-M
CO1,CO4, CO7	Analyze the limbic system.	6	Experiential- Learning21.2	CAN	Does	DIS,PER,CBL,JC,PL

Unit 2 نواة قاعدی (Nawat-e-Qa'edi) Basal Nuclei. نواة شبکی (Nizam-e-Shabki) Reticular System.

21.2.1. نواة قاعدی (Nawat-e-Qa'edi) Basal Nuclei.

21.2.2. نواة شبکی (Nizam-e-Shabki) Reticular System.

References: 1,2,3,5,6,8,10,11,16,21,24,25,27,30,31,35,42,53,54,58,62,64,75,77,79,101,105

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the basal nuclei system in detail.	3	Lecture	CK	Knows-how	L&PPT ,L_VC,L&GD,BL
CO1,CO3, CO4,CO7	Demonstrate the basal nuclei.	5	Practical21.3	PSY- GUD	Shows-how	RP,D-M,CBL
CO1,CO4, CO7	Analyse the reticular system.	6	Experiential- Learning21.3	CAN	Does	FC,CBL,JC,DIS,D
CO1,CO4	Describe the reticular system.	2	Lecture	CC	Knows-how	L&GD,BL,L_VC,L&PPT
CO1,CO3, CO4,CO7	Demonstrate the reticular system.	5	Practical21.4	PSY- GUD	Shows-how	PER,PL,CBL,D-M,IBL
CO1,CO4, CO7	Analyze the basal nuclei.	7	Experiential- Learning21.4	CAN	Does	PER,JC,DIS,PL

Practical Training Activity

Practical Training 21.1 Hypothalamo-Hypophyseal System.

Total Learning Hours: 5 Hours

Activity 1: Demonstration (60 Min)

The teacher will explain the anatomical structures and functional zones of the hypothalamus and pituitary gland using 3D models, virtual anatomy software, or holographic projections. Connections between the hypothalamus and pituitary will be highlighted, along with their roles in endocrine regulation.

Students will observe the demonstration, take notes, and ask clarifying questions to reinforce understanding.

Activity 2: Clinical Case Discussion (PBL) (60 Min)

The teacher will introduce clinical scenarios involving pituitary tumors or hormonal imbalances such as diabetes insipidus and acromegaly, providing patient history and imaging data.

Students will analyze cases in groups, correlating symptoms with anatomical and functional abnormalities, and propose diagnostic strategies and treatment plans.

Activity 3: Neuroendocrine Pathway Mapping (90 Min)

The teacher will provide examples of hormonal release pathways and feedback mechanisms.

Students will draw flowcharts mapping hormone release pathways from the hypothalamus to the pituitary gland and peripheral endocrine glands. They will present their pathways, explaining the importance of feedback mechanisms and identifying areas prone to dysfunction.

Activity 4: Flipped Classroom (90 Min)

The teacher will provide preparatory materials such as videos or readings about the hypothalamo-hypophyseal system prior to the session.

Students will prepare by reviewing these materials independently and engage in an interactive discussion during class, participating in quizzes to test their knowledge and address misconceptions.

Practical Training 21.2 Limbic System.

Total Learning Hours : 5 Hours

Activity 1: Teacher Demonstration (60 Min)

Teacher will explain the anatomical structure and functional zones of the dorsal thalamus using 3D models, virtual anatomy software, or holographic projections.

Key nuclei, their connections, and sensory relay functions will be highlighted.

Students will observe the demonstration and take notes to reinforce their understanding, actively engaging by asking questions for clarification.

Activity 2: 3D Model / Poster Creation (90 Min)

Teacher will provide guidance and resources for designing 3D models or educational posters that showcase the dorsal thalamus's anatomy, nuclei, connections, and clinical relevance.

Students will design 3D models (using clay, printed, or digital methods) or posters in groups. They will present their creations to the class, explaining the anatomical and functional features, as well as emphasizing clinical correlations.

Activity 4: Imaging Interpretation Session (90 Min)

Teacher will demonstrate how to interpret CT/MRI brain images, focusing on identifying the dorsal thalamus and pathological changes.

Students will review imaging findings in small groups, correlating them with clinical presentations and anatomical structures. They will collaborate to identify pathology and discuss its implications.

Activity 5: Brainstorming & Quiz Session (60 Min)

Teacher will facilitate a brainstorming session covering the anatomy, functions, and clinical significance of the dorsal thalamus, followed by a rapid quiz round to consolidate knowledge.

Students will participate actively in brainstorming ideas, discussing challenging concepts, and answering quiz questions to test their understanding and deepen engagement.

Practical Training 21.3 Basal Nuclei

Total Learning Hours: 5 Hours

Activity 1: Teacher Demonstration (60 Min)

The teacher will demonstrate the anatomy, location, and connections of the basal nuclei using 3D models, virtual anatomy software, or holographic projections.

Emphasis will be placed on the functional zones and circuits involved in motor control and behavior modulation.

Students will observe the demonstration, take notes, and ask clarifying questions to enhance their understanding of the basal nuclei's structural and functional relationships.

Activity 2: Brain Dissection / Prosection / Virtual Lab (90 Min)

The teacher will guide students through the examination of brain specimens or virtual dissections, focusing on locating basal nuclei structures such as the caudate nucleus, putamen, globus pallidus, subthalamic nucleus, and substantia nigra.

Students will actively engage with preserved specimens or virtual tools to identify these structures and discuss their roles in sensory-motor integration and functional circuits.

Activity 3: Neuroimaging Review (CT / MRI Interpretation) (90 Min)

The teacher will demonstrate how to interpret CT and MRI brain imaging, focusing on basal nuclei regions and pathological changes such as lacunar infarcts or atrophy.

Students will review imaging slides collaboratively, identifying basal nuclei structures and correlating findings with clinical conditions. They will discuss implications for diagnosis and management.

Activity 4: Group Debate or Role Play (60 Min)

The teacher will facilitate a structured debate or role play where students take on roles such as physicians, neurologists, or researchers to discuss basal nuclei-related disorders, diagnosis, and treatment strategies.

Students will collaboratively engage in debates or role plays to evaluate contrasting perspectives on diagnostic approaches and interventions, fostering critical thinking and teamwork.

Practical Training 21.4 Reticular System.

Total Learning Hours : 5 Hours

Activity 1: Demonstration (30 Min)

The teacher will demonstrate the structure and functions of the reticular system using 3D anatomical models, virtual simulation software, or holographic projections. The focus will be on key components such as reticular formation, ascending and descending pathways, and their roles in motor control and alertness. Students will observe the demonstration, take notes, and engage in labeling diagrams to visually map the system's connections and functions.

Activity 2: Clinical Case-Based Learning (90 Min)

The teacher will introduce clinical scenarios involving dysfunctions of the reticular system, such as impaired consciousness or disrupted motor reflexes. MRI/CT scans will provide visual insights.

Students will analyze cases in groups, correlating anatomical knowledge with imaging data and clinical symptoms. They will discuss possible diagnoses and treatment strategies.

Activity 3: Group Presentation and Peer Teaching (90 Min)

The teacher will facilitate group presentations where students explain the anatomy and functions of the reticular system.

Students will work in groups to design educational posters or digital presentations, focusing on applied aspects such as its role in wakefulness, motor control, and clinical relevance. They will present their findings to peers and clarify concepts through Q&A.

Activity 4: Simulation and Inquiry-Based Learning (90 Min)

The teacher will create simulated environments to demonstrate reticular system functions, such as its role in alertness.

Students will engage in inquiry-based learning by posing questions related to real-world applications of the reticular system. They will interact with simulations, observe outcomes, and propose hypotheses for further exploration, deepening their understanding through hands-on inquiry.

Experiential Learning Activity

Experiential-Learning Learning 21.1: Hypothalamo-Hypophyseal System

Total Learning Hours:7:00 Hours

Activity 1: Interactive Histology Session (60 Min)

Students will identify histological features of the hypothalamus and pituitary gland using histological slides or virtual tools. They will connect their observations to disorders such as adenomas, discussing how structural abnormalities can impact hormonal regulation.

Activity 2: Clinical Pathology Review (60 Min)

Students will analyze clinical cases focusing on hormonal imbalances and hypothalamic-pituitary imaging findings. They will work in groups to correlate case details with anatomical and functional abnormalities, presenting their conclusions and proposed solutions.

Activity 3: Imaging Correlation Session (60 Min)

Students will examine CT/MRI data to identify abnormalities within the hypothalamic-pituitary axis. They will interpret findings and correlate them to clinical conditions such as pituitary adenomas, hormonal deficiencies, or dysfunctions, fostering practical diagnostic skills.

Activity 4: Collaborative Problem Solving (60 Min)

Students will work in teams to analyze real-world hormonal excess or deficiency problems. They will integrate their understanding of anatomy, physiology, and clinical aspects to develop diagnostic and therapeutic strategies and share their solutions with the class.

Activity 5: Journal Club (JC): (90 Min)

Students will review and present research articles focusing on the anatomy, regulation, and disorders of the hypothalamo-hypophyseal system. Groups will analyze methodologies, critique findings, and discuss potential future research directions, emphasizing critical thinking and collaborative learning.

Activity 6: Library Session (90 Min)

Students will conduct in-depth research using library resources to explore topics such as hormonal pathways, imaging techniques, and clinical conditions affecting the hypothalamo-hypophyseal system. They will compile their findings into reference guides or group presentations, improving their research and synthesis skills.

Experiential-Learning Learning 21.2: Limbic System

Total Learning Hours: 6:00 Hours

Activity 1: Journal Club Activity: Limbic System (2 Hours)

Students will review and present research articles or case studies exploring the anatomy, functions, and clinical relevance of the limbic system. Discussions will focus on topics such as emotional regulation, memory processing, and limbic system disorders like PTSD or epilepsy. Groups will critically analyze findings and propose future research directions.

Activity 2: Case-Based Learning (CBL) Activity: Limbic System (1 Hour)

Students will analyze clinical cases involving limbic system dysfunctions, such as memory loss or emotional disturbances. Groups will examine anatomical correlations, interpret imaging findings, and propose diagnostic approaches and treatment strategies.

Activity 3: Peer Teaching Activity: Limbic System (2 Hours)

Students will collaborate to prepare presentations on the anatomy and applied aspects of the limbic system. They will explain key concepts to their peers, such as circuit connections and functions, using visual aids like diagrams or models. Discussions will emphasize clinical applications and understanding.

Activity 4: Discussion and Q&A Session (1 Hour)

Students will engage in a structured discussion, answering questions related to the limbic system's function, clinical implications, and its interaction with other brain regions. They will debate different viewpoints and clarify concepts based on peer and instructor feedback.

Experiential-Learning Learning 21.3: Reticular System

Total Learning Hours: 6:00 Hours

Activity 1: Journal Club Activity: Reticular System (2 Hours)

Students will review and present research articles focused on the anatomy, functions, and clinical relevance of the reticular system. Discussions will explore topics like arousal, sleep-wake cycles, and motor coordination, integrating clinical applications such as consciousness disorders and motor impairments.

Activity 2: Simulation Activity: Reticular System (1.5 Hours)

Students will interact with virtual simulations showcasing the reticular system's neural pathways, analyzing variables like stimuli affecting arousal or motor reflexes. Groups will examine how disruptions impact consciousness and motor control, linking simulations to clinical scenarios

Activity 3: Case Study and Application (1.5 Hours)

Students will examine clinical cases related to reticular system dysfunction, such as coma, sleep disorders, and attention deficits.

They will interpret neurological findings and discuss their implications in patient care.

Activity 4 : Q&A and Discussion (1 Hour)

A guided Q&A session will allow students to clarify complex concepts and engage in discussions on the significance of the reticular system in daily physiological functions and neurological disorders.

Experiential-Learning Learning 21.4: Basal Nuclei

Total Learning Hours :7:00 Hours

Activity 1: Exploration and Conceptual Understanding (2 Hours)

Students will review the anatomical structures, functions, and neural connections of the basal nuclei. They will analyze its role in motor control, cognition, and behavior through interactive discussions and multimedia resources.

Activity 2: Journal Club Activity: Basal Nuclei (2 Hours)

Students will review and present journal articles focused on the functional anatomy, disorders and clinical relevance of the basal nuclei. Groups will critically analyze findings and discuss implications for diagnosis, treatment, and research.

Activity 3: Problem-Based Learning (PBL) Activity: Basal Nuclei (1 Hour)

Students will work on a simulated clinical case involving basal nuclei dysfunction, analyzing symptoms, imaging data, and anatomical correlations. Groups will propose diagnostic steps and treatment strategies, presenting their findings and discussing solutions collaboratively.

Activity 4: Application and Analysis (1 Hour)

Students will examine real-world clinical cases involving basal nuclei dysfunctions, such as Parkinson's disease and Huntington's disease. They will analyze how damage to specific basal nuclei structures affects movement and behavior.

Activity 5: Q&A and Critical Thinking Discussion (1 Hour)

Students will engage in a structured Q&A session, discussing key concepts, clarifying doubts, and debating the impact of basal nuclei disorders on neurological function. They will propose possible treatment approaches and diagnostic strategies based on their learning.

Modular Assessment

Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Total Hours of the Assessment: 4:00 Hours Interactive Quiz with Instant Feedback – 10 Marks	4

Students take an online quiz with multiple-choice and short-answer questions on the function and dysfunction of the hypothalamo-hypophyseal system, limbic system, basal nuclei, and reticular system. 2. Role-Playing & Simulation – 12 Marks Students engage in role-playing exercises simulating patient care scenarios where they must diagnose and propose treatment for disorders related to these systems. 3. Conceptual Poster Presentation – 8 Marks Students create a poster summarizing the key concepts related to each system (hypothalamo-hypophyseal, limbic, basal nuclei, and reticular system). 4. Critical Review of Recent Research – 10 Marks Students will be assigned a recent research paper on one of the systems (e.g., the role of the hypothalamo-hypophyseal axis in stress response, or neurodegeneration in the basal nuclei). They will critically review. 5. Diagnostic Imaging Interpretation – 10 Marks Students are provided with MRI or PET scan images showing abnormalities in the hypothalamo-hypophyseal, limbic, basal nuclei, or reticular system. They must: Identify affected areas and propose a diagnostic approach and management plan based on imaging results. or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	
Module 22 : تشریح عصبی اطلاقی (Tashreeh-e- A'sabi Itlaqi) Clinical Neuroanatomy	
Module Learning Objectives (At the end of the module, the students should be able to)	

Describe the cross sectional anatomy of brain and spinal cord and Applied aspects of Nervous System.

Conduct the presentation, group discussion related to the cross sectional anatomy of brain and spinal cord and the presentation, group discussion and clinical examination regarding the applied aspects of Nervous system.

Identify the cross sectional anatomy of brain and spinal cord and applied aspects of Nervous system.

Unit 1 دماغ و نخاع کا مستعرض تراشه (Dimagh wa Nukha ka Tashreehi Musta'raz Tarsha) Cross Sectional anatomy of Brain and Spinal cord.

22.1.1. دماغ و نخاع کا مستعرض تراشه Dimagh wa Nukha ka Tashreehi Musta'raz Tarsha (Cross Sectional anatomy of Brain and Spinal cord.

References: 1,2,3,5,6,7,8,9,10,11,16,20,21,23,25,27,30,31,35,42,53,54,58,62,64,75,77,79,101,105

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the cross-sectional anatomy of brain.	3	Lecture	CC	Knows-how	L&PPT ,L_VC,L&GD,D-M
CO1,CO3,CO4,CO7	Demonstrate the cross sectional anatomy of brain.	5	Practical22.1	PSY-GUD	Shows-how	DIS,D-M,CBL,BS
CO1,CO4,CO7	Analyze the Cross Sectional anatomy of the brain.	7	Experiential-Learning22.1	CAN	Does	CBL,IBL,FC,DIS,SDL
CO1,CO3,CO4,CO7	Analyze the Cross Sectional anatomy of spinal cord.	6	Experiential-Learning22.2	CAN	Does	DIS,CBL,JC,SDL
CO1,CO4	Describe the cross sectional anatomy of the spinal chord.	2	Lecture	CC	Knows-how	L&GD,L_VC,L&PPT
CO1,CO3,CO4,CO7	Demonstrate the cross sectional anatomy of the spinal cord.	5	Practical22.2	PSY-GUD	Shows-how	SIM,D-M,CBL

Unit 2 نظام عصبی کے اطلاقی پہلو (Nizam e-A'sbi ke Itlaqi Pehlu) Applied aspects of Nervous System.

22.2.1. نظام عصبی کے اطلاقی پہلو (Nizam e-A'sbi ke Itlaqi Pehlu) Applied aspects of Nervous System.

References: 1,2,3,4,5,6,7,8,9,10,11,13,14,15,16,21,24,25,26,27,28,30,31,35,38,42,44,45,46,53,54,62,75,77,79,101,103,105

3A	3B	3C	3D	3E	3F	3G
CO1,CO4, CO7	Describe the applied aspects of the central nervous system in detail.	3	Lecture	CC	Know	BL,L_VC,L&GD,L&PPT
CO1,CO4, CO7	Demonstrate the applied aspects of the peripheral nervous system.	5	Practical22.3	PSY- GUD	Shows-how	D,BS,DIS
CO1,CO4, CO7	Analyze the applied aspects of the peripheral nervous system.	6	Experiential- Learning22.3	CAN	Does	CD,CBL,D,DIS
CO1,CO4, CO7	Describe the applied aspects of the peripheral nervous system in detail.	2	Lecture	CC	Knows-how	BL,L&GD,L_VC,L&PPT
CO1,CO3, CO4,CO7	Demonstrate the applied aspects of the Central nervous system.	5	Practical22.4	PSY- GUD	Shows-how	D,BS,SIM
CO1,CO4, CO7	Analyze the applied aspects of the central nervous system.	7	Experiential- Learning22.4	CAN	Does	RLE,PL,SDL,DIS

Practical Training Activity

Practical Training 22.1 Cross Sectional Anatomy of the Brain

Total Learning Hours: 5 Hours

Activity 1: 3D Anatomical Model Demonstration (60 Min)

The teacher will use 3D brain models to demonstrate major brain structures and sectional planes, emphasizing spatial relationships and the functional importance of each section.

Students will observe and interact with the models to reinforce their understanding of gross anatomy.

Activity 2: Histology Slide Analysis (60 Min)

The teacher will guide the examination of histological slides showing brain tissue features, connecting microscopic structures to gross sectional anatomy.

Students will analyze these slides to identify key components and discuss their relevance to neurological function and pathology.

Activity 3: Brainstorming Session (90 Min)

The teacher will facilitate discussions on the clinical applications of brain sectional anatomy in fields such as neurology, neurosurgery and imaging.

Students will brainstorm ideas and explore real-world scenarios where cross-sectional knowledge aids in diagnosis and treatment planning.

Activity 4: Clinical Simulation / Case-Based Scenarios (90 Min)

The teacher will present simulated cases involving brain injuries or pathologies, emphasizing the diagnostic importance of cross-sectional anatomy.

Students will analyze these scenarios, correlating anatomy with clinical presentations and propose diagnostic and management strategies.

Practical Training 22.2 Cross Sectional Anatomy of the Spinal Cord.

Total Learning Hours : 5 Hours

Activity 1: Teacher Demonstration (60 Min)

The teacher will demonstrate spinal cord cross-sections, highlighting grey and white matter, spinal tracts, nuclei and their clinical relevance using 3D models or virtual anatomy software.

Students will observe the presentation, note the anatomical details and ask questions to clarify concepts.

Activity 2: Case-Based Learning (60 Min)

The teacher will present clinical cases involving spinal cord injuries, syringomyelia, or multiple sclerosis, providing patient history and imaging data.

Students will work in groups to analyze the cases, connect symptoms to specific spinal levels and propose diagnostic and treatment approaches.

Activity 3: Poster / Chart Making (90 Min)

The teacher will provide guidance for creating educational charts on spinal tracts, nuclei and the applied anatomy of cross-sections.

Students will collaborate in groups to design charts or posters, visually representing CNS structures and their clinical significance. These will be shared and explained during presentations.

Activity 4: Simulation-Based Activity (90 Min)

The teacher will demonstrate the use of simulation models to illustrate spinal cord injuries and their effects at various levels.

Students will interact with the simulation models, practicing identification of injury levels and explaining functional impairments to peers.

Practical Training 22.3 Applied Aspects of the Peripheral Nervous System

Total Learning Hours : 5 Hours

Activity 1: Teacher Demonstration (60 Min)

The teacher will explain the anatomy of peripheral nerves, nerve roots, and plexuses using 3D anatomical models and virtual dissection tools. Focus will be on their structure, course, and functional components (motor, sensory and autonomic).

Students will observe the demonstration, engage with questions and take notes to solidify their understanding.

Activity 2: Cross-Sectional Diagram Drawing & Labeling (60 Min)

The teacher will provide an overview of the structural organization of major peripheral nerves and plexuses.

Students will draw and label detailed diagrams, including motor, sensory and autonomic components, ensuring clarity and anatomical accuracy.

Activity 3: Imaging Interpretation Session (60 Min)

The teacher will introduce imaging modalities (MRI, ultrasound, nerve conduction studies) and their relevance in diagnosing peripheral nerve pathologies.

Students will interpret given images, identify conditions such as neuropathies and nerve entrapments and correlate findings with clinical symptoms.

Activity 4: Brainstorming Session (60 Min)

The teacher will facilitate a brainstorming discussion about real-life scenarios of peripheral nerve injuries, such as carpal tunnel syndrome or sciatic nerve injury.

Students will discuss the functional impact of these injuries, proposing ideas for clinical evaluation and treatment strategies.

Activity 5: Surface Anatomy & Palpation Activity (60 Min)

The teacher will demonstrate the surface anatomy and landmarks for identifying major peripheral nerves (e.g., sciatic, median and ulnar nerves).

Students will practice palpating the course of these nerves on peers, enhancing their understanding of peripheral nerve location and clinical examination techniques.

Practical Training 22.4 Applied Aspects of the Central Nervous System.

Total Learning Hours: 5:00 Hours

Activity 1: Teacher Demonstration (60 Min)

The teacher will demonstrate the anatomical and functional aspects of the brain, spinal cord and CNS pathways using 3D models or virtual anatomy applications.

Clinical examples such as spinal cord injuries or neural pathway disruptions will be emphasized.

Students will observe the demonstration, note key anatomical and applied features and engage in discussions to clarify concepts.

Activity 2: Brain and Spinal Cord Dissection / Virtual Lab (90 Min)

The teacher will guide students through dissections or virtual labs focusing on CNS structures, fiber tracts and their applied clinical anatomy.

Students will observe or perform dissections, identifying key CNS regions and discussing their functional relevance to conditions such as demyelination or spinal cord trauma.

Activity 3: Histology / Microscopy of CNS Structures (60 Min)

The teacher will demonstrate the histological examination of CNS tissues, highlighting features of neurons, glial cells and pathological changes.

Students will observe and analyze histological slides, correlating their findings with disease conditions such as gliomas or multiple sclerosis.

Activity 4: Brainstorming / Interactive Q&A (90 Min)

Teacher will facilitate brainstorming sessions to explore the clinical relevance of CNS anatomy and functions.

Students will actively participate in discussions, share ideas, and engage in a rapid Q&A session to reinforce their understanding of applied CNS concepts

Experiential Learning Activity

Experiential-Learning Learning 22.1: Cross Sectional Anatomy of the Brain.

Total Learning Hours: 7:00 Hours

Activity 1: Understanding the Cross-Sectional Anatomy of the Brain (2 Hours)

Students will begin by studying the structural organization of the brain using cross-sectional views. They will analyze key anatomical structures, including the cerebral cortex, basal nuclei, thalamus, hypothalamus, brainstem and cerebellum. Special emphasis will be placed on the differentiation of white and gray matter, the ventricular system and major sulci and gyri. They will also explore coronal, sagittal and axial cross-sections to understand spatial relationships between brain regions.

Activity 2: Peer Teaching Activity: Cross-Sectional Anatomy of the Brain (2 Hours)

Students will collaborate in groups to prepare and teach specific brain cross-sections (e.g., cortex, basal ganglia, thalamus). Lessons will include visuals and clinical correlations, such as strokes or neurodegeneration. Following the teaching, they will facilitate Q&A sessions, reinforcing understanding through interactive peer-led discussions.

Activity 3: Case-Based Analysis and Clinical Correlation (1.5 Hours)

Students will examine clinical case studies involving brain pathologies such as stroke, traumatic brain injury, tumors, and neurodegenerative diseases (e.g., Alzheimer's and Parkinson's disease). They will interpret cross-sectional imaging (MRI/CT scans) to identify key anatomical structures and pathological changes. Students will discuss how damage to specific brain areas affects cognition, motor control and sensory processing.

Activity 4: Q&A Session and Peer Discussion (1.5 Hours)

Students will participate in an interactive Q&A session where they present their case analyses, discussing the significance of cross-sectional brain anatomy in clinical diagnosis and treatment. They will answer questions related to brain structure-function relationships, the impact of lesions, and potential interventions such as neurosurgical procedures and neurorehabilitation. Peer discussions will encourage debate on emerging technologies in brain imaging, including functional MRI (fMRI) and diffusion tensor imaging (DTI).

Experiential-Learning Learning 22.2: Cross Sectional Anatomy of Spinal Cord

Total Learning Hours: 6:00 Hours

Activity 1: Understanding the Cross-Sectional Anatomy of the Spinal Cord (2 Hours)

Students will begin by reviewing the structural organization of the spinal cord, including its gray and white matter distribution, major tracts, and functional zones. They will study the arrangement of dorsal and ventral horns, central canal, and surrounding meninges. Additionally, they will explore key features such as the division of the spinal cord into cervical, thoracic, lumbar, sacral, and coccygeal regions, each with distinct anatomical characteristics. Special emphasis will be placed on understanding the role of different spinal cord levels in motor and sensory functions.

Activity 2: Journal Club (1.5 Hours)

Students will review and discuss research articles or case studies focusing on the cross-sectional anatomy of the spinal cord and its clinical correlations. Topics may include spinal cord injuries, demyelination disorders, or nerve root compressions. Discussions will emphasize understanding the arrangement of grey and white matter, spinal tracts and their significance in motor and sensory pathways, fostering critical thinking and clinical application.

Activity 2: Case-Based Analysis and Clinical Correlation (1 Hour)

Students will analyze clinical cases involving spinal cord injuries and disorders, such as spinal cord compression, herniated discs, and diseases like multiple sclerosis or spinal cord tumors. They will interpret cross-sectional imaging (MRI/CT scans) to identify key anatomical structures and pathological changes. Additionally, they will examine how specific lesions in different spinal cord regions affect sensory and motor pathways, leading to conditions like paraplegia, quadriplegia, or Brown-Séquard syndrome.

Activity 3: Q&A Session and Peer Discussion (1.5 Hours)

Students will engage in an interactive Q&A session where they will present findings from their case analyses and discuss clinical implications. They will answer questions related to spinal cord anatomy, functional impairments due to injuries, and potential treatment approaches, including surgical interventions and neurorehabilitation. Peer discussion will encourage debate on emerging advancements in spinal cord research, such as regenerative medicine and spinal cord stimulation therapies.

Experiential-Learning Learning 22.3: Applied Aspects of the Peripheral Nervous System

Total Learning Hours: 6:00 Hours

Activity 1: Introduction to the PNS and Its Clinical Relevance (2 Hours)

The student will begin by reviewing the anatomical and physiological structure of the peripheral nervous system (PNS) and its role in transmitting signals between the central nervous system (CNS) and the rest of the body. They will explore its function in sensory input, motor control, and autonomic regulation. Special attention will be given to clinical relevance, such as the diagnosis and treatment of PNS disorders (e.g., peripheral neuropathies, carpal tunnel syndrome, and Guillain-Barré syndrome). The student will then discuss how disruptions in the PNS can lead to sensory, motor, or autonomic dysfunctions in patients.

Activity 2: Analyzing Clinical Scenarios and Case Studies (2 Hours)

In this step, the student will analyze real-world clinical case studies that involve PNS disorders. For example, they will examine cases of diabetic neuropathy, traumatic nerve injuries, and conditions like sciatica or Bell's palsy. The student will assess how these conditions affect patients' quality of life, how diagnosis is performed (e.g., nerve conduction studies, electromyography), and the treatment options available. They will explore how healthcare providers address these issues through both medical and therapeutic interventions, understanding the pathophysiology and potential recovery processes.

Activity 3: Interactive Discussion and Q&A Session (2 Hours)

The student will participate in an interactive Q&A session, where they will present and discuss their understanding of the applied aspects of the PNS. This includes questions related to the management of PNS disorders, emerging treatment strategies (e.g., nerve regeneration techniques or targeted therapies), and ethical considerations in patient care. Students will analyze and debate current clinical practices, offering insights on how the healthcare system can improve diagnosis, prevention, and management of PNS disorders. Peer discussion and feedback will encourage critical thinking and refinement of knowledge.

Experiential-Learning Learning 22.4: Applied Aspects of the Central Nervous System.

Total Learning Hours: 7 Hours

Activity 1: Understanding the Applied Aspects of the CNS (2 Hours)

The student will begin by reviewing the structure and function of the central nervous system (CNS) in relation to clinical and medical practices. This includes examining how the CNS impacts various bodily functions, neurological disorders and treatments. The student will identify key areas where the CNS plays a role in patient care, such as neurological assessments, diagnostic imaging and surgical interventions.

Activity 2: Analyzing Real-World Clinical Scenarios (1.5 Hours)

The student will analyze clinical case studies where CNS dysfunctions are prevalent, such as strokes, neurodegenerative diseases and brain injuries. They will examine the implications of these conditions on patient health, diagnostic techniques and treatment plans. Students will apply their understanding of CNS structure and function to these cases, exploring how the system's health directly influences clinical outcomes and care decisions.

Activity 3: Journal Club (JC): Applied Aspects of the Central Nervous System (2 Hours)

Students will review and present research articles or case studies focusing on applied aspects of the central nervous system, such as neural control of motor functions, cognitive processing and clinical conditions like stroke or multiple sclerosis. Discussions will emphasize the connection between anatomy, physiology and clinical practice, fostering critical thinking and collaborative analysis.

Activity 4: Discussion, Critical Thinking and Q&A Session (1.5 Hours)

During this interactive step, students will engage in a Q&A session where they will address real-world questions about the CNS's applied aspects, such as how emerging therapies or interventions can address CNS conditions. Students will discuss the limitations, ethical considerations and advancements in CNS research and treatments. They will present their own analyses and suggestions for improving clinical practices related to CNS disorders, encouraging peer discussion and feedback.

Modular Assessment

Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Total Hours of the Assessment: 4:00 Hours Cross-Sectional Imaging Interpretation – 15 Marks Task: Students are given cross-sectional images (MRI/CT scans) of the brain and spinal cord for interpretation. 2. Applied Case Study Analysis – 12 Marks	4

Present students with clinical case studies that involve applied aspects of the nervous system, such as spinal cord injury, stroke, or neurodegenerative diseases. 3. Concept Map Creation – 8 Marks Students will create a concept map that integrates cross-sectional anatomy of the brain and spinal cord with clinical applications (e.g., pathologies like multiple sclerosis, spinal cord lesions). 4. Objective Structured Practical Examination (OSPE) – 15 Marks In this practical exam, students rotate through various stations focused on cross-sectional anatomy and applied aspects of the nervous system. Stations might include: Brain anatomy station: Identification of key regions on MRI/CT scans. Spinal cord station: Interpretation of spinal cord injuries or pathologies (e.g., disc herniation). Clinical signs station: Observing clinical symptoms and matching them to specific brain/spinal cord lesions. or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	
Semester No : 6	
Module 23 : عصبى اليااف (Asab-e-alyaf) Nerve fibres. عصبى ضفيرات (Asabi Zafiraat) Nerve Plexuses.	
Module Learning Objectives (At the end of the module, the students should be able to) 1 Describe the cranial and spinal nerves, upper motor neuron and lower motor neuron 2 Conduct the presentation, group discussion and clinical examination regarding the cranial and spinal nerves, upper motor neuron and lower motor neuron	

3 Identify the cranial and spinal nerves, upper motor neurons and lower motor neurons.

Unit 1 عصب مرکزی (Asab-e- Markazi) Central Nerve. عصب محیطی (Asab-e- Muheeti) Peripheral Nerve. عصبی ضفیرات (Asabi Zafiraat) Nerve Plexuses.

23.1.1. عصب مرکزی (Asab-e- Markazi) Central Nerve.

23.1.2. عصب محیطی (Asab-e- Muheeti) Peripheral Nerve.

23.1.3. عصبی ضفیرات (Asabi Zafiraat) Nerve Plexuses.

References: 1,2,3,4,5,6,8,10,11,16,18,21,24,25,27,30,31,35

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the central nerves.	2	Lecture	CC	Know	BL,L&PPT ,L_VC,L&GD
CO1,CO4, CO7	Demonstrate the central nerves and their applied aspects.	4	Practical23.1	PSY- GUD	Shows-how	SIM,RLE,CBL,D
CO1,CO4, CO7	Analyze the central nerves and their applied aspects.	5	Experiential- Learning23.1	CAN	Does	DIS,PL,CBL,SDL
CO1,CO4, CO7	Analyze the Peripheral nerves and nerve plexuses.	4	Experiential- Learning23.2	CAN	Does	DIS,D,PL,CBL
CO1,CO4	Describe the peripheral nerves.	2	Lecture	CC	Know	L_VC,L&PPT ,BL,L&GD
CO1,CO4, CO7	Demonstrate the Peripheral nerves and nerve plexuses.	3	Practical23.2	PSY- GUD	Shows-how	SDL,D,D-M,SIM,IBL
CO1,CO4	Describe the Nerve plexuses.	1	Lecture	CC	Knows-how	L_VC,L&PPT ,BL,L&GD

CO1,CO4, CO7	Analyze the applied aspects Peripheral nerves and nerve plexuses.	4	Experiential- Learning23.3	CAN	Shows-how	CBL,DIS,SDL,CD
CO1,CO4, CO7	Demonstrate the applied aspects of Peripheral nerves and nerve plexuses.	3	Practical23.3	PSY- GUD	Does	D-M,D,PL,CBL
Unit 2 عصبیہ حرکی اعلیٰ (Asabiyah Harki, A'la) Upper motor Neuron. عصبیہ حرکی اسفل (Asbiyah Harki asfal) Lower motor Neuron. 23.2.1. عصبیہ حرکی اعلیٰ (Asabiyah Harki, A'la) Upper motor Neuron. 23.2.2. عصبیہ حرکی اسفل (Asbiyah Harki asfal) Lower motor Neuron. References: 1,2,3,4,5,6,7,8,9,10,11,16,21,24,25,27,30,31,35,42,53,54,58,75,79,101,105						
3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the upper motor neurons in detail.	3	Lecture	CC	Know	BL,L&GD,L_VC,L&PPT
CO1,CO4, CO7	Demonstrate the Upper motor Neurons and their applied aspects.	5	Practical23.4	PSY- GUD	Shows-how	CBL,D-BED,PL,SIM,D
CO1,CO4, CO7	Analyze the upper motor neuron and their applied aspects.	6	Experiential- Learning23.4	CAN	Does	DIS,FC,BS,JC,PER
CO1,CO4, CO7	Analyze the Lower motor Neurons and their applied aspects.	7	Experiential- Learning23.5	CAN	Does	D,CBL,SIM,D-BED
CO1,CO4	Describe the lower motor neurons in detail.	2	Lecture	CC	Know	PL,L&PPT ,BL,L_VC,L&GD

CO1,CO4, CO7	Demonstrate the lower motor Neurons and their applied aspects.	5	Practical23.5	PSY- MEC	Shows-how	D,SIM,CD,D-BED
Practical Training Activity						
Practical Training 23.1 Applied Aspects of Central Nerves.						
Total Learning Hours: 4:00 Hours Activity 1: Teacher Demonstration (1 Hour) The Teacher will provide an overview of central nerves, their anatomical pathways and clinical significance using models, diagrams and imaging techniques. Real-life cases will be introduced to highlight applied aspects. Activity 2: Student Hands-on Illustration (1 Hour) Students will create detailed anatomical illustrations of central nerves, labeling key structures and pathways. They will analyze case-based scenarios where central nerve dysfunctions impact neurological function. Activity 3: Functional Demonstration & Group Discussion (1 Hour) Students will collaborate in small groups to demonstrate nerve functions using interactive activities and simulations. They will discuss clinical manifestations of central nerve damage and possible diagnostic approaches. Activity 4: Q&A and Case Analysis (1 Hour) A Q&A session will be conducted where students will analyze case studies related to central nerve disorders. They will present findings and discuss their clinical applications, reinforcing theoretical and practical understanding.						
Practical Training 23.2 Peripheral nerves and nerve plexuses						
Total Learning Hours: 3:00 Hours Activity 1: Teacher Demonstration (30 min)						

The instructor will provide an overview of peripheral nerves and nerve plexuses, explaining their anatomical organization, functions, and clinical significance. A live or digital demonstration will illustrate key nerve pathways and common nerve injuries.

Activity 2: Student Illustration and Mapping (60 min)

Students will sketch and label major peripheral nerves and plexuses (e.g., brachial, lumbar, sacral) on anatomical charts or models. They will identify key landmarks and trace nerve distributions to specific muscles and sensory areas.

Activity 3: Hands-on Demonstration (60 min)

Students will work in groups to locate and palpate nerve landmarks on each other or anatomical models. They will simulate nerve conduction pathways and discuss potential dysfunctions related to nerve compression or trauma.

Activity 4: Case-Based Application and Q&A (30 min)

Students will analyze case studies involving nerve injuries, such as carpal tunnel syndrome or sciatica. They will propose diagnostic and treatment approaches, followed by a Q&A session to reinforce their understanding of applied aspects.

Practical Training 23.3 Applied Aspects of Peripheral Nerves and Nerve Plexuses

Total Learning Hours: 3:00 Hours

Activity 1: Teacher Demonstration (30 min)

The teacher will illustrate the anatomy, function and clinical significance of peripheral nerves and nerve plexuses using anatomical models, diagrams and digital imaging. Key applied aspects, such as nerve injuries, neuropathies and surgical implications, will be explained.

Activity 2: Student Hands-on Illustration (60 min)

Students will create labeled diagrams of major nerve plexuses (cervical, brachial, lumbar, sacral) and their clinical correlations. They will analyze nerve pathways and mark potential sites of injury.

Activity 3: Case-Based Discussion & Application (60 min)

Students will examine real or simulated clinical cases involving nerve damage (e.g., carpal tunnel syndrome, sciatica). They will discuss symptoms, diagnostic approaches and potential treatments.

Step 4: Interactive Q&A and Peer Review (30 min)

Students will present their findings and diagrams to peers for feedback. The instructor will facilitate a Q&A session to clarify doubts and reinforce key concepts related to the applied aspects of peripheral nerves and plexuses.

Practical Training 23.4 Applied Aspects of Upper motor Neurons

Total Learning Hours: 5:00 Hours

Activity 1: Teacher Demonstration (60 Min)

The Teacher will illustrate the structure, function and pathways of upper motor neurons (UMNs) using detailed diagrams and models. They will also explain common clinical conditions related to UMN lesions, such as spasticity and hyperreflexia.

Activity 2: Student Illustration (90 Min)

Students will then draw diagrams to represent the UMN pathways, labeling key structures such as the motor cortex, corticospinal tract and brainstem. They will also identify the anatomical regions affected by UMN damage.

Activity 3: Student Demonstration (90 Min)

In small groups, students will simulate neurological assessments related to UMN lesions, including reflex testing (e.g., Babinski sign) and discuss the implications of findings for diagnosis and treatment planning.

Activity 4: Q&A Session (60 Min)

A discussion and Q&A session will follow, where students will share their observations, clarify doubts, and apply their knowledge to clinical case studies to deepen their understanding of the applied aspects of UMN function and disorders.

Practical Training 23.5 Applied aspect of lower motor neurons (LMNs).

Total Learning Hours: 5:00 Hours

Activity 1: Teacher Demonstration:(60 Min)

The teacher will begin by illustrating the structure and function of lower motor neurons (LMNs), explaining their role in transmitting signals from the spinal cord to muscles. Key concepts, such as the neuromuscular junction, reflex arcs and motor neuron diseases (e.g., ALS), will be covered.

Activity 2: Student Illustration (90 Min)

Students will illustrate the anatomy of LMNs, including their pathway from the spinal cord to muscle groups. They will mark relevant structures such as the anterior horn of the spinal cord, nerve roots and target muscles.

Activity 3: Practical Application (90 Min)

Students will simulate clinical scenarios involving LMN dysfunction, such as assessing signs of weakness, muscle atrophy and reflex abnormalities in a patient. They will practice identifying symptoms associated with LMN disorders.

Activity 4: Q&A and Reflection (60 Min)

Students will engage in a Q&A session to discuss their findings and any challenges faced during the activity. The teacher will facilitate a discussion to clarify the clinical significance of LMN involvement in neurological conditions.

Experiential Learning Activity

Experiential-Learning Learning 23.1: Central Nerve and its applied aspects

Total Learning Hours: 5:00 Hours

Activity 1: Explore the Anatomy and Function of the Central Nervous System (CNS) (1 Hour)

The student will begin by studying the structure and function of the central nervous system, including the brain and spinal cord. They will learn about the key components of the CNS, such as the cerebrum, cerebellum, brainstem, spinal cord and understand their roles in processing sensory input, coordinating motor output and regulating autonomic functions. The student will explore how the CNS integrates information, controls bodily functions and supports cognition, emotion and memory.

Activity 2: Analyze Clinical Case Studies and Applied Aspects of CNS Disorders (1 Hour)

The student will analyze clinical case studies that highlight common CNS disorders, such as stroke, multiple sclerosis (MS), spinal cord injuries and neurodegenerative diseases. They will investigate how these conditions disrupt normal CNS functions, leading to symptoms like paralysis, cognitive impairments

and sensory loss. Students will discuss diagnostic techniques, such as neuroimaging and neurological examinations, to assess CNS dysfunction and formulate treatment approaches.

Activity 3: Apply Therapeutic Approaches and Discuss Future Advances (2 Hours)

In this step, students will discuss and critically evaluate various therapeutic approaches used in the treatment of CNS disorders, including pharmacological treatments, surgical interventions and rehabilitation strategies. They will explore current research advancements, such as stem cell therapy and neuroplasticity, that aim to improve recovery and rehabilitation for CNS patients. Students will engage in a Q&A session to address questions about the challenges in treating CNS disorders and discuss future possibilities in neuroscience.

Activity 4 : Q&A Session (1 Hour)

In this interactive session, students will participate in a Q&A to clarify any uncertainties regarding the anatomy, function, clinical cases and applied aspects of the CNS. The session will allow students to engage with their peers and the instructor, exchange insights and deepen their understanding of CNS disorders and treatment options.

Experiential-Learning Learning 23.2: Peripheral nerves and Nerve Plexuses

Total Learning Hours : 4:00 Hours

Activity 1: Study the Structure and Function of Peripheral Nerves and Plexuses (1 Hour)

The student will begin by studying the anatomy of the peripheral nervous system (PNS), including the types of peripheral nerves (sensory, motor, and mixed) and their roles in transmitting signals between the central nervous system (CNS) and the rest of the body. They will focus on the major nerve plexuses: the brachial, lumbar, sacral and cervical plexuses and understand their contributions to sensory and motor functions in specific regions of the body. The student will also learn how these plexuses form intricate networks that enable movement and sensation.

Activity 2: Analyze Clinical Cases and Pathologies Involving Peripheral Nerves and Plexuses (1 Hour)

In this step, the student will analyze clinical case studies involving damage or dysfunction in the peripheral nerves and nerve plexuses. Students will study conditions such as brachial plexus injuries, carpal tunnel syndrome, sciatica, and other neuropathies. They will learn how these conditions affect motor and

sensory functions, and discuss diagnostic approaches such as electromyography (EMG), nerve conduction studies, and imaging techniques. The student will also explore the clinical implications of peripheral nerve injuries and possible treatment options.

Activity 3: Discuss Treatment and Rehabilitation of Peripheral Nerve Disorders (1 Hour)

Students will explore therapeutic approaches used in the treatment of peripheral nerve disorders, including pharmacological interventions, physical therapy, surgical procedures and nerve regeneration techniques. They will also analyze emerging treatments, such as nerve grafts and bioelectronic devices, which aim to repair or regenerate damaged peripheral nerves. The student will engage in a Q&A session where they will present their findings, discuss therapeutic options and reflect on the challenges of managing nerve injuries.

Activity 4: Q&A Session: (1 Hour)

In this interactive session, students will have the opportunity to ask questions, clarify doubts, and deepen their understanding of the anatomical and clinical aspects of the peripheral nerves and nerve plexuses. They will discuss complex scenarios and treatment options with peers and the instructor to consolidate their knowledge.

Experiential-Learning Learning 23.3: Applied Aspects of Peripheral nerves and nerve plexuses

Total Learning Hours :4:00 Hours

Activity 1: Case-Based Analysis (60 Min)

Students will examine real or simulated clinical cases involving peripheral nerve injuries, nerve compression syndromes, or plexus disorders. They will analyze anatomical structures, pathways and functional impairments to determine the clinical presentation and consequences of these conditions.

Activity 2: Practical Application & Discussion (120 Min)

Students will collaborate in groups to map nerve distributions, identify affected regions in various clinical scenarios and propose potential diagnostic and treatment approaches. They will compare findings and discuss real-world applications of their knowledge in neurological assessments and rehabilitation strategies.

Activity 3: Q & A Session and Critical Review (60 Min)

Students will engage in a guided Q&A session where they present their analyses and receive instructor and peer feedback. They will discuss challenges in diagnosis and treatment, refining their understanding of the applied aspects of peripheral nerve anatomy and plexuses in clinical practice.

Experiential-Learning Learning 23.4: Applied aspect of Upper Motor Neuron

Total Learning Hours: 6:00 Hours

Activity 1: Concept Review and Analysis (1.5 Hours)

Students begin by revisiting theoretical knowledge of the upper motor neuron (UMN) structure, pathways and functions through focused study guides or multimedia content.

They collaboratively analyze the role of UMNs in motor control, emphasizing key differences between UMNs and lower motor neurons and participate in structured discussions to consolidate their understanding.

Activity 2: Clinical Correlation and Case Study (1.5 Hours)

Students dive into detailed clinical case scenarios, such as stroke, spinal cord injuries, or neurodegenerative disorders affecting UMN pathways.

They work in small groups to identify UMN lesion signs such as spasticity, hyperreflexia, or paralysis, comparing these with related lower motor neuron presentations to enhance clinical differentiation.

Visual aids like MRI images or patient symptom charts are introduced to foster real-world diagnostic thinking.

Activity 3: Q&A Session and Group Discussion (1 Hour)

Students engage in a dynamic Q&A session, where facilitators guide them through nuanced case analyses, focusing on points of clinical uncertainty or debate.

Group discussions expand into differential diagnoses, emphasizing how UMN-related knowledge informs clinical decision-making and treatment planning.

Activity 4: Journal Club Activity (2 Hours)

Students select and review recent research articles, clinical studies, or meta-analyses related to UMN disorders, forming diverse perspectives on the selected topics.

Presentations are followed by peer-led discussions and critical appraisals, encouraging students to evaluate the methodological rigor, findings and relevance to modern clinical practice.

Participants collaboratively brainstorm innovative research ideas based on knowledge gaps identified during the activity.

Experiential-Learning Learning 23.5: Applied aspect of Lower Motor Neuron (LMN) lesions.

Total Learning Hours: 7:00 Hours

Activity 1: Case-Based Discussion (Application of Knowledge) (2 Hours)

Students will be presented with a clinical case related to Lower Motor Neuron (LMN) lesions, such as a patient with flaccid paralysis, muscle atrophy, and hyporeflexia. They will work in groups to analyze the case, identify the affected neural structures, and explain the underlying neurophysiology.

Activity 2: Hands-On Neurological Examination (Skill Development) (2.5 Hours)

Students will practice neurological examination techniques (e.g., muscle tone assessment, deep tendon reflex testing, and nerve conduction studies) on simulated patients or peers. They will document their findings and interpret results based on LMN dysfunction.

Activity 3: Clinical Correlation & Problem-Solving (Critical Thinking & Integration) (2.5 Hours)

Students will be presented with multiple differential diagnosis scenarios where they must distinguish between LMN disorders such as Guillain-Barré Syndrome, Poliomyelitis, and Peripheral Neuropathy. They will work in teams to formulate a diagnosis and propose management strategies.

Modular Assessment

Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Total Hours of the Assessment: 4:00 Hours 1. Diagnostic Imaging Quiz – 20 Marks Teacher will Provide cross-sectional images (MRI/CT) showing lesions in the central nervous system or peripheral nerve involvement. Students need to: Identify the location and type of the lesion (e.g., upper motor neuron or lower motor neuron). Explain the implications of the lesion in terms of motor and sensory function (e.g., paralysis, reflex changes). 2. Concept Map – 8 Marks	4

Students create a concept map linking the upper motor neurons, lower motor neurons, central nervous system, peripheral nervous system, and nerve plexuses. 3. Practical Clinical Examination – 12 Marks Students will demonstrate practical neurological assessments to detect signs of upper motor neuron (UMN) and lower motor neuron (LMN) dysfunction. For example, testing reflexes, muscle tone, and voluntary movement. 4. Case-Based Discussion – 10 Marks Teacher will Provide a clinical case study with symptoms of motor and sensory dysfunction. For example, a patient presents with weakness, loss of muscle tone, atrophy, or fasciculations. or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	
Module 24 : مجموعہ سریری (Majmo'ah-e- Sareeri) Thalamic complex , النظام البطني وغذاء تحت العنكبوت (Nizam-e-Batani wa khil'a Tahat-e-Ankabutiyah) Ventricular system and Sub Arachnoid spaces.	
Module Learning Objectives (At the end of the module, the students should be able to) 1 Describe the thalamic complex and ventricular system of the brain. 2 Conduct the presentation, group discussion and clinical examination regarding the thalamic complex, ventricular system of the brain. 3 Identify the different components of the thalamic complex and ventricular system of the brain. and Clinical presentation of ventricles of Brain.	
Unit 1 سریر مؤخر (Sareer-e-Moakh'ar) Dorsal thalamus. سریر مقدم (Sareer-e-Muqaddam) Ventral thalamus. 24.1.1. سریر مؤخر (Sareer-e-Moakh'ar) Dorsal thalamus. 24.1.2. سریر مقدم (Sareer-e-Muqaddam) Ventral thalamus.	

References: 1,2,3,4,5,6,7,8,10,11,16,21,24,25,27,30,31,35,42,53,54,58,62,64,75,77,79,101,105						
3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the Dorsal thalamus.	3	Lecture	CC	Know	L&GD,BL,L&PPT ,L_VC
CO1,CO4, CO7	Demonstrate the Dorsal thalamus.	5	Practical24.1	PSY- GUD	Shows-how	D-M,CBL,PER,SIM,FC
CO1,CO4, CO7	Analyze the Ventral thalamus.	6	Experiential- Learning24.1	CAN	Does	RP,PL,PER,DIS,PBL
CO1,CO4	Describe the Ventral thalamus.	2	Lecture	CC	Know	SDL,L&PPT ,BL,L&GD,L_VC
CO1,CO4, CO7	Analyze the Dorsal thalamus.	7	Experiential- Learning24.2	CAN	Does	FC,CBL,IBL,SDL,PER
CO1,CO4, CO7	Demonstrate the Ventral thalamus.	5	Practical24.2	PSY- GUD	Shows-how	PL,DIS,D-M,CBL
Unit 2 نظام بطنی (Nizam-e-Batani)Ventricular system. خلاء تحت العنكبوت (Khil'a Tahat-e-Ankabutiyah) Sub Arachnoid spaces. 24.2.1. نظام بطنی (Nizam-e-Batani)Ventricular system. 24.2.2. خلاء تحت عنكبوتية (Khil'a Tahat-e-Ankabutiyah) Sub Arachnoid spaces. References: 1,2,3,4,5,6,7,8,10,11,16,21,24,25,27,30,31,35,42,53,54,58,62,64,75,77,79,101,105						
3A	3B	3C	3D	3E	3F	3G

CO1,CO4, CO7	Describe the Ventricular system of the brain and its applied aspects.	3	Lecture	CC	Know	L&PPT ,BL,L&GD,L_VC
CO1,CO4, CO7	Demonstrate the Ventricular system of the brain and its applied aspects.	5	Practical24.3	PSY- GUD	Shows-how	D-M,PER,PL,DIS,CBL
CO1,CO4, CO7	Analyze the Ventricular system of the brain and its applied aspects.	7	Experiential- Learning24.3	CAN	Does	PER,DIS,JC,PL,CBL
CO1,CO4, CO7	Describe the Sub Arachnoid spaces of the brain and its applied aspects.	2	Lecture	CC	Know	L_VC,L&PPT ,L&GD
CO1,CO4, CO7	Demonstrate the Sub Arachnoid spaces of the brain and its applied aspects.	5	Practical24.4	PSY- GUD	Shows-how	D-M,PER,D,CBL
CO1,CO4, CO7	Analyze the Sub Arachnoid spaces of the brain and its applied aspects.	6	Experiential- Learning24.4	CAN	Does	FC,PER,CBL,IBL,PL

Practical Training Activity

Practical Training 24.1 Dorsal Thalamus.

Total Learning Hours: 5 Hours

Activity 1: Teacher Demonstration (60 Min)

Students will learn about the dorsal thalamus through an interactive demonstration using 3D models, virtual anatomy software, or holographic projections. The explanation will focus on thalamic nuclei, their connections and sensory relay functions, fostering foundational understanding.

Activity 2: Brain Dissection (60 Min)

Students will observe preserved brain specimens or prosected samples or through virtual dissection to locate the dorsal thalamus. They will identify major thalamic nuclei and discuss their roles in sensory processing. This hands-on activity strengthens anatomical identification skills and real-world application.

Activity 3: Clinical Case-Based Discussion (90 Min)

Students will analyze real or simulated clinical cases involving thalamic lesions, sensory deficits, or pain syndromes. They will correlate anatomical knowledge with MRI/CT findings and neurological symptoms, enhancing their ability to connect theory to clinical practice.

Activity 4: 3D Model / Poster Creation (90 Min)

Students will collaborate in groups to design 3D models (clay, printed, or digital) or create educational posters illustrating the dorsal thalamus's anatomy, nuclei and functions. They will present their models or posters to the class, focusing on clinical correlations and functional relevance.

Practical Training 24.2 Ventral Thalamus.

Total Learning Hours: 5 Hours

Activity 1: Visual Demonstration Using Models or Virtual Tools (60 Min)

The teacher will demonstrate the anatomical and functional aspects of the ventral thalamus using 3D anatomical models or virtual anatomy software. The teacher will highlight its location, subnuclei and their roles in sensory and motor integration, making use of annotations and interactive features.

Students will observe the demonstration attentively, take detailed notes and ask questions to ensure clarity. They will then label diagrams or sketches provided by the teacher to consolidate their understanding.

Activity 2: Guided Hands-on Dissection or Prosection (90 Min)

The teacher will guide a hands-on activity where students examine brain specimens or a virtual prosection. The teacher will help students locate and identify the ventral thalamus and its connections to surrounding structures.

Students will actively engage by handling or observing specimens under supervision and pinpointing the ventral thalamus. They will discuss with peers how its position and structure relate to its sensory and motor roles.

Activity 3: Case-Based Learning with Role Play (90 Min)

Teacher will present a clinical case involving dysfunctions of the ventral thalamus, such as movement disorders or sensory processing issues. Real diagnostic tools like CT or MRI scans will be introduced as part of the discussion.

Students will assume roles such as neurologists, radiologists or patients. Each group will analyze the case collaboratively.

Activity 4: Collaborative Q&A and Peer Presentations (60 Min)

Teacher will facilitate a Q&A session, clarifying doubts and encouraging critical thinking about the ventral thalamus. The teacher will provide feedback during group presentations.

Students will form groups to prepare and present topics related to the ventral thalamus, such as its role in motor control and sensory processing or its clinical relevance. They will use diagrams, case data or multimedia resources to enhance their presentations.

Practical Training 24.3 Applied Aspects of the Ventricular System

Total Learning Hours : 5 Hours

Activity 1: Demonstration (60 Min)

The teacher will demonstrate the ventricular system of the brain using 3D anatomical models or virtual anatomy software. The teacher highlights the structure, CSF pathways and connections with surrounding regions.

Students will observe the demonstration and note key features. They will label diagrams provided during the session to consolidate understanding and ask questions for clarification.

Activity 2: Student Engagement (60 Min)

The teacher will guide a hands-on activity with brain specimens or virtual prosection, focusing on identifying the ventricular system's anatomical features and connections with cortical structures.

Students will engage by observing or handling specimens under supervision, locating key ventricular structures and discussing their functional significance and clinical implications in small groups.

Activity 3: Clinical Correlation Using Imaging (MRI/CT) (60 Min)

The teacher will demonstrate diagnostic imaging techniques, such as MRI and CT scans, to illustrate the ventricular system's anatomy and its involvement in disorders like hydrocephalus or ventriculitis.

Students will analyze the imaging provided and correlate anatomical observations with clinical presentations. They will work collaboratively to discuss potential diagnoses and treatment approaches based on the scans.

Activity 4: Q&A and Peer Teaching (60 Min)

The teacher will facilitate a Q&A session and provide guidance for peer teaching.

Students will prepare short presentations as part of peer teaching, explaining the anatomical and functional aspects of the ventricular system and its applied clinical relevance. They will use diagrams or case data to enhance their explanations.

Activity 5: Problem-Based Learning (PBL) (60 Min)

The teacher will introduce a clinical case scenario involving a ventricular system disorder, such as hydrocephalus. The case includes patient history, imaging data and symptoms.

Students will work in teams to solve the case by identifying the underlying anatomical and functional issues, proposing diagnostic steps and suggesting therapeutic approaches. Each group will present their findings and solutions to their peers.

Practical Training 24.4 Applied Aspects of Sub Arachnoid Spaces

Total Learning Hours : 5 Hours

Activity 1: Teacher Demonstration (3D Model/Virtual Simulation (60 Min)

Teacher will demonstrate the anatomical features of the subarachnoid space using 3D models or virtual anatomy software. Key structures such as cisterns, arachnoid villi and cerebrospinal fluid (CSF) pathways will be highlighted, with the use of labels and interactive features to ensure clarity.

Students will observe the demonstration, taking notes on the highlighted structures and their functions. They will ask questions for further clarification and identify the clinical significance of these anatomical features.

Activity 2: Hands-on Dissection / Prosection (90 Min)

The teacher will provide guided demonstrations of brain specimens, focusing on locating and identifying subarachnoid spaces and major cisterns. Facilitate discussions on the role of the subarachnoid space in CSF circulation and its involvement in clinical conditions like subarachnoid hemorrhage.

Students will observe and engage with the brain specimens, locating and identifying key structures under the teacher's guidance. They will participate in a discussion by relating anatomical observations to CSF circulation and associated clinical conditions.

Activity 3: Applied Aspect Analysis through Case Discussion (90 Min)

The teacher will introduce clinical cases involving subarachnoid hemorrhage, meningitis or hydrocephalus. Present diagnostic imaging such as CT or MRI scans and guide students in correlating anatomical knowledge with clinical findings.

Students will analyze provided case scenarios in small groups, identifying key diagnostic features and correlating them with their anatomical knowledge. They will participate in discussions to deepen understanding of the applied aspects of these conditions.

Activity 4: Q&A Session and Group Presentation (60 Min)

Teacher will facilitate a Q&A session to address any remaining doubts or gaps in understanding. Provide constructive feedback on group presentations and help connect clinical relevance to the concepts discussed.

Students will engage in the Q&A session, actively clarifying concepts and sharing insights. In small groups, they will prepare and present their findings, highlighting clinical relevance and complications related to subarachnoid spaces.

Experiential Learning Activity

Experiential-Learning Learning 24.1: Ventral Thalamus

Total Learning Hours : 6:00 Hours

Activity 1: Structural Exploration and Functional Analysis (90 Min)

Students will examine the anatomy of the ventral thalamus, focusing on its key nuclei and their roles in sensory and motor pathways, particularly in motor coordination and relay functions.

Students will use 3D anatomical models, histological slides, and neuroimaging scans to study the structures. They will collaborate in groups to discuss findings and label diagrams to reinforce their knowledge.

Activity 2: Clinical Case Analysis (90 Min)

Students will analyze case studies where dysfunction in the ventral thalamus is implicated in neurological disorders such as Parkinson's disease or stroke. They will discuss how these disorders impact movement and sensory processing.

Students will review imaging data, identify symptoms and correlate anatomical observations with clinical presentations. They will participate in collaborative discussions to deepen understanding and develop diagnostic reasoning.

Activity 3: Interactive Q&A and Collaborative Reflection (90 Min)

Students will participate in a Q&A session to clarify findings, address gaps in knowledge, and deepen their understanding of the ventral thalamus's applied aspects in clinical neurology.

Students will engage in open discussions, share questions with peers and reflect on feedback to refine their knowledge and confidence.

Activity 4: Applied Role Play and Problem-Based Learning (90 Min)

Students will engage in role play and problem-based learning to solve clinical scenarios involving ventral thalamus disorders. They will explore real-world applications of anatomical and clinical knowledge.

Students will take on roles like neurologists, radiologists, or patients to analyze and solve the presented case. Teams will collaborate to propose diagnostic steps and treatment approaches, presenting their solutions to the class.

Experiential-Learning Learning 24.2: Dorsal Thalamus

Total Learning Hours: 7:00 Hours

Activity 1: Exploration and Structural Analysis (2.5 Hours)

Students will study the anatomy, nuclei and functional organization of the dorsal thalamus using anatomical models, histological slides and neuroimaging scans (MRI/CT). They will identify key thalamic nuclei and their connections with cortical and subcortical structures. Students will prepare a concise presentation as part of a peer teaching exercise, where they will explain the identified structures, their roles and clinical relevance to their classmates, fostering collaborative learning and reinforcing knowledge.

Activity 2: Functional and Clinical Correlation (2.5 Hours)

Students will analyze case studies related to thalamic dysfunction, such as sensory disturbances, thalamic pain syndrome and motor impairments. They will discuss the role of the thalamus in sensory processing, cognition and motor coordination.

Activity 3: Q&A and Interactive Discussion (2 Hours)

Students will participate in a Q&A session to discuss applied aspects of the dorsal thalamus, debating its role in neurological disorders and therapeutic interventions. They will engage in critical discussions on recent advancements in thalamic research and neurorehabilitation.

Experiential-Learning Learning 24.3: Applied Aspects of Ventricular System

Total Learning Hours: 7:00 Hours

Activity 1: Exploration and Analysis (2 Hours)

Students will study the structure, function and circulation of cerebrospinal fluid (CSF) within the ventricular system through detailed examination of anatomical models, cross-sectional images and radiological scans (MRI/CT). They will focus on understanding the organization of ventricles, their spatial connections and how CSF flows within this system. Students will collaboratively analyze the observed features, documenting key insights on the anatomical pathways and functional significance of CSF circulation. They will prepare brief presentations to share their findings and interpretations with peers, fostering deeper comprehension and interactive learning.

Activity 2: Case-Based Application (2 Hours)

Students will analyze clinical cases related to ventricular system disorders, such as hydrocephalus, CSF obstruction and infections. They will discuss diagnostic approaches and imaging techniques used to assess these conditions.

Activity 3: Journal Club (2 Hours)

Students will review and present research articles or case studies related to the ventricular system's anatomy, CSF circulation and clinical applications.

Students will critically analyze the findings, prepare concise presentations focusing on anatomical and clinical relevance and share their insights with peers to foster collaborative learning and deeper understanding.

Activity 4: Q&A and Critical Discussion (1 Hour)

Students will engage in a Q&A session, debating the implications of ventricular dysfunctions and proposing medical or surgical management strategies. They will refine their understanding by addressing real-world challenges in neurology and neurosurgery	
Experiential-Learning Learning 24.4: Applied Aspects of Sub Arachnoid Spaces	
Total Learning Hours: 6 Hours Activity 1: Case-Based Analysis (2 Hours) Students will examine clinical scenarios related to the subarachnoid space, such as cerebrospinal fluid (CSF) circulation disorders, hemorrhages or infections. They will analyze imaging studies (MRI/CT) to identify abnormalities. Activity 2: Application of Theoretical Knowledge (2 Hours) Students will correlate anatomical structures with clinical conditions, discussing the impact of subarachnoid hemorrhages, meningitis and hydrocephalus. They will propose diagnostic and therapeutic approaches based on their findings. Activity 3: Q&A and Critical Discussion (2 Hours) Students will participate in an interactive session, debating clinical cases and refining their understanding through faculty-led discussions. They will address key questions related to CSF dynamics, pathology and neurosurgical interventions	
Modular Assessment	
Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Total Hours of the Assessment: 4:00 Hours 1. Research Paper Presentation – 20 Marks	4

Students are assigned to research a recent scientific paper related to one of the topics (e.g., thalamic function, hydrocephalus, subarachnoid hemorrhage). They will present their findings to the class, summarizing the paper's objectives, methodology, findings, and clinical relevance.

2. Virtual Anatomy Tour and Quiz – 10 Marks

Students participate in an interactive virtual anatomy tour that includes 3D models of the thalamus, ventricular system, and subarachnoid spaces. During the tour, students answer a set of interactive quiz questions based on anatomical landmarks and functions of these structures.

3. Peer Teaching and Discussion – 10 Marks

Students work in small groups to teach a specific topic related to the thalamus, ventricular system, or subarachnoid spaces. They will create a teaching session (e.g., a presentation or interactive discussion) for their peers.

4. Clinical Problem-Solving Exercise – 10 Marks

Provide students with a complex clinical problem that involves the dorsal/ventral thalamus, ventricular system, or subarachnoid space (e.g., a patient presenting with acute confusion, loss of consciousness, and headache potentially indicating a subarachnoid hemorrhage).

or

Any practical in converted form can be taken for assessment. (25 Marks)

and

Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)

Paper No : 4 (تشریح سطحی، شعاعی، قانونی و جدید تشریحی تحقیقات) (Tashreeh-e-Satahi ,Shua'ei wa Qanooni wa Jadeed Tashreehi Tahqeeqat) Surface, Radiological, Forensic Anatomy and Recent Advances)

Semester No : 3

Module 25 : خطہ راس و عنق کی سطحی تحدید (Khitta-e-Ra's wa Unq ki satahi Tahdeed) Surface marking of Head and Neck region.

Module Learning Objectives

(At the end of the module, the students should be able to)

1 Describe: the key anatomical landmarks and structures of the head and neck region, including the bones, muscles, blood vessels, and nerves and explain their clinical significance.

2 Conduct: the Surface marking of Head region and Neck region

3 Identify: a detailed surface anatomy examination of the head and neck region, demonstrating proficiency in locating anatomical features using palpation.

Unit 1 خطہ راس کی سطحی تحدید (Khitta-e-Ra's ki satahi Tahdeed) Surface marking of Head region.

25.1.1. خطہ راس کی سطحی تحدید (Khitta-e-Ra's ki satahi Tahdeed) Surface marking of Head region.

References: 106,107,108,109,110

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe dermatomes of the Head	1	Lecture	CC	Knows-how	L&PPT ,BL,DIS
CO1,CO4	Describe the surface anatomy of Superior Sagittal Sinus, Accessory, Vagus, Glassopharyngeal, Hypoglossal and Facial Nerve.	1	Lecture	CE	Knows-how	L&PPT ,BL,L_VC,D-M
CO1,CO4	Evaluate motor speech, sensory,auditory and visual areas	1	Lecture	CE	Knows-how	L_VC,DIS,L&GD

CO1,CO4	Describe the surface anatomy of Longitudinal Fissure, Lateral Sulcus (Sylvian Fissure) ,superior, Inferior Frontal Sulcus, Lateral Ventricle and Superior Temporal Sulcus.	1	Lecture	CE	Knows-how	DIS,L&GD,L&PPT
CO1,CO4	Evaluate the Bony Landmarks of the Head	1	Lecture	CE	Knows-how	L&PPT ,D-M,SIM
CO1,CO4, CO7	Assess a thorough assessment of cranial nerves related to facial movements and sensations and performs a simulated clinical examination of the head, integrating surface anatomical knowledge with patient assessment.	2	Practical25.1	PSY- GUD	Shows-how	PER,SIM,IBL,D- M,L_VC
CO1,CO4, CO7	Demonstrate key Anatomical landmarks, differentiate muscle attachment points and apply palpation techniques in functional movement of the head.	2	Practical25.2	PSY- GUD	Shows-how	L_VC,IBL,D-M,FC
CO1,CO4	Create a 3D model of the head, accurately representing surface anatomy and key landmarks including illustration of dermatome and design precise anatomical diagrams illustrating sutures and Fontanelles.	2	Practical25.3	PSY- ORG	Shows-how	D,PT,D-M,PrBL
CO1,CO4	Demonstrate the temporomandibular joint by feeling for the condylar process while the patient opens and closes their mouth and assess for any tenderness or abnormal movement.	2	Practical25.4	PSY- GUD	Shows-how	PBL,TBL,D-M
CO1,CO4	Palpate and identify the external auditory canal and its external opening (external acoustic meatus), understanding its role in ear-related examinations and its clinical significance in conditions like otitis externa.	2	Practical25.5	PSY- GUD	Shows-how	D-BED,L&PPT ,PT
CO1,CO4, CO7	Design a comprehensive clinical examination protocol using surface landmarks to evaluate the functional status of the cranial nerves.	3	Experiential- Learning25.1	PSY- ORG	Does	SDL,PAL,CBL,L&GD

CO1,CO4, CO7	Analyse the implications of injuries to surface landmarks for underlying neurovascular structures.	4	Experiential-Learning25.2	CAN	Does	BL,L&PPT ,CBL,PL
CO1,CO4	Assess skin and soft tissue structures, including the scalp and forehead, to identify abnormalities such as cysts, scars or lesions that may indicate dermatologic or systemic conditions.	3	Experiential-Learning25.3	CE	Does	JC,CBL,PAL,SDL,L&PPT
CO1,CO4	Formulate hypotheses about the origin of referred pain or sensory abnormalities based on surface anatomy of the head	3	Experiential-Learning25.4	CS	Does	SIM,JC,DIS,ML,IBL

Unit 2 **خطہ عنق کی سطحی تحدید (Khitta-e- Unq ki satahi Tahdeed) Surface marking of Neck region.**

25.2.1. **خطہ عنق کی سطحی تحدید (Khitta-e- Unq ki satahi Tahdeed) Surface marking of Neck region.**

References: 106,107,108,109,110

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Describe the surface anatomy of Parotid Gland, Parotid Duct, Thyroid Gland and Submandibular Gland.	1	Lecture	CC	Knows-how	L_VC,D-M,L&PPT
CO1,CO4	Describe the surface anatomy of Frontal Sinus, Maxillary Sinus, Palatine Tonsil and Suprameatal Triangle.	1	Lecture	CC	Knows-how	L&PPT ,L&GD,D
CO1,CO4	Describe the surface anatomy of Facial, Common Carotid, External Carotid, Internal Carotid and Middle Meningeal Arteries.	1	Lecture	CE	Knows-how	L&PPT ,L&GD,DIS

CO1,CO4	Evaluate the surface anatomy of Subclavian Vessels, Vocal Cord, Facial ,External Jugular and Internal Jugular Veins.	1	Lecture	CE	Knows-how	L,L&GD,DIS
CO1,CO4	Describe the bony landmarks and Dermatomes of the Neck	1	Lecture	CE	Knows-how	D,L&PPT ,D-M
CO1,CO4, CO7	Investigate the relationship between surface anatomy and pain referral patterns , understanding how neck pain or discomfort may indicate underlying conditions affecting deeper structures.	4	Experiential- Learning25.5	CAN	Does	IBL,CBL,D,L&PPT
CO1,CO4, CO7	Analyse the surface anatomy of the neck across different populations, recognizing variations in age, gender or health status and their impact on clinical assessments.	5	Experiential- Learning25.6	CAN	Does	D,L&PPT ,PL
CO1,CO4	Document research studies to investigate the role of surface anatomy of the neck in diagnosing the diseases of the deeper organs.	4	Experiential- Learning25.7	AFT- VAL	Does	D,IBL,PAL,RP
CO1,CO4	Apply surface anatomy knowledge to accurately position a patient for clinical procedures such as tracheostomy, central venous catheterization or thyroid examination.	2	Practical25.6	PSY- GUD	Shows-how	SIM,D-M
CO1,CO4, CO7	Practice range of motion assessments of the neck by palpating muscular and bony structures during flexion, extension and rotation.	2	Practical25.7	CAP	Shows-how	D-M,D-BED,D
CO1,CO4, CO7	Perform systematic palpation to identify cervical lymph nodes and assess their clinical significance.	3	Practical25.8	PSY- GUD	Shows-how	SIM,TBL,D-M,CBL
CO1,CO4	Demonstrate the correct technique for locating and assessing major vascular structures such as the carotid artery and jugular vein.	3	Practical25.9	PSY- GUD	Shows-how	D-BED,D- M,CD,CBL,D

Practical Training Activity
Practical Training 25.1 Cranial Nerves and Surface Anatomy Integration
Total Learning Hours: 2 Hours Activity 1: Demonstration – (30 Min) Teacher will demonstrate cranial nerve assessment techniques, highlighting key surface anatomical landmarks related to facial movements and sensations. Activity 2: Guided Practice – (30 Min) Students will perform assessments on peers under supervision, identify relevant anatomical structures and nerve functions. Activity 3: Independent Application – (30 Min) Students will conduct a full simulated clinical examination; integrate surface anatomy with patient assessment skills. Activity 4: Review & Discussion – (30 Min) The session will conclude with a review of findings, peer feedback and discussion on clinical implications.
Practical Training 25.2 Anatomical Landmarks of the Head & Palpation
Total Learning Hours: 2 Hours Activity 1: Introduction to Anatomical Landmarks and Muscle Attachment Points (30 Min) Teacher will give an overview of key anatomical landmarks of the head (frontal bone, temporal bone, zygomatic arch, mastoid process, occipital protuberance) and their functional significance. Then explain of how these landmarks relate to muscle attachment and function (e.g., jaw opening, head rotation, tilting). Activity 2: Teacher Demonstration of Palpation and Functional Movement (30 Min) Teacher will demonstrate accurate palpation techniques to identify bony landmarks (frontal bone, temporal bone, zygomatic arch, mastoid process, occipital protuberance).

Teacher will explain how to palpate the masseter, temporalis, and sternocleidomastoid muscles while describing their function during movements like jaw opening and head rotation.

Activity 3: Student Practice with Supervision (30 Min)

Students will practice palpating the anatomical landmarks and muscle attachment points under teacher supervision.

Teacher will provide individualized feedback and guides students to refine their techniques for better accuracy and understanding of muscle function during movement.

Activity 4: Reinforcement, Q&A, and Final Practice (30 Min)

Teacher will review the concepts through Q&A, addressing any questions or difficulties faced by students.

Final practice session where students independently will demonstrate palpation skills and anatomical knowledge, identify bony landmarks and muscle attachment points accurately.

Practical Training 25.3 3D Head Anatomy Model

Total Learning Hours: 2 Hours

Activity 1: Demonstration & Explanation– (30 Min)

The teacher will explain key surface anatomy landmarks of the head, including dermatomes, sutures and fontanelles, using visual aids and models.

Activity 2: 3D Model Construction– (30 Min)

Students collaboratively will construct a 3D model of the head, accurately incorporating surface landmarks, sutures and fontanelles.

Activity 3: Diagram Illustration– (30 Min)

Students will be divided into 2-5 groups and each group will create detailed anatomical diagrams highlighting dermatomes, sutures and fontanelles for reference and learning.

Activity 4: Presentation & Discussion– (30 Min)

Each group will present their models and diagrams, discussing their significance in clinical applications and developmental anatomy.

Practical Training 25.4 Temporomandibular Joint Palpation and Assessment

Total Learning Hours: 2:00 Hours

Activity 1: Teacher Demonstration (60 Min)

The teacher will demonstrate how to locate and palpate the temporomandibular joint (TMJ) by gently placing fingers in front of the ear and feeling for the condylar process while the patient opens and closes their mouth. The teacher will explain how to assess for tenderness, abnormal movements or any clicking sounds that may indicate dysfunction.

Activity 2: Student Practice (30 Min)

Students will practice locating and palpating the TMJ themselves, performing the assessment on a partner or mannequin, checking for tenderness, abnormal movement or irregularities in the joint's function while the patient moves their jaw.

Activity 3 :Q & A Session (30 Min)

After the practice, students will engage in a Q & A session where they can ask questions about the TMJ assessment, discuss challenges they encountered during the practice and clarify any doubts about the procedure and clinical significance of findings.

Practical Training 25.5 Ear Canal Palpation

Total Learning Hours: 2:00 Hours

Activity 1: Teacher Demonstrates (60 Min)

The teacher will demonstrate how to palpate and identify the external auditory canal and its external opening (external acoustic meatus), explaining its clinical relevance and role in ear-related examinations, particularly in conditions like otitis externa.

Activity 2: Students Practice (60 Min)

Students will palpate the external auditory canal and its external opening on themselves or on peer, while noting any abnormalities or signs of infection and discuss the clinical significance of their findings.

Practical Training 25.6 Clinical Positioning Practice

Total Learning Hours: 2:00 Hours

Activity 1: Instructor Demonstration — (30 Min)

The teacher will explain key surface anatomical landmarks relevant to tracheostomy, central venous catheterization and thyroid examination, demonstrating proper patient positioning.

Activity 2: Guided Student Practice – (30 Min)

Students will practice identifying these landmarks on peers or mannequins, ensuring correct positioning for each procedure under supervision.

Activity 3: Independent Application — (30 Min)

Students will apply their knowledge to position a simulated patient for different procedures, refining their accuracy and technique.

Activity 4: Discussion & Feedback – (30 Min)

The session concludes with students presenting their observations, discussing challenges and receiving instructor feedback for improvement.

Practical Training 25.7 Neck Range of Motion (ROM) Palpation**Total Learning Hours: 2:00 Hours****Activity 1: Demonstration – (30 Min)**

The teacher will explain and demonstrates proper palpation techniques to assess bony and muscular structures of the neck during different movements.

Activity 2: Guided Practice – (30 Min)

Students will practice palpating key landmarks while performing neck flexion, extension and rotation under supervision.

Activity 3: Application – (30 Min)

Students will apply their skills in simulated clinical scenarios, identifying movement restrictions or abnormalities.

Activity 4: Reflection & Discussion – (30 Min)

A debriefing session will allow the students to discuss findings, refine techniques and relate observations to clinical conditions.

Practical Training 25.8 Cervical Lymph Nodes**Total Learning Hours: 3:00 Hours**

Activity 1: Teacher Demonstration– (60 Min)

The Teacher will demonstrate proper palpation techniques for identifying cervical lymph nodes, explaining their anatomical locations and clinical relevance. Students will learn to systematically palpate cervical lymph nodes, differentiate normal from abnormal findings, and apply this knowledge in clinical assessments through demonstration, guided practice, case-based application, and discussion.

Activity 2: Student Practice– (30 Min)

Students will practice palpation on peers under supervision, learning to differentiate normal and abnormal lymph nodes.

Activity 3: Clinical Application– (60 Min)

Students will apply their skills in case-based scenarios, assessing lymph node enlargement and its potential causes.

Activity 4: Discussion & Q&A– (30 Min)

The session will conclude with a discussion on findings, interpretation and clinical significance, reinforcing learning.

Practical Training 25.9 Palpation of Major Blood Vessels of Neck**Total Learning Hours: 3:00 Hours****Activity 1: Demonstration – (30 Min)**

The Teacher will explain the anatomical location and clinical importance of the carotid artery and jugular vein, demonstrating proper palpation and auscultation techniques on a model or volunteer.

Activity 2: Student Practice – (60 Min)

Under supervision, students will practice locating the carotid artery and jugular vein on each other, applying proper palpation pressure and identifying pulse characteristics.

Activity 3: Clinical Application – (30 Min)

Students will assess vascular structures in different patient positions, noting variations in pulse strength and jugular venous distension under different physiological conditions.

Activity 4: Q&A and Feedback – (60 Min)

The session will conclude with a discussion on common clinical scenarios, troubleshooting palpation difficulties, and refining techniques based on teacher feedback.

Experiential Learning Activity

Experiential-Learning Learning 25.1: Cranial Nerve Examination Protocol

Total Learning Hours: 3:00Hours

Activity 1: Develop Examination Framework– (60 Min) Student will outline a structured clinical examination protocol, identifying key surface landmarks relevant to cranial nerve assessment.

Activity 2: Apply and Test Protocols– (60 Min) Using peer collaboration, student will perform the designed examination, assessing cranial nerve functions through palpation, sensory tests and motor evaluations.

Activity 3: Analyze Findings– (30 Min) Student will interpret results, correlating observations with underlying anatomical structures and potential neurological implications.

Activity 4: Q&A and Refinement– (30 Min) through discussion and feedback, student will refine their protocols, addressing challenges and ensuring accuracy in clinical application.

Experiential-Learning Learning 25.2: Neurovascular Injury Prediction

Total Learning Hours: 4:00 Hours

Activity 1: Identify Surface Landmarks– (60 Min)

Student will analyze key anatomical landmarks of the head and their relationship to underlying neurovascular structures.

Activity 2: Correlate with Injury Scenarios– (60 Min)

Using case studies or imaging, students will assess how trauma to specific landmarks (e.g., pterion, mastoid process) affects nearby nerves and blood vessels.

Activity 3: Predict Clinical Outcomes– (60 Min)

Based on their analysis, students will predict potential complications such as nerve damage, vascular compromise, or functional impairments, linking surface anatomy to real-world clinical implications.

Activity 4: Q&A and Peer Discussion– (60 Min)

Student will engage in a discussion to justify their predictions, address misconceptions and refine their understanding through guided peer interaction and instructor feedback.

Experiential-Learning Learning 25.3: Scalp & Forehead Assessment

Total Learning Hours: 3:00 Hours

Activity 1: Perform Guided Palpation (60 Min)

Students will begin by palpating the scalp and forehead, using correct techniques to assess the skin and soft tissue structures, focusing on areas like the frontal region, temporal areas and vertex of the scalp.

Activity 2: Identify Abnormalities (60 Min)

After gaining knowledge of normal and abnormal skin features, students will identify and distinguish abnormalities such as cysts, scars or lesions during palpation, noting characteristics such as texture, size and location.

Activity 3: Analyze Clinical Relevance (60 Min)

Students will analyze their findings and relate identified abnormalities to potential dermatologic or systemic conditions, considering conditions like sebaceous cysts, dermatofibromas or indications of systemic diseases (e.g., lupus, cancer) and reflect on their diagnostic significance.

Experiential-Learning Learning 25.4: Referred Pain Hypothesis

Total Learning Hours: 3:00Hours

Activity 1: Analyze Surface Anatomy– (60 Min) Student will examine key surface landmarks of the head, focusing on nerve pathways and their role in sensory perception and referred pain.

Activity 2: Correlate with Clinical Cases– (60 Min) Using patient scenarios, students will relate surface anatomy to sensory abnormalities such as trigeminal neuralgia or headaches caused by occipital nerve compression.

Activity 3: Formulate Hypotheses– (30 Min) Based on anatomical and clinical correlations, students will hypothesize potential causes of referred pain or sensory disturbances, linking them to specific nerve distributions.

Activity 4: Q&A Session: – (30 Min) Student will engage in discussions, ask questions, and clarify doubts about their hypotheses, refining their understanding through peer and instructor feedback.

Experiential-Learning Learning 25.5: Neck Pain Referral Mapping

Total Learning Hours: 4:00 Hours

Activity 1: Analyze the Surface Anatomy –(60 Min)

Students will review and identify key surface anatomical landmarks of the neck such as muscles, bones and vascular structures, and understand their role in supporting underlying structures.

Activity 2: Correlate with Pain Referral Patterns–(90 Min)

Students will explore how specific areas of pain or discomfort in the neck correspond to potential issues in deeper structures (e.g., muscles, nerves, blood vessels) and recognize common patterns in referred pain.

Activity 3: Apply Knowledge to Clinical Scenarios–(90 Min)

Students will assess case studies or clinical scenarios to predict possible underlying conditions causing neck pain, integrating their understanding of surface anatomy and pain referral patterns.

Experiential-Learning Learning 25.6: Neck Anatomy & Clinical Variations

Total Learning Hours: 5:00 Hours

Activity 1: Analyze and review–(90 Min)

Students will analyze the surface anatomy of the neck, focusing on key landmarks and review how these landmarks may vary across different populations (age, gender, health status).

Activity 2: Compare and identify–(120 Min)

Students will compare these anatomical variations across different groups, identifying specific differences in structure and appearance of the neck that could affect clinical assessments.

Activity 3: Apply clinical reasoning–(90 Min)

Students will apply this understanding to clinical assessments, recognizing how variations in surface anatomy can influence diagnostic decisions, treatment approaches and overall patient care.

Experiential-Learning Learning 25.7: Neck Anatomy Research Proposal

Total Learning Hours: 4:00 Hours

Activity 1: Identify Research Gaps – (90 Min)

Students will review existing literature on the correlation between surface anatomy and deeper organ of the neck pathologies to identify unanswered questions.

Activity 2: Develop a Research Proposal –(90 Min)

Based on findings, students will design a study outlining objectives, methodology and potential clinical applications of surface anatomy of the neck in disease diagnosis.

Activity 3: Evaluate and Present – (60 Min)

Students will critically assess feasibility, ethical considerations and potential impact before presenting their research proposal for peer and instructor feedback.

Modular Assessment

Assessment	Hour

Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Total Hours of the Assessment: 4:00 Hours 1. Practical Palpation & Identification Exercise – 15 Marks Students will be asked to palpate key anatomical landmarks on a peer or model, including structures They will need to identify the structures and describe their clinical significance. 2. Case-Based Scenario Analysis – 10 Marks Provide students with a clinical scenario. Students must analyze the case, identify the relevant surface anatomy, and explain the importance of specific structures in the clinical situation. 3. Imaging Interpretation & Correlation Exercise – 10 Marks Students will be given imaging studies (such as X-rays or CT scans or MRI images) of the head and neck region. They must identify key anatomical landmarks visible in the images and explain how the surface anatomy correlates with the deeper structures seen in the imaging studies. 4. Interactive Oral Examination (Viva) – 10 Marks During a viva session, students will be asked a series of questions related to the surface anatomy of the head and neck, such as: 5. Concept Map – 5 Marks Students will create a concept map linking the various surface anatomical landmarks of the head and neck, such as muscles, arteries, veins, and nerves. or Any practical in converted form can be taken for assessment. (25 Marks) and	4

Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)						
Module 26 : تشریح شعاعی (Tashreeh-e- Shua'ei) Radiological Anatomy.						
Module Learning Objectives (At the end of the module, the students should be able to) 1. Describe the principles and techniques behind each imaging modality (X-ray, USG, CT, CECT, Mammography, MRI, and Radionuclide), including their uses in medical practice. 2. Conduct image analysis for X-ray, USG, CT, CECT, Mammography, MRI, and Radionuclide, accurately identifying anatomical structures in respective images. 3. Identify the normal anatomical structures as seen in X-ray, USG, CT, CECT, Mammography, MRI, and Radionuclide imaging, and understand how these modalities highlight these structures.						
Unit 1 سادہ عکس ریزی (Sadah aks srezi) Simple x-rays procedures. تصویر بالموجات الشعاعیہ (Tasveer Bil Maujatis Sautiya) Ultrasonography. تصویر مقطعی حاسوبی (Tasweer maqta'ei Hasubi) Computed Tomography Scan. تصویر مقطعی حاسوبی مع التباين (Tasweer maqta'ei Hasubi ma'attabaun) Contrast Enhanced Computed Tomography Scan. 26.1.1. سادہ عکس ریزی (Sadah aks srezi) Simple x-rays procedures. 26.1.2. تصویر بالموجات الشعاعیہ (Tasveer Bil Maujatis Sautiya) Ultrasonography. 26.1.3. تصویر مقطعی حاسوبی (Tasweer maqta'ei Hasubi) Computed Tomography Scan. 26.1.4. تصویر مقطعی حاسوبی مع التباين (Tasweer maqta'ei Hasubi ma'attabaun) Contrast Enhanced Computed Tomography Scan. References: 110,111,112,113,114,115,116,117,118,119,120,121,122,123,124,125,126						
3A	3B	3C	3D	3E	3F	3G
CO1,CO5	Describe the basic principles and interactions of X-rays with different tissues.	1	Lecture	CAP	Knows-how	L&PPT ,L_VC,L&GD
CO1,CO5	Identify normal anatomical structures on X-ray, USG, CT and CECT images. •	3	Practical26.1	CAN	Shows-how	PrBL,CBL,PBL,PT

CO1,CO5	Develop structured imaging reports by describing normal findings systematically across X-ray, USG, CT and CECT. •	5	Experiential-Learning26.1	CS	Does	BS,PL
CO1,CO5	Apply a structured approach (e.g., ABCs for X-ray, FAST protocol for USG, systematic review for CT) to interpret medical images effectively.	4	Experiential-Learning26.2	CAP	Does	PAL,DIS,PL
CO1,CO5	Analyse the strengths and limitations of X-ray, USG, CT, and CECT in assessing normal anatomy and differentiating tissues.	4	Experiential-Learning26.3	CE	Does	DIS,D-BED
CO1,CO5	Describe the principles of CT and CECT imaging, including image acquisition and reconstruction techniques.	2	Lecture	CE	Knows-how	L&PPT ,L&GD,L_VC
CO1,CO5	Describe the principles of Ultra Sonography and ultrasound physics, including sound wave propagation and echogenicity.	2	Lecture	CE	Knows-how	L_VC,L&PPT ,L&GD
CO1,CO5	Demonstrate the systematic approach to interpreting an X-ray including orientation, exposure and positioning and USG, including probe selection, orientation and scanning planes.	4	Practical26.2	PSY-GUD	Shows-how	D,CBL
CO1,CO5	Evaluate the principles of CT, including reviewing image orientation (axial, coronal and sagittal) and contrast phases and explain the systematic evaluation of CECT images, including arterial, venous and delayed phases.	3	Practical26.3	CE	Shows-how	DIS,D,PER
Unit 2 تصوير شعاعى ثلثى (Tasweer-e-Shu'ai Sadyi) Mammography. تصوير بارين المقتناطيسى (Tasweer Bil Raneen Al Maqnateesi) Magnetic Resonance Imaging. تصوير شعاعى نواتى (Tasveer Shu'a'ei Navati) Radionuclide scanning. 26.2.1. تصوير بارين المقتناطيسى (Tasweer Bil Raneen Al Maqnateesi) Magnetic Resonance Imaging.						

26.2.2. تصویر شعاعی شای (Tasweer-e-Shu'ai Sadyi) Mammography.

26.2.3. تصویر شعاعی نواتی (Tasveer Shu'a'ei Navati) Radionuclide scanning.

References: 116,125

3A	3B	3C	3D	3E	3F	3G
CO1,CO5	Apply a systematic approach to mammographic image evaluation, including craniocaudal (CC) and mediolateral oblique (MLO) views.	3	Practical26.4	CAP	Shows-how	D,PT,DIS
CO1,CO5	Describe the basic principles of radionuclide imaging, including the use of radiopharmaceuticals and gamma cameras.	1	Lecture	CE	Knows-how	L&GD,L_VC,L&PPT
CO1,CO5	Evaluate a structured approach to interpreting MRI, including selecting appropriate sequences (T1, T2, STIR, FLAIR, and DWI).	4	Practical26.5	CE	Shows-how	PT,DL,PBL
CO1,CO5	Develop structured imaging reports by describing normal findings in MRI, mammography and nuclear imaging.	5	Experiential-Learning26.4	CS	Does	JC,BL,DIS,PER
CO1,CO5	Participate in simulated case-based discussions to practice distinguishing normal imaging from early pathology.	4	Experiential-Learning26.5	AFT-SET	Does	PAL,JC,L&PPT,DIS,BL
CO1,CO5	Interpret MRI, mammography and radionuclide imaging to understand their strengths and limitations for different clinical indications.	4	Experiential-Learning26.6	CAN	Does	CBL,BS,PAL
CO1,CO5	Identify a structured approach to interpreting nuclear medicine scans, including PET, SPECT and gamma camera imaging.	3	Practical26.6	CAN	Shows-how	PT,X-Ray,D,DIS

CO1,CO5	Describe the basic principles and techniques of mammographic imaging, including full-field digital mammography (FFDM) and digital breast tomosynthesis (DBT).	2	Lecture	CE	Knows-how	L&GD,L,L&PPT
CO1,CO5	Describe the strengths and limitations of mammography in detecting benign and malignant breast conditions.	1	Lecture	CE	Knows-how	L_VC,L&GD,L&PPT
CO1,CO5	Describe the basic principles of MRI, including the role of magnetic fields, radio frequency pulses and relaxation times (T1, T2).	1	Lecture	CE	Knows-how	L_VC,L&PPT ,L&GD

Practical Training Activity

Practical Training 26.1 Identification of Normal Anatomical Structures

Total Learning Hours: 3:00 Hours

Activity 1: Teacher Demonstration (30 Min)

Teacher will demonstrate the identification of normal anatomical structures on X-ray, USG, CT and CECT images, explaining the key features and landmarks for each modality.

Highlight normal variations and how they may appear differently in each imaging technique.

Activity 2: Student Practice (60 Min)

Students will practice identifying normal anatomical structures under guidance on sample X-ray, USG, CT and CECT images.

Teacher will provide real-time feedback as students point out anatomical landmarks in different imaging modalities.

Activity 3: Independent Student Performance (60 Min)

Students independently will identify normal anatomical structures across X-ray, USG, CT and CECT images.

Students will explain the significance of the identified structures in the context of each modality (e.g., how bone, soft tissue and air appear on X-ray vs. CT).

Activity 4: Discussion & Feedback (30 Min)

Discussion to share observations, challenges and interpretations of normal anatomical structures across different imaging techniques.

Teacher will provide feedback, reinforcing important points and clarifying any difficulties encountered during independent practice.

Practical Training 26.2 X-ray & USG Interpretation

Total Learning Hours: 4:00 Hours

Activity 1: Demonstration (60 Min)

The Teacher will explain and demonstrate a systematic approach to X-ray interpretation, covering orientation, exposure and positioning using sample images.

Demonstrate proper ultrasound (USG) probe selection, orientation and scanning planes on a model or phantom.

Activity 2: Discussion & Feedback (60 Min)

Group discussion to review challenges, observations and key takeaways from X-ray and USG interpretation.

Teacher will provide constructive feedback and clarifies doubts, reinforcing best practices.

Activity 3: Student Performance (60 Min)

Students will systematically interpret X-rays and explain their findings independently.

Students conduct an ultrasound scan, correctly selecting probes, adjusting scanning planes and identifying key structures.

Activity 4: Student Practice (60 Min)

Students will practice interpreting X-ray images under supervision, identifying correct orientation and exposure adjustments.

Students will perform basic USG scanning techniques, adjusting probe angles and recognizing normal anatomical landmarks.

Practical Training 26.3 CT Imaging Principles & CECT Evaluation

Total Learning Hours: 3:00 Hours

Activity 1: Teacher Demonstration (60 Min)

The Teacher will demonstrate the systematic approach to CT interpretation, including image orientation (axial, coronal, sagittal) using sample images.

The Teacher will show how to assess contrast phases in CT and explain the arterial, venous and delayed phases in CECT images pointing out key landmarks.

Activity 2: Guided Student Practice (30 Min)

Students will practice interpreting CT images, identifying the correct orientation and recognizing contrast phases (e.g., arterial, venous, delayed).

Students review CECT images under supervision, evaluating different phases and correlating findings with anatomical structures.

Activity 3: Student Performance (60 Min)

Students independently analyze CT and CECT images, applying the systematic approach to image orientation and correctly identifying each contrast phase.

Students interpret CECT findings, accurately distinguishing between the arterial, venous and delayed phases.

Activity 4: Discussion & Feedback : (30 Min)

Group discussion to review findings, share challenges and discuss best practices for evaluating CT and CECT images.

Teacher provides feedback on image interpretation, clarifying doubts and reinforcing essential concepts.

Practical Training 26.4 Mammographic Image Evaluation

Total Learning Hours: 3:00 Hours

Activity 1: Introduction and Demonstration by Teacher (30 Min)

The Teacher will introduce the systematic approach to evaluating mammographic images, focusing on the craniocaudal (CC) and mediolateral oblique (MLO) views.

The Teacher will demonstrate key anatomical landmarks and explain the process of assessing positioning and image quality for each view.

Activity 2: Guided Practice with Teacher Support (60 Min)

Students will practice evaluating mammographic images under the guidance of the Teacher, focusing on identifying normal structures and detecting positioning errors.

The Teacher will provide real-time feedback and clarification on techniques for recognizing proper positioning and image quality.

Activity 3: Independent Practice by Students (60 Min)

Students will independently analyze and evaluate mammographic images, ensuring accurate interpretation of normal anatomical structures and assessing image quality, positioning and potential artifacts.

Students will apply the systematic approach to evaluate both craniocaudal(CC) and mediolateral oblique(MLO) views with minimal guidance.

Activity 4: Reflection and Group Discussion (30 Min)

Students will participate in a group discussion to reflect on their findings, share experiences and address any challenges encountered during image evaluation.

The Teacher will provide constructive feedback, discussing common difficulties and reinforcing best practices for image assessment and positioning.

Practical Training 26.5 MRI Sequence Interpretation

Total Learning Hours: 4:00 Hours

Activity 1: Demonstration (60 Min)

The Teacher will explain and demonstrate the structured approach to MRI interpretation, including sequence selection (T1, T2, STIR, FLAIR, and DWI).

Show examples of how each sequence highlights different tissue characteristics and pathologies and guide students in understanding when to use each sequence for specific clinical scenarios.

Activity 2: Student Practice (60 Min)

Students will select the appropriate MRI sequences based on case scenarios under supervision; interpret different tissue types and pathologies (e.g., edema on STIR, tumors on FLAIR).

Teacher will provide real-time guidance on identifying the strengths and limitations of each MRI sequence.

Activity 3: Independent Student Performance (60 Min)

Students will independently interpret MRI images, selecting the correct sequences and explaining their choice based on anatomical and pathological indications.

Students will describe how different sequences (T1, T2, STIR, FLAIR, and DWI) demonstrate varying tissue properties and abnormalities.

Activity 4: Discussion & Feedback (60 Min)

Group discussion to review student findings, address challenges and clarify any difficulties encountered in interpreting MRI sequences.

Teacher will provide constructive feedback, reinforcing the application of appropriate sequences and improving interpretation skills.

Practical Training 26.6 Nuclear Medicine Scan Interpretation

Total Learning Hours: 3:00 Hours

Activity 1: Teacher Demonstration (30 Min)

The Teacher will explain and demonstrate a structured approach to interpreting nuclear medicine scans, including PET, SPECT and gamma camera imaging.

The Teacher will demonstrate how to identify normal biodistribution patterns and highlight key features of each imaging modality (e.g., anatomical regions, physiological uptake).

Activity 2: Students Practice with Teacher Support (60 Min)

Students will practice interpreting nuclear medicine scans under the guidance of the Teacher, focusing on recognizing normal patterns in PET, SPECT and gamma camera images.

The Teacher will provide real-time feedback, helping students identify both normal and abnormal findings and reinforcing the differences between imaging modalities.

Activity 3: Independent Student Practice (60 Min)

Students will independently interpret PET, SPECT and gamma camera images, identifying normal physiological uptake and differentiating normal from abnormal patterns.

Students will apply the structured approach to scan evaluation, providing their interpretation based on anatomical and physiological relevance.

Activity 4: Discussion and Feedback (30 Min)

Group discussion to share findings, discusses challenges encountered and review different approaches for interpreting nuclear medicine scans.

The Teacher will provide constructive feedback, reinforcing key concepts and clarifying any misunderstandings regarding normal and abnormal patterns in PET, SPECT and gamma camera imaging.

Experiential Learning Activity

Experiential-Learning Learning 26.1: Structured Imaging Reporting Across Modalities

Total Learning Hours: 5:00 Hours

Activity 1: Initial Independent Practice (120 Min)

The student will independently review X-ray, USG, CT and CECT images and begin drafting structured imaging reports.

The student will focus on systematically describing normal findings and key anatomical structures in each imaging modality, ensuring accurate and thorough observations.

Activity 2: Self-Assessment and Revision (90 Min)

The student will critically assess their own reports, ensuring they have followed a consistent format and correctly described all normal anatomical findings.

The student will revise the reports as needed, refining their descriptions based on clarity, accuracy and completeness.

Activity 3: Peer Review and Reflection (90 Min)

The student will participate in peer review, exchanging reports with colleagues to gain different perspectives on the structure and content of their reports.

Following the peer review, the student will reflect on feedback, make necessary improvements to their reports and consider how to enhance their future imaging evaluations and report writing.

Experiential-Learning Learning 26.2: Structured Medical Image Interpretation

Total Learning Hours: 4:00 Hours

Activity 1: Initial Guided Application (90 Min)

Student will apply the learned structured approaches (e.g., ABCs for X-ray, FAST protocol for USG and systematic review for CT) under the supervision of the Teacher.

The Teacher will provide support and feedback while students apply these methods to real or simulated medical images, ensuring correct application of the structured approaches.

Activity 2: Independent Practice (90 Min)

Students will independently analyze medical images (X-ray, USG, CT) using the respective structured approaches.

They will identify key findings (e.g., bone fractures, fluid collections, organ abnormalities) and document their interpretations based on the protocols.

Activity 3: Reflection and Group Discussion (60 Min)

After independent practice, students will engage in group discussion to review their findings and reflect on challenges faced during the interpretation process.

The Teacher will provide feedback, reinforcing the importance of the structured approaches and discussing any common issues or mistakes encountered.

Experiential-Learning Learning 26.3: Imaging Modalities Strengths & Limitations

Total Learning Hours: 4:00 Hours

Activity 1: Evaluation and Analysis (90 Min)

The student will independently review a set of X-ray, USG, CT and CECT images, focusing on assessing normal anatomy and identifying how each imaging modality differentiates various tissues.

The student will document the strengths and limitations of each modality in terms of image clarity, tissue differentiation and visualization of specific anatomical structures.

Activity 2: Synthesis and Comparison (90 Min)

The student will synthesize their findings by creating a comparative analysis of the strengths and limitations of X-ray, USG, CT and CECT. This will include factors like resolution, tissue contrast, cost-effectiveness and clinical relevance for assessing normal anatomy.

The student will organize their analysis in a clear, structured format, identifying which imaging modality is most effective for different anatomical regions and clinical scenarios.

Activity 3: Peer Discussion and Reflection (60 Min)

The student will engage in a peer discussion to share their comparative analysis, debating the advantages and disadvantages of each imaging technique based on real-world cases.

The student will reflect on the feedback received from peers and incorporate insights to further refine their understanding of each imaging modality's application and limitations in clinical practice.

Experiential-Learning Learning 26.4: Structured Imaging Reporting

Total Learning Hours: 5:00 Hours

Activity 1: Initial Report Drafting and Practice (120 Min)

The student will independently review MRI, mammography and nuclear imaging scans, focusing on identifying normal findings in each modality.

The student will create initial structured imaging reports, systematically describing the normal anatomy and key features visible in the images, using the appropriate medical terminology for each imaging technique.

Activity 2: Self-Assessment and Refinement (90 Min)

The student will critically assess their reports for clarity, accuracy and structure, ensuring that all normal anatomical features are correctly described and organized according to the standard reporting format.

The student will revise the reports based on self-reflection, improving their descriptions where necessary and ensuring that they adhere to the established guidelines for each imaging modality.

Activity 3: Peer Review and Feedback (90 Min)

The student will participate in a peer review session where reports are shared with classmates for constructive feedback.

The student will incorporate peer feedback, refining their reports further.

Experiential-Learning Learning 26.5: Imaging Case Discussions

Total Learning Hours: 4:00 Hours

Activity 1: Initial Case Review and Group Discussion (60 Min)

The student will review simulated case scenarios with a mix of normal and early pathology images across different modalities (e.g., X-ray, MRI, CT).

The student will discuss the images in a group, identifying key features of normal anatomy and the subtle early signs of pathology such as small tumors, early fractures or tissue changes.

Activity 2: Independent Analysis and Interpretation (90 Min)

The student will independently analyze the images from each case, attempting to distinguish between normal variations and potential early pathologies.

The student will document their findings, noting how early signs of disease or injury may present and which imaging modalities are most sensitive to these early changes.

Activity 3: Peer Feedback and Reflection (90 Min)

The student will present their analysis to the group, explaining their rationale for distinguishing normal findings from early pathology.

The group will provide peer feedback, discussing different interpretations and approaches to recognizing subtle pathologies. The student will reflect on feedback to enhance their diagnostic skills and understanding of early disease presentation.

Experiential-Learning Learning 26.6: Imaging Modalities Comparison

Total Learning Hours: 4:00 Hours

Activity 1: Independent Analysis of Imaging Techniques (90 Min)

The student will independently review a set of MRI, mammography and radionuclide imaging scans, focusing on clinical indications for each modality (e.g., breast cancer detection, bone scans, neurological imaging).

The student will evaluate the strengths (e.g., sensitivity, tissue differentiation, specificity) and limitations (e.g., cost, patient accessibility, resolution) of each imaging technique in the context of these clinical indications.

Activity 2: Comparative Synthesis and Documentation (90 Min)

The student will create a comparative analysis, summarizing how each imaging modality excels or falls short for specific clinical scenarios (e.g., MRI for soft tissue, mammography for early breast cancer detection, radionuclide imaging for functional imaging).

The student will document their findings, focusing on factors like resolution, diagnostic accuracy, safety and cost-effectiveness for each modality.

Activity 3: Peer Discussion and Reflection (60 Min)

The student will engage in a peer discussion to share their comparative analysis, discussing how the strengths and limitations of each modality affect clinical decision-making in different scenarios.

The student will reflect on feedback from peers and the Teacher, revising their analysis as needed and gaining a deeper understanding of when and why to choose specific imaging techniques for various clinical indications.

Modular Assessment**Assessment****Hour**

Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C.

Total Hours of the Assessment: 4:00 Hours**1. Image Comparison Exercise – 15 Marks**

Students are provided with **pairs of images**

They must **compare the images** and provide a **written explanation of the differences**, identifying the normal anatomical structures in the image and noting any pathology (if present).

2. Practical Demonstration of Imaging Techniques – 10 Marks

In a **practical demonstration**, students will explain the **procedure for obtaining a specific type of image** (e.g., X-ray or MRI or USG).

They will outline the **technical steps, patient preparation, and safety considerations** for performing the imaging, followed by a discussion of the images typically produced.

3. Clinical Case Review Presentation – 10 Marks

Students will be given **clinical case scenarios** with associated **medical images** from one or more imaging modalities.

4

They must present their analysis of the case, identifying key normal anatomical structures and explaining why the imaging modality is appropriate for this case. 4. Diagnostic Imaging Quiz (Interactive) – 5 Marks An interactive, timed quiz (could be multiple-choice or true/false) 5. Interactive Group Discussion – 10 Marks (20%) In a group discussion, students will be presented with a challenging clinical scenario and its associated imaging studies. They will discuss the normal findings seen in the images, explain their significance, and contribute to the identification of any potential clinical diagnoses. or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	
Semester No : 4	
Module 27 : تصویروں کی تعبیر (Tasveeron Ki Ta'abeer) Interpretation of Radiographs.	
Module Learning Objectives (At the end of the module, the students should be able to) 1 Describe: the fundamental principles and technical aspects behind the interpretation of X-ray, USG, CT, CECT, Mammography, MRI, and Radionuclide imaging. 2 Conduct: a thorough analysis of X-ray, USG, CT, CECT, Mammography, MRI, and Radionuclide images, accurately identifying normal anatomical structures and pathological abnormalities. 3 Identify: the normal anatomical structures and common pathological findings in X-ray, USG, CT, CECT, Mammography, MRI, and Radionuclide imaging.	

Unit 1 (Sadah aks srezi Tasveeron Ki Ta'abeer) plain x-rays. (Tasveer Bil Maujatis Sautiyah Ki Ta'abeer) Ultrasonography.

(Tasweer maqta'ei Hasubi Ki Ta'abeer) Interpretation of Computed Tomography Scan.

27.1.1. (Sadah aks srezi Tasveeron Ki Ta'abeer) plain x-rays.

27.1.2. (Tasveer Bil Maujatis Sautiyah Ki Ta'abeer) Ultrasonography.

27.1.3. (Tasweer maqta'ei Hasubi Ki Ta'abeer) Interpretation of Computed Tomography Scan.

References: 110,111,112,113,114,115,117,118,119,120,121,122,123,124,126

3A	3B	3C	3D	3E	3F	3G
CO1,CO5	Develop Case Scenarios Based on X-ray, CT and USG Findings for Peer Teaching.	5	Experiential-Learning27.1	PSY-ORG	Does	PL,DIS,TBL
CO1,CO5	Analyse Differential Diagnoses Based on X-ray, CT and USG Imaging Characteristics	4	Experiential-Learning27.2	CS	Does	L&GD,DIS,D,PAL
CO1,CO5	Compare the Effectiveness of X-ray vs. USG in Diagnosing Specific Conditions.	4	Practical27.1	PSY-GUD	Shows-how	FC,DIS,D
CO1,CO5	Interpret a Clinical Report Integrating X-ray, CT and USG Images with Clinical Findings.	4	Practical27.2	PSY-GUD	Shows-how	FC,X-Ray,D,DIS
CO1,CO5	Document Research Studies on the Role of X-ray, CT and USG in Diagnosing or Treating Specific Diseases.	4	Experiential-Learning27.3	AFT-VAL	Does	BL,W,PAL,D,L&PPT
CO1,CO5	Integrate Normal Anatomical Structures with Pathological Finding	2	Practical27.3	PSY-GUD	Shows-how	FC,PBL,DL,DIS

CO1,CO5	Describe the indications and limitations of X-ray imaging in diagnosing various conditions, particularly for skeletal, thoracic and abdominal evaluations.	2	Lecture	CE	Knows-how	L,EDU,L&PPT ,L_VC,X-Ray
CO1,CO5	Describe the indications for ultrasound in diagnosing abdominal, obstetrics and musculoskeletal conditions and explain its advantages over other imaging techniques.	2	Lecture	CE	Knows-how	L,L_VC,L&PPT
CO1,CO5	Describe the indications for CT imaging in clinical practice, with a focus on trauma, neuroimaging and detailed abdominal and chest evaluations.	1	Lecture	CE	Knows-how	L&PPT ,L_VC,L&GD

Unit 2 تصویر بالرنین (Tasweer maqta'ei Hasubi ma'attabaun Ki Ta'abeer) Interpretation of Contrast Enhanced Computed Tomography Scan. تصویر بالرنین (Tasweer Bil Raneen Al Maqnateesi Ki Ta'abeer) Interpretation of Magnetic Resonance Imaging. تصویر شعاعی نواتی کی تعبیر (Tasveer Shua'aei al- Nawavi Ki Ta'abeer) Interpretation of Radionuclide scanning.

27.2.1. تصویر مقطعی حاسوبی مع التیان کی تعبیر (Tasweer maqta'ei Hasubi ma'attabaun Ki Ta'abeer) Interpretation of Contrast Enhanced Computed Tomography Scan.

27.2.2. تصویر بالرنین المقناطیسی کی تعبیر (Tasweer Bil Raneen Al Maqnateesi Ki Ta'abeer) Interpretation of Magnetic Resonance Imaging.

27.2.3. تصویر شعاعی نواتی کی تعبیر (Tasveer Shua'aei al- Nawavi Ki Ta'abeer) Interpretation of Radionuclide scanning.

References: 116,125

3A	3B	3C	3D	3E	3F	3G
CO1,CO5	Evaluate Recent Advancements in CECT, MRI and Radionuclide Imaging	4	Experiential-Learning27.4	CAN	Does	X-Ray,FC,BL,L&PPT ,D
CO1,CO5	Identify Safety Guidelines and Protocols for CECT, MRI and radionuclides Imaging Techniques.	4	Practical27.4	PSY-GUD	Shows-how	DL,FC,PT,DIS

CO1,CO5	Construct Comprehensive Radiology Reports for CECT, MRI and Radionuclide Imaging.	4	Experiential-Learning27.5	PSY-ORG	Does	BS,PAL,FC
CO1,CO5	Develop an Evidence-Based Imaging Strategy for Disease Diagnosis using CT, CECT, MRI and radionuclide imaging	5	Experiential-Learning27.6	CS	Does	PAL,BL,PrBL
CO1,CO5	Evaluate Sensitivity, Specificity and Diagnostic Accuracy of CECT, MRI and Radionuclide Imaging.	3	Practical27.5	CE	Shows-how	BS,DIS,PT
CO1,CO5	Describe the various clinical indications for CECT, such as evaluating tumors, vascular abnormalities, infections and trauma.	2	Lecture	CC	Knows-how	L_VC,FC,L&PPT
CO1,CO5	Identify Strengths and Limitations of CECT, MRI and Radionuclide Imaging	3	Practical27.6	CAN	Shows-how	D,L&PPT ,DIS
CO1,CO5	Describe the clinical indications for MRI in diagnosing conditions related to the brain, spinal cord, musculoskeletal system and soft tissues.	2	Lecture	CC	Knows-how	L&GD,L&PPT ,L_VC
CO1,CO5	Describe the clinical applications of PET and SPECT in oncology (e.g., tumor detection, staging), cardiology (e.g., myocardial perfusion) and neurology (e.g., brain function assessment).	1	Lecture	CC	Knows-how	L&GD,L_VC,L&PPT
Practical Training Activity						
Practical Training 27.1 X-ray vs. USG Effectiveness Comparison						
Total Learning Hours: 4 Hours Activity 1: Teacher Demonstration (60 Min)						

The Teacher will demonstrate how X-ray, CT and ultrasound (USG) are used to diagnose specific conditions, highlighting the strengths and limitations of each imaging modality.

The Teacher will present clinical cases where both X-ray and USG are used to diagnose the same condition, explaining how each technique contributes to accurate diagnosis.

Activity 2: Guided Group Analysis (60 Min)

Students will work in small groups, analyzing case studies with both X-ray, CT and USG images for the same conditions.

The Teacher will guide the groups in evaluating the effectiveness of each modality by discussing the clarity of images, diagnostic accuracy and the practical applications of both techniques in a clinical context.

Activity 3: Independent Comparison and Reporting (60 Min)

Students will independently analyze a new set of clinical cases, using both X-ray, CT and USG images.

They will compare the strengths and limitations of each imaging modality, documenting their findings in a detailed report. Students will justify their choices of imaging technique for each case, explaining the reasons behind their selection.

Activity 4: Group Discussion & Teacher Feedback (60 Min)

Students will present their individual analyses in small groups, discussing their findings and comparing the results.

The Teacher will provide feedback on the students' assessments, addressing any misconceptions, clarifying concepts and guiding them in refining their diagnostic skills.

Practical Training 27.2 Integrated Clinical Imaging Report

Total Learning Hours: 4 Hours

Activity 1: Teacher Demonstration (60 Min)

The Teacher will demonstrate how to construct a clinical report by integrating the interpretation of X-ray, CT and USG images with clinical findings.

The demonstration will include a sample case, showing how to analyze both types of images, correlate them with clinical symptoms and organize the findings into a clear and concise report.

Activity 2: Guided Practice (60 Min)

Students will work in pairs or small groups to analyze a case study provided by the Teacher, which includes both X-ray, CT and USG images along with clinical details.

The Teacher will guide the students in interpreting the images, correlating them with clinical symptoms and drafting a preliminary clinical report.

Activity 3: Independent Report Construction (60 Min)

Students will independently analyze a new case, reviewing the X-ray, CT and USG images alongside clinical findings.

They will construct a detailed clinical report, integrating the image interpretation with clinical details and justifying their conclusions.

Activity 4: Peer Review and Teacher Feedback (60 Min)

Students will exchange their reports with a peer for review, discussing their findings and the structure of the report.

The Teacher will provide feedback on the clarity, accuracy and thoroughness of the reports, helping students refine their skills in integrating imaging with clinical information.

Practical Training 27.3 Anatomy-Pathology Integration**Total Learning Hours: 2 Hours****Activity 1: Teacher Demonstration and Guided Practice (60 Min)**

The teacher will demonstrate how to identify normal anatomy and pathological findings in X-ray, USG and CT images, explaining the differences and how pathology alters the image. Students will practice identifying these changes under the Teacher's guidance.

Activity 2: Independent Analysis and Group Discussion (60 Min)

Students will independently analyze a set of X-ray, USG and CT images, identifying both normal anatomical structures and pathological findings. They will present their findings in class, followed by group discussion and Teacher feedback to clarify concepts and reinforce learning.

The session will conclude with a Q&A session and reflection on challenges faced during integration.

Practical Training 27.4 Imaging Safety Protocols

Total Learning Hours: 4 Hours**Activity 1: Teacher Demonstration (60 Min)**

The Teacher will demonstrate safety guidelines and protocols for various imaging techniques.

Topics will include radiation safety for CECT (e.g., dose reduction techniques, protective measures), safety considerations for MRI (e.g., patient contraindications, safety with implants or metallic objects) and handling precautions for radionuclides (e.g., storage, disposal and patient care).

The Teacher will also provide case studies highlighting potential risks and safety breaches in imaging settings.

Activity 2: Group Research on Specific Protocols (60 Min)

Students will be divided into small groups, each assigned to research and discuss the safety protocols specific to one imaging modality: CT/CECT, MRI or radionuclides.

Each group will explore safety measures, contraindications and risk prevention strategies relevant to their assigned imaging modality.

Step 3: Protocol Creation (45 Min)

Students will create a detailed checklist or safety protocol document for their assigned modality, including the steps to mitigate risks and ensure patient and staff safety.

They will include information on patient screening, safety measures for imaging equipment and emergency protocols for unexpected events related to each modality.

Activity 4: Presentation and Peer Review (45 Min)

Each group will present their safety protocol findings to the class, focusing on the unique aspects of their assigned imaging modality.

Students will engage in a peer review session, providing feedback and asking questions on each group's protocol, while the Teacher facilitates discussion and clarifies any misconceptions.

Activity 5: Teacher Feedback and Reflection (30 Min)

The Teacher will offer feedback on the group presentations, highlighting key points, addressing gaps and reinforcing best practices for safety in clinical imaging.

Students will reflect on the importance of these protocols and how they can apply this knowledge in real-world clinical settings

Practical Training 27.5 Diagnostic Accuracy of CECT, MRI & Radionuclide Imaging

Total Learning Hours: 3Hours**Activity 1: Teacher Demonstration (30 Min)**

The Teacher will demonstrate how to evaluate the sensitivity, specificity and diagnostic accuracy of different imaging modalities (e.g., CECT, MRI, Radionuclide) in various clinical settings.

The Teacher will explain the concepts of sensitivity, specificity and diagnostic accuracy, providing examples of how these metrics are calculated and interpreted in clinical practice.

Activity 2: Guided Analysis of Clinical Cases (60 Min)

Students will be provided with clinical case studies that include different imaging modalities.

In groups, students will analyze the cases, evaluating the sensitivity, specificity and diagnostic accuracy of the imaging techniques used. They will apply theoretical knowledge to calculate or estimate these metrics using the provided data.

Activity 3: Independent Evaluation (60 Min)

Students will independently assess a new clinical case involving multiple imaging techniques.

They will calculate and analyze the sensitivity, specificity and diagnostic accuracy of each modality, considering the clinical relevance and limitations of the images in the case.

Activity 4: Group Discussion and Teacher Feedback (30 Min)

Students will present their findings to the class, discussing the strengths and weaknesses of the imaging techniques used in each case.

The Teacher will provide feedback on their evaluations, offering additional insights into how these metrics influence clinical decision-making and the choice of imaging modality.

Practical Training 27.6 CECT, MRI & Radionuclide Imaging Comparison

Total Learning Hours: 3Hours**Activity 1: Teacher Demonstration (45 Min)**

The Teacher will introduce the principles, strengths and limitations of CT, CECT, MRI and radionuclide imaging.

Real-world examples will be provided to illustrate how different imaging modalities are used in diagnosing various medical conditions.

Activity 2: Group-Based Case Analysis (45 Min)

Students will be divided into groups, each assigned a specific medical condition (e.g., tumor detection, organ imaging, vascular studies).

Each group will analyze which imaging modalities are most suitable for their assigned condition and justify their choices.

Activity 3: Independent Comparison and Evaluation (45 Min)

Students will individually compare the strengths and limitations of each imaging technique based on resolution, contrast, safety and diagnostic value.

They will prepare a brief summary outlining their findings.

Activity 4: Presentation and Peer Discussion (45 Min)

Groups will present their findings, comparing how different modalities perform for various conditions.

The class will engage in peer discussions and the Teacher will provide feedback and additional insights to reinforce key learning points.

Experiential Learning Activity

Experiential-Learning Learning 27.1: Imaging Case Scenarios for Peer Teaching

Total Learning Hours: 5 Hours

Activity 1: Review and Identify Key Concepts (60 Min)

Students will review a range of X-ray, CT and USG images, identifying key conditions and clinical features.

They will select specific conditions or scenarios that effectively highlight the practical application of X-ray, CT and USG findings for teaching purposes.

Activity2: Design Case Scenarios (120 Min)

Students will design detailed case scenarios based on the selected X-ray, CT and USG findings.

They will include clinical symptoms, diagnostic images and questions to encourage peer discussion and learning. Students will focus on creating engaging, informative scenarios that promote critical thinking.

Step 3: Peer Teaching Session (60 Min)

Students will present their case scenarios to their peers, guiding them through the analysis of the X-ray, CT and USG findings.

They will facilitate group discussions, encouraging peers to diagnose the condition and discuss possible treatment options.

Activity 4: Feedback and Reflection (60 Minutes)

After the peer teaching session, students will reflect on the effectiveness of their case scenario in teaching and learning.

The Teacher and peers will provide feedback, highlighting strengths and suggesting improvements for future scenarios.

Experiential-Learning Learning 27.2: Imaging-Based Differential Diagnosis

Total Learning Hours: 4 Hours

Activity 1: Review of Imaging Characteristics (45 Min)

Students will review X-ray, CT and USG images, identifying key imaging characteristics such as shape, size, location and texture of abnormalities.

The Teacher will guide the students in understanding how these characteristics correlate with different clinical conditions.

Activity 2: Case Analysis and Identification of Potential Diagnosis (60 Min)

Students will be given a set of X-ray, CT and USG images depicting various clinical conditions.

They will analyze the images, identifying potential diagnosis based on the observed characteristics and begin formulating a list of differential diagnosis.

Activity 3: Formulation of Differential Diagnosis (90 Min)

Students will independently formulate a differential diagnosis for each case, using their knowledge of imaging features to narrow down possible conditions.

They will document their reasoning and justify their choices based on imaging characteristics.

Activity 4: Group Discussion and Teacher Feedback (45 Min)

Students will present their differential diagnoses to the group, discussing their reasoning behind each choice.

The Teacher and peers will provide feedback, offering insights and suggesting alternative diagnosis or additional factors to consider.

Experiential-Learning Learning 27.3: Research on X-ray, CT & USG in Disease Diagnosis

Total Learning Hours: 4 Hours

Activity 1: Literature Review and Research Gap Identification (60 Min)

Students will review existing research on the use of X-ray, CT and USG in diagnosing or treating diseases.

They will identify gaps in the literature and choose a specific disease or clinical condition to focus on, determining where further research is needed.

Activity 2: Defining Research Question and Objectives (45 Min)

Based on the identified research gap, students will develop a clear research question and define the objectives of their study.

They will decide on how X-ray, CT and USG can be used to explore these objectives, considering the clinical significance and potential impact of their research.

Activity 3: Designing the Research Methodology (45 Min)

Students will design the methodology for their research study, including selecting the study type (observational, experimental, etc.), choosing control groups (if applicable) and determining data collection methods.

They will also plan how to integrate X-ray, CT and USG into their study, including criteria for imaging selection, diagnostic evaluation and treatment monitoring.

Activity 4: Developing the Research Proposal (60 Min)

Students will write a detailed research proposal that outlines their research question, objectives, methodology and expected outcomes.

They will include a justification for using X-ray, CT and USG in the study as well as a plan for analyzing and interpreting the data.

Activity 5: Presenting Proposals and Receiving Feedback (30 Min)

Students will present their research proposals to the class, explaining their study design, research questions and methodology.

Peers and the Teacher will provide constructive feedback, discussing strengths, weaknesses and potential improvements in the design and implementation of their studies.

Experiential-Learning Learning 27.4: Advancements in CECT, MRI & Radionuclide Imaging

Total Learning Hours: 4 Hours

Activity1: Research and Literature Review (90 Min)

Students will explore recent advancements in CECT, MRI and radionuclide imaging, including AI-assisted interpretation, low-dose CECT and hybrid imaging (PET-CECT, PET-MRI).

They will analyze research articles, clinical case studies and technological developments to understand their impact on diagnostics and patient care.

Activity 2: Comparative Analysis and Group Discussion (90 Min)

In groups, students will compare traditional imaging methods with recent advancements, evaluating their benefits, limitations and clinical relevance. Each group will discuss potential challenges in implementation, ethical concerns and future trends.

Activity 3: Presentation and Expert Feedback (60 Min)

Groups will present their findings, highlighting key advancements and their implications for medical imaging. The Teacher will provide feedback, address questions and guide students in critically assessing technological progress in radiology.

Experiential-Learning Learning 27.5: Radiology Report Construction

Total Learning Hours: 4 Hours**Activity 1: Review of Reporting Guidelines (60 Min)**

Students will study standardized radiology reporting formats for CECT, MRI and radionuclide imaging. Key components such as structure, terminology, clinical correlations and recommendations will be discussed.

Activity 2: Interpretation of Imaging Cases (60 Min)

Students will analyze provided radiological images, identifying key findings and clinical implications. They will assess pathology, anatomical variations and incidental findings relevant to patient management.

Activity 3: Report Construction and Justification (60 Min)

Based on their image interpretation, students will draft structured radiology reports. Reports will include a clear description of findings, clinical significance and recommendations for further action or follow-up.

Activity 4: Presentation and Peer Review (60 Min)

Students will present their reports for peer review, discussing their diagnostic reasoning and recommendations. Feedback from peers and the Teacher will help refine reporting accuracy, clarity and clinical relevance.

Experiential-Learning Learning 27.6: Evidence-Based Imaging Strategy for Diagnosis

Total Learning Hours: 5 Hours**Activity 1: Research and Literature Review (60 Min)**

Students will review clinical guidelines and research articles on the use of CECT, MRI and radionuclide imaging for diagnosing specific diseases.

They will identify key factors influencing imaging choices, such as sensitivity, specificity, cost and patient safety.

Activity 2: Designing an Imaging Strategy (90 Min)

Based on their research, students will develop an evidence-based imaging strategy for a chosen disease.

They will outline the sequence of imaging modalities, justification for their selection and how each contributes to accurate diagnosis.

Activity 3: Case-Based Application and Critical Evaluation (90 Min)

Students will apply their imaging strategy to a clinical case, assessing its effectiveness and limitations.

They will compare alternative approaches and refine their strategy based on patient factors and diagnostic challenges.

Activity 4: Presentation and Peer Review (60 Min)

Students will present their strategies to the class, explaining their rationale and clinical relevance.

Peer discussion and Teacher feedback will help refine their approach and reinforce evidence-based decision-making in medical imaging.

Modular Assessment

Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Total Hours of the Assessment: 4:00 Hours 1. Radiology Report Writing – 20 Marks Students are given an X-ray, CT, MRI, or USG image.	4

They must write a structured radiology report. 2. Image Annotation Task – 10 Marks Students are provided with radiological images with unlabeled structures. They must mark and annotate important anatomical landmarks and pathological findings. 3.Oral Viva / Panel Discussion – 10 Marks One-on-one or group discussion with examiners. 4. Group-Based Case Presentation – 10 Marks Students work in small groups to analyze a radiology case study. They present their findings, interpretations, and possible diagnoses to the class. or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	
Module 28 : خطہ صدر و بطن کی سطحی تحدید (Khitta-e-Sadr wa Batan ki Satahi Tahdeed) Surface marking of Thorax and Abdomen region.	
Module Learning Objectives (At the end of the module, the students should be able to) 1 Describe the key anatomical landmarks and structures of the thorax and abdomen and their relationship to the surface anatomy. 2 Conduct a thorough examination of the thorax and abdomen using palpation techniques to identify key surface landmarks and related structures. 3 Identify and locate the surface landmarks of the thorax and abdomen through palpation, demonstrating proper technique and accuracy.	
Unit 1 خطہ صدر کی سطحی تحدید (Khitta-e-Sadr ki satahi Tahdeed) Surface marking of Thorax. 28.1.1. خطہ صدر کی سطحی تحدید (Khitta-e-Sadr ki satahi Tahdeed) Surface marking of Thorax. References: 106,107,108,109,110	

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Demonstrate different surface anatomical landmarks of the thorax and relate them to underlying vasculature and musculature.	3	Experiential-Learning28.1	PSY-SET	Does	D-M,L&GD,PAL,DIS
CO1,CO5	Illustrate the surface anatomy of the thorax with detailed labeling of landmarks and their clinical relevance.	3	Practical28.1	PSY-ORG	Shows-how	D-M,FC,PT,X-Ray,DIS
CO1,CO5	Analyze the relationship between surface anatomical features and internal organ positioning in the thorax and assess how well the surface anatomy of the thorax reflects internal pathology, such as in cases of trauma or disease.	4	Practical28.2	CAN	Shows-how	D,FC,DIS,PT
CO1,CO5	Critique the accuracy of various imaging modalities (e.g., X-ray, ultrasound) in reflecting the surface anatomy of the thorax.	3	Experiential-Learning28.2	CAN	Does	PAL,FC,BS,PER
CO1,CO5	Judge the effectiveness of palpation techniques in identifying key surface landmarks of the thorax during physical exams.	4	Experiential-Learning28.3	CE	Does	CBL,FC,PAL,DIS
CO1,CO4	Identify the bony landmarks related to thorax and location of the Apex Beat, Borders, Orifices and Auscultatory Area of the Heart using surface anatomy.	1	Lecture	CAN	Knows-how	L&PPT ,L_VC,L
CO1,CO4	Describe the surface anatomy of the Esophagus, Trachea, Lungs, Root of Lungs, Pleura, Ascending Aorta, Arch of Aorta and Descending Aorta	2	Lecture	CAP	Knows-how	L_VC,L&GD,L&PPT ,D-M
CO1,CO5	Identify the surface anatomical landmarks in relation to the common entry points for surgical procedures like Chest Tube Insertion, thoracocentesis and pericardiocentesis.	3	Experiential-Learning28.4	CAN	Does	D-M,L_VC,CBL

CO1,CO5	Evaluate the clinical significance of the surface anatomy landmarks of the thorax in patient diagnosis.	3	Practical28.3	CE	Shows-how	CD,PT,DIS,FC,D
CO1,CO4	Describe the surface anatomy of the Brachiocephalic, Left Common Carotid and Left Subclavian Artery, Internal Thoracic Artery, Right Brachiocephalic Vein, Left Brachiocephalic Vein, Superior Vena cava, Thoracic Duct, Intercostal Spaces and Dermatomes of the Thorax.	2	Lecture	CC	Knows-how	L_VC,L,L&PPT
Unit 2 خطہ بطن کی سطحی تحدید (Khitta-e- Batan ki satahi Tahdeed) Surface marking of Abdomen region 28.2.1. خطہ بطن کی سطحی تحدید (Khitta-e- Batan ki satahi Tahdeed) Surface marking of Abdomen region. References: 106,107,108,109,110						
3A	3B	3C	3D	3E	3F	3G
CO1,CO5	Identify and correlate specific abdominal surface anatomy landmarks with referred pain patterns and common abdominal complaints to improve differential diagnosis skills.	3	Experiential-Learning28.5	CAN	Does	DIS,JC,FC,BS,L&PPT
CO1,CO5	Analyse surface anatomical landmarks to common abdominal imaging techniques (X-ray, ultrasound, CT), understanding how imaging results correspond to anatomical positioning.	3	Experiential-Learning28.6	CE	Does	BL,W,X-Ray,FC,TBL
CO1,CO5	Demonstrate appropriate hand positioning and palpation techniques for identifying anatomical structures of abdomrn	2	Practical28.4	PSY-GUD	Shows-how	D-BED,X-Ray,RLE
CO1,CO5	Design a practical guide for clinicians to effectively use surface anatomical landmarks during abdominal examination.	3	Practical28.5	PSY-ORG	Shows-how	D-BED,PT,DIS

CO1,CO4	Determine the location of the Umbilicus, Regions of Anterior Abdominal Wall, Inguinal Canal and Stomach.	1	Lecture	CAP	Knows-how	L&PPT ,L_VC,L
CO1,CO4	Describe the bony landmarks related to abdomen and surface anatomy of Gastric Triangle, Duodenum, Ileocolic Orifice, Vermiform Appendix, Mc Burney's Point, Sigmoid Point, Cecum, Ascending Colon, Transverse Colon, Descending Colon and Sigmoid Mesocolon.	1	Lecture	CE	Knows-how	CBL,L&PPT ,L_VC,D-BED
CO1,CO4	Describe the surface anatomy of Liver, Gall Bladder, Portal Vein, Common Bile Duct ,Pancreas, Spleen, Kidney & Renal Angle, Supra Renal Gland and Ureters.	2	Lecture	CE	Knows-how	SIM,CBL,D-BED,L_VC
CO1,CO4	Describe the surface anatomy of Inferior Vena Cava, Abdominal Aorta,Common iliac Artery, Coeliac Trunk, Superior Mesentric Artery, Renal Artery, Inferior Mesentric Artery, Inferior Epigastric Artery and Dermatomes of the Abdomen.	1	Lecture	CE	Knows-how	CD,D-BED,L&PPT ,CBL
CO1,CO7	Identify key abdominal surface landmarks (e.g., umbilicus, iliac crest, costal margin) during physical exams to assess the relationship between surface anatomy and internal structures.	2	Practical28.6	CC	Shows-how	LRI,D-BED,L_VC,CD
CO1,CO7	Construct a clinical case study requiring the identification and application of surface anatomical landmarks for diagnosing abdominal pain.	3	Practical28.7	PSY-ORG	Shows-how	D-BED,FC,L_VC,CD

CO1,CO7	Demonstrate the use of surface anatomy to assist in performing clinical procedures like abdominal paracentesis, catheter placement or abdominal surgery.	3	Experiential-Learning28.7	CAN	Does	CBL,LRI,L_VC
CO1,CO7	Identify the method for enhancing palpation skills for surface anatomical landmarks through the use of 3D or virtual reality technology.	4	Experiential-Learning28.8	AFT-VAL	Does	TUT,DIS,PAL

Practical Training Activity

Practical Training 28.1 Thoracic Surface Landmarks Map

Total Learning Hours: 3 Hours

Activity 1: Teacher Demonstration (45 Min)

The teacher will demonstrate key thoracic surface landmarks using anatomical models and radiological images.

Clinical relevance to internal structures and procedures (e.g., auscultation points, needle insertion sites) will be highlighted.

Activity 2: Hands-On Surface Anatomy Mapping (45 Min)

Students will identify and mark thoracic surface landmarks on peers or anatomical models.

They will compare these landmarks with imaging to understand their relationship with underlying structures.

Activity 3: Case-Based Application (45 Min)

Students will analyze clinical cases where surface anatomy is crucial (e.g., chest tube placement, pericardiocentesis).

They will discuss how variations in anatomy affect clinical procedures and diagnosis.

Activity 4: Group Discussion, Q&A and Teacher Feedback (45 Min)

Students will present their thoracic maps and case analyses.

A Q&A session will address challenges, reinforcing the importance of accurate surface anatomy mapping in clinical practice.

Practical Training 28.2 Surface Anatomy & Thoracic Internal Pathology

Total Learning Hours: 4 Hours

Activity 1: Teacher Demonstration (60 Min)

The Teacher will demonstrate key thoracic surface landmarks and their correlation with internal structures using anatomical models and imaging (X-ray, CT, MRI).

Case examples of trauma or disease (e.g., pneumothorax, pleural effusion) will be presented to illustrate how surface anatomy reflects internal pathology.

Activity 2: Hands-On Surface Anatomy Mapping (60 Min)

Students will identify and mark thoracic surface landmarks on peers or anatomical models.

They will compare these landmarks with radiological images to assess their accuracy in locating internal organs.

Activity 3: Case-Based Pathology Assessment (60 Min)

Students will analyze imaging from patients with thoracic trauma or disease.

They will assess how well surface anatomy predicts internal pathology and discuss limitations in clinical assessment.

Activity 4: Group Discussion and Teacher Feedback (60 Min)

Students will present findings, debating cases where surface anatomy aligns or misrepresents internal pathology.

The Teacher will provide insights on clinical applications and the importance of integrating imaging with physical examination.

The session will conclude with a Q&A where students can clarify concepts, discuss challenges and explore clinical applications with the Teacher's guidance.

Practical Training 28.3 Clinical Significance of Thoracic Surface Anatomy

Total Learning Hours: 3 Hours

Activity 1: Teacher Demonstration (45 Min)

The Teacher will demonstrate key thoracic surface landmarks, explaining their clinical significance in diagnosing conditions like pneumothorax, pleural effusion and rib fractures.

Radiological images and clinical case examples will be used to highlight how surface landmarks correlate with internal structures.

Activity 2: Hands-On Identification and Application (45 Min)

Students will identify and mark thoracic surface landmarks on peers or anatomical models.

They will apply their knowledge to clinical scenarios, discussing how these landmarks aid in diagnosis and procedural interventions (e.g., chest tube insertion).

Activity 3: Case Study Analysis (45 Min)

Students will analyze real clinical case studies where surface anatomy is critical (e.g., trauma, respiratory distress).

They will correlate the surface landmarks with patient symptoms and imaging findings to assess the clinical relevance.

Activity 4: Group Discussion, Q&A and Teacher Feedback (45 Min)

Students will present their analyses, discussing the clinical significance of each landmark.

A Q&A session will follow allowing students to clarify doubts and receive feedback to reinforce their understanding.

Practical Training 28.4 Hand Positioning & Palpation Techniques

Total Learning Hours: 2:00 Hours

Activity 1: Teacher Demonstration (30 Min)

The Teacher will demonstrate proper hand positioning and palpation techniques for identifying key anatomical structures of the abdomen. Emphasis will be placed on applying the right amount of pressure, using the pads of the fingers and avoiding excessive force during palpation.

Activity 2: Students Guided Practice (30 Min)

Students will observe and then practice hand positioning and palpation techniques under supervision, focusing on key anatomical structures. They will begin with simple landmarks and progress to more complex areas while ensuring proper technique.

Activity 3: Independent Practice (30 Min)

Students will perform palpation exercises independently on abdomen, identifying anatomical structures on a model or cadaver. They will record their findings and reflect on their accuracy.

Activity 4: Feedback and Reflection (30 Min)

After the practice, students will receive constructive feedback on their technique. A discussion will follow to address any challenges or questions encountered during the palpation process, encouraging self-reflection and improvement.

Practical Training 28.5 Practical Guide for Abdominal Examination Using Surface Anatomy

Total Learning Hours: 3:00 Hours

Activity 1: Teacher Demonstration (30 Min)

The Teacher will demonstrate key abdominal surface landmarks using anatomical models and imaging.

Clinical relevance to examinations (e.g., palpation, percussion, auscultation) and diagnostic procedures will be explained.

Activity 2: Hands-On Identification and Mapping (60 Min)

Students will practice locating and marking abdominal surface landmarks on peers or models.

They will correlate these landmarks with internal organs and their diagnostic significance.

Activity 3: Guide Development and Case Application (60 Min)

Students will collaborate to design a clinician-friendly guide outlining key surface landmarks, their functions and clinical applications.

They will apply their guide to case studies, demonstrating its use in real diagnostic scenarios.

Activity 4: Presentation, Q&A and Teacher Feedback (30 Min)

Students will present their practical guides and discuss their clinical applications.

A Q&A session will address challenges and reinforce the importance of surface anatomy in abdominal examinations.

Practical Training 28.6 Abdominal surface landmarks (e.g., umbilicus, iliac crest, and costal margin etc)

Total Learning Hours: 2:00 Hours

Activity 1: Teacher Demonstration (30 Min)

The teacher will demonstrate how to locate and identify key abdominal surface landmarks such as the umbilicus, iliac crest and costal margin, on a model or volunteer.

The teacher will explain the clinical significance of each landmark and how they correlate with underlying internal structures (e.g., organs, muscles and vascular structures).

Activity 2: Guided Practice (30 Min)

Students will work in pairs or small groups, using anatomical models or each other, to practice locating and identifying these key abdominal landmarks.

The Teacher will provide guidance and feedback, ensuring students understand how to palpate and assess the surface anatomy accurately.

Activity 3: Independent Practice (30 Min)

Students will individually perform abdominal examinations on models or peers, identifying and marking key abdominal landmarks.

Students will use their knowledge to relate these landmarks to underlying anatomical structures and assess how they assist in understanding clinical conditions.

Activity 4: Reflection and Q&A (30 Min)

Students will reflect on their experience and discuss any challenges they encountered during the practice session.

A Q&A session will be held where the Teacher answers questions and reinforces the importance of surface anatomy in clinical practice.

Practical Training 28.7 Surface anatomical landmarks on a patient presenting with abdominal pain.

Total Learning Hours: 3:00 Hours

Activity 1: Teacher Demonstration (30 Min)

The Teacher will demonstrate key abdominal surface landmarks using anatomical models and imaging.

Clinical relevance to common conditions (e.g., appendicitis, cholecystitis, bowel obstruction) will be highlighted.

Activity 2: Hands-On Surface Anatomy Identification (60 Min)

Students will practice locating and marking abdominal surface landmarks on peers or models.

They will compare these landmarks with radiological images to understand their relationship with underlying organs.

Activity 3: Case Study Development and Diagnosis (60 Min)

Students will create and analyze clinical case scenarios based on surface anatomy findings.

They will assess symptoms, correlate with anatomical structures and propose possible diagnoses.

Activity 4: Group Discussion, Q&A and Teacher Feedback (30 Min)

Students will present their case studies and diagnostic reasoning.

A Q&A session will address challenges, reinforcing the role of surface anatomy in diagnosing abdominal conditions.

Experiential Learning Activity

Experiential-Learning Learning 28.1: Thoracic Surface Landmarks & Underlying Structures

Total Learning Hours: 3:00 Hours

Activity 1: Review and Identification (60 min)

Students will review theoretical knowledge of thoracic surface anatomy including key landmarks such as the clavicle, ribs, sternum and intercostal spaces.

The Teacher will demonstrate the location of these landmarks on anatomical models and radiological images.

Activity 2: Hands-On Identification and Correlation (60 Min)

Students will identify and mark surface anatomical landmarks on anatomical models or peers.

They will correlate these landmarks with underlying structures like the major blood vessels (e.g., aorta, subclavian artery) and muscles (e.g., intercostals, diaphragm) using imaging studies.

Activity 3: Group Discussion and Feedback (60 Min)

Students will present their findings, discussing the relationship between surface landmarks and underlying vasculature and musculature.

The Teacher will provide feedback, reinforcing the clinical relevance of this correlation in medical examinations and procedures

Experiential-Learning Learning 28.2: Accuracy of Imaging Modalities in Thoracic Surface Anatomy

Total Learning Hours: 3:00 Hours

Activity 1: Review of Imaging Modalities (60 Min)

Students will review theoretical knowledge of different imaging modalities (X-ray, ultrasound, CT, MRI) and their ability to represent thoracic surface anatomy.

The Teacher will explain the strengths and limitations of each imaging technique in visualizing surface landmarks.

Activity 2: Hands-On Image Analysis (60 Min)

Students will analyze various radiological images (X-ray, ultrasound, CT, MRI) of the thorax, comparing them to anatomical models or surface anatomy landmarks.

They will assess the accuracy of each modality in reflecting thoracic surface features such as ribs, clavicles and sternum.

Activity 3: Group Critique and Feedback (60 Min)

Students will present their findings and critique the effectiveness of each imaging modality in representing surface anatomy.

The Teacher will provide feedback, guiding students in improving their critical analysis of imaging techniques.

Experiential-Learning Learning 28.3: Effectiveness of Thoracic Palpation Techniques

Total Learning Hours: 4:00 Hours

Activity 1: Review and Preparation (60 Min)

Students will review theoretical knowledge about key thoracic surface landmarks and palpation techniques.

They will prepare by practicing correct hand placement and palpation methods on anatomical models or peers.

Activity 2: Hands-On Palpation Practice (90 Min)

Students will perform palpation on peers or anatomical models to identify thoracic surface landmarks.

They will assess the accuracy and effectiveness of their technique in locating key structures such as ribs, sternum and clavicles.

Activity 3: Evaluation and Feedback (90 Min)

Students will reflect on their palpation experience, evaluating their success in identifying landmarks.

The Teacher will provide feedback on technique and students will discuss challenges and improvements in small groups.

Experiential-Learning Learning 28.4: Surgical Entry Points & Surface Anatomy

Total Learning Hours: 3:00 Hours

Activity 1: Review and Analyze (60 Min)

Students will review the theoretical aspects of surface anatomy related to chest tube insertion, thoracocentesis and pericardiocentesis.

They will study diagrams, videos or models to identify key anatomical landmarks like intercostal spaces, the xiphoid process and mid-axillary lines.

Activity 2: Hands-on Practice and Exploration (60 Min)

Students will perform hands-on activities using anatomical models or virtual simulations to locate the surface landmarks relevant to each procedure.

They will practice identifying appropriate entry points for chest tube insertion, thoracocentesis and pericardiocentesis based on surface anatomy.

Activity 3: Group Discussion and Feedback (60 Min)

In groups, students will present their findings and discuss the significance of accurate surface landmark identification for the safety and effectiveness of each procedure.

The Teacher will provide feedback and answer questions to reinforce understanding with a focus on clinical application.

Experiential-Learning Learning 28.5: Abdominal Anatomy & Referred Pain Correlation

Total Learning Hours: 3:00 Hours

Activity 1: Review and Analyze (60 Min)

Students will review theoretical concepts related to abdominal surface anatomy and referred pain patterns associated with common abdominal conditions (e.g., appendicitis, cholecystitis, peptic ulcers).

They will analyze case studies or diagrams to understand how specific abdominal landmarks correspond to pain referral areas and common complaints.

Activity 2: Hands-on Practice (60 Min)

Students will participate in guided exercises to palpate and identify key abdominal landmarks on patients or models, while correlating these landmarks with common referred pain patterns.

They will then practice using surface anatomy to link these pain patterns to potential underlying abdominal conditions.

Activity 3: Case Study Application and Discussion (60 Min)

Students will be given clinical case scenarios and asked to use abdominal surface anatomy and referred pain patterns to suggest differential diagnoses.

A group discussion will follow, where students present their findings and receive feedback from Teachers, enhancing their diagnostic reasoning and clinical skills.

Experiential-Learning Learning 28.6: Surface Anatomy & Abdominal Imaging Correlation

Total Learning Hours: 3:00 Hours

Activity 1: Review and Analyze (60 Min)

Students will review the theoretical principles of abdominal surface anatomy and familiarize themselves with common imaging techniques (X-ray, ultrasound, CT). They will analyze how specific surface landmarks correspond to anatomical structures visible in imaging results.

Activity 2: Hands-on Application (60 Min)

Using sample imaging results (X-ray, ultrasound, CT scans), students will practice identifying anatomical structures and correlating them with surface landmarks, discussing how positioning affects image quality and interpretation.

Activity 3: Discussion and Reflection (60 Min)

In groups, students will present their findings and discuss the relationship between surface anatomy and imaging techniques in clinical cases. The Teacher will guide a reflective discussion on how understanding surface landmarks improves the accuracy of imaging interpretation.

Experiential-Learning Learning 28.7: Surface Anatomy in Clinical Procedures

Total Learning Hours: 3:00 Hours

Activity 1: Review and Learn (60 min)

Students will review the theoretical aspects of surface anatomy related to abdominal structures, focusing on landmarks relevant to procedures like abdominal paracentesis, catheter placement and abdominal surgery.

They will study diagrams, videos and case studies to understand how surface anatomy guides the location of key organs and vessels.

Activity 2: Hands-on Practice (60 Min)

Using models or simulations, students will practice identifying and palpating key abdominal landmarks (e.g., iliac crest, umbilicus, costal margin) to aid in the safe performance of clinical procedures.

They will practice positioning for abdominal paracentesis, catheter placement or surgical incisions based on surface anatomy.

Activity 3: Demonstration and Application (60 Min)

Students will demonstrate their ability to apply surface anatomy by performing mock procedures (paracentesis, catheter insertion or simulated abdominal surgery) on models, with feedback from Teachers to ensure accuracy and safety. A Q&A session will follow, allowing students to discuss challenges and receive clarification on techniques and landmarks used in real clinical settings.	
Experiential-Learning Learning 28.8: 3D/VR-Based Palpation Skill Enhancement	
Total Learning Hours: 4:00 Hours Activity 1: Research and Conceptualization (60 Min) Students will review current methods for teaching palpation skills and explore the potential of 3D or virtual reality technology in enhancing these skills. The Teacher will provide examples of existing virtual reality applications in medical training. Activity 2: Method Development and Design (90 Min) Students will design an innovative method or concept that integrates 3D or virtual reality technology to improve palpation of surface anatomical landmarks. They will outline key features, user interactions and potential benefits in their proposed method. Activity 3: Presentation and Feedback (90 Min) Students will present their proposed method, highlighting how it enhances palpation skills and the expected impact on learning outcomes. The Teacher and peers will provide feedback, offering suggestions for refinement and practical application.	
Modular Assessment	
Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Total Hours of the Assessment: 4:00 Hours	4

1.Clinical Skill Demonstration – 20 Marks Students demonstrate palpation of key landmarks Perform a basic clinical examination Use surface markings to outline the heart or lungs, or liver on a peer or model. 2.Anatomy Mapping & Labeling Task – 15 Marks Students are given a blank body diagram and must label key surface landmarks, auscultation points, or organ locations. Identify referred pain areas for thoracic/abdominal conditions. 3.Forensic & Radiological Correlation Exercise – 10 Marks Compare a radiograph, ultrasound, or CT scan with surface anatomy features. Identify how external anatomical landmarks relate to internal structures. Discuss the forensic relevance of surface anatomy 4.Oral Viva / Peer Teaching – 5 Marks Each student explains a specific anatomical region to peers. Or, participate in a structured viva with examiners asking questions on anatomical relationships. or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	
Semester No : 5	
Module 29 : طرف اعلیٰ و طرف اسفل کی سطحی تحدید (Taraf-e-Aa'la wa Taraf-e-Asfal ki satahi Tahdeed) Surface Marking of Upper And Lower Limbs.	
Module Learning Objectives (At the end of the module, the students should be able to)	

- 1 Describe the key anatomical landmarks and structures of the upper and lower limbs, including bones, joints, muscles, tendons, and neurovascular pathways.
- 2 Conduct a detailed palpation of the upper and lower limbs to identify key surface landmarks such as bony prominences, joint lines, and muscle bellies
- 3 Identify the clinical relevance of these surface anatomical features in the context of physical examination, diagnosis, and surgical procedures.

Unit 1 طرف اعلیٰ کی سطحی تحدید (Taraf-e-Aa'la ki satahi Tahdeed) Surface marking of upper limbs.

29.1.1. طرف اعلیٰ کی سطحی تحدید (Taraf-e-Aa'la ki satahi Tahdeed) Surface marking of upper limbs.

References: 106,107,108,109,110

3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Demonstrate how to palpate the arterial pulse of the upper limb and apply it in clinical assessments.	2	Practical29.1	PSY- MEC	Shows-how	PT,D-BED,D
CO1,CO4	Apply knowledge of surface landmarks to locate important bony landmarks and muscles of the upper limb during a physical exam	2	Practical29.2	CAP	Shows-how	DIS,D
CO1,CO4	Develop a clinical protocol that integrates surface anatomy to improve the accuracy of upper limb nerve blocks.	3	Practical29.3	CAP	Shows-how	DIS,D-M,FC,D
CO1,CO4	Demonstrate mastery in combining palpation of the upper limb with neurological tests for related functional assessments.	4	Experiential- Learning29.1	PSY- SET	Does	CD,BS,PAL,L_VC
CO1,CO4	Apply surface anatomy knowledge in all clinical encounters involving upper limb injuries.	5	Experiential- Learning29.2	CAP	Does	DIS,DL,CBL,PER,BL
CO1,CO4	Construct a 3D model of the upper limb highlighting critical surface landmarks for use in accurate positioning of superficial veins for venesection	3	Practical29.4	PSY- ORG	Shows-how	DL,PT,DIS,D-M

	procedures, intramuscular, intravenous injections and overall educational simulations.					
CO1,CO4	Demonstrate how to palpate the arterial pulse of the upper limb and apply it in clinical assessments.	4	Experiential-Learning29.3	PSY-MEC	Does	CBL,D-BED,L&PPT ,RLE,L_VC
CO1,CO4	Examine the Bony landmarks and surface anatomy of Superficial, Deep Palmar Arch, Flexor, Extensor Retinaculum and Dermatomes of the Upper Limb	2	Lecture	CS	Knows-how	L_VC,L&GD,L&PPT ,L
CO1,CO4	Appraise the surface anatomy of the Cephalic, Basilic , Median Cubital Vein and Axillary, Median, Radial and Ulnar Nerves	2	Lecture	CE	Knows-how	L,L&PPT ,L&GD,L_VC
CO1,CO4	Evaluate the surface anatomy of the Axillary, Brachial Radial and Ulnar Arteries.	1	Lecture	CE	Knows-how	L&PPT ,L,L_VC,L&GD
Unit 2 طرف اسفل کی سطحی تحدید (Taraf-e-Asfal ki satahi Tahdeed) Surface marking of lower limbs 29.2.1. طرف اسفل کی سطحی تحدید (Taraf-e-Asfal ki satahi Tahdeed) Surface marking of lower limbs. References: 106,107,108,109,110						
3A	3B	3C	3D	3E	3F	3G
CO1,CO4	Analyze the mechanics of common sports movements (e.g., squatting, jumping, running) and relate them to muscle activation.	5	Experiential-Learning29.4	CAN	Does	FC,ML,PL,FV,BL

CO1,CO4	Create and apply body painting to visually map key structures like dermatomes, muscle groups, and vascular pathways.	4	Experiential-Learning29.5	CC	Does	DIS,D-BED,PAL,BL,TUT
CO1,CO4	Identify key bony landmarks and soft tissue structures of the lower limb through surface palpation.	3	Practical29.5	CAN	Shows-how	D-M,CBL,BL,D-BED
CO1,CO4	Identify & correlate surface anatomy with underlying muscles, vessels, and nerves.	4	Practical29.6	CAN	Shows-how	SIM,DIS,D,JC
CO1,CO4	Demonstrate clinical examination techniques relevant to lower limb surface anatomy.	3	Practical29.7	PSY-SET	Shows-how	PT,D-M,D,CD,DIS
CO1,CO4	Interpret real-life case scenarios (e.g., patient with foot drop, sciatica) by correlating symptoms with surface anatomical landmarks.	4	Experiential-Learning29.6	CS	Does	CBL,PAL,D-BED
CO1,CO4	Describe the Dermatomes of the Lower Limb, Flexor, Superior Extensor, Inferior Extensor, and Superior Peroneal and Inferior Peroneal Retinaculum.	1	Lecture	CE	Knows-how	L&PPT ,L&GD,L_VC,L
CO1,CO4	Describe the surface anatomy of the Femoral, Great Saphenous, Short Saphenous Veins, Perforators and Femoral, Sciatic, Tibial, Common Peroneal, Superficial Peroneal, Deep Peroneal, Median Plantar, and Lateral Plantar Nerves.	2	Lecture	CE	Knows-how	L&GD,L&PPT ,L,L_VC

CO1,CO4	Describe the surface anatomy of the Femoral, Inferior Gluteal, Superior Gluteal, Anterior Tibial, Popliteal, Posterior Tibial Dorsalis Pedis, Median Plantar Artery, and Lateral Plantar Arteries	2	Lecture	CE	Knows-how	L,L&GD,L&PPT ,L_VC
Practical Training Activity						
Practical Training 29.1 Palpating Arterial Pulses of the Upper Limb						
Total Learning Hours: 2:00Hours Activity 1: Teacher Demonstration (30 Min) The teacher will demonstrate the technique for palpating key arterial pulses in the upper limb (e.g., radial, brachial, and ulnar pulses) on anatomical models or volunteers. The teacher will explain the clinical significance of each pulse and its role in assessing circulation and cardiovascular health. Activity 2: Guided Practice (30 Min) Students will work in pairs or small groups to practice palpating the upper limb pulses on their peers or anatomical models. The Teacher will provide guidance, ensure correct technique, and reinforce the importance of pulse assessment in clinical settings. Activity 3: Independent Practice (30 Min) Students will individually palpate the arterial pulses of the upper limb on their peers, applying the technique and assessing the strength, regularity, and symmetry of the pulses. Students will practice incorporating pulse palpation into overall clinical assessments, such as circulatory status and cardiovascular evaluation. Activity 4: Reflection and Q&A (30 minutes) Students will reflect on their practice and discuss any challenges faced during pulse palpation. A Q&A session will follow, where the Teacher clarifies any doubts and reinforces the importance of accurate pulse assessment in clinical practice.						
Practical Training 29.2 Mapping Muscles & Bones of the Upper Limb						

Total Learning Hours: 2:00Hours

Activity 1: Teacher Demonstration (30 Min)

The teacher will demonstrate the process of locating key bony landmarks (e.g., clavicle, scapula, humerus, radius, ulna) and muscles (e.g., deltoid, biceps brachii, triceps) of the upper limb during a physical exam.

The teacher will explain the clinical significance of each landmark and muscle and their role in the assessment of upper limb function.

Activity 2: Guided Practice (30 Min)

Students will work in pairs or small groups, using anatomical models or each other, to practice identifying bony landmarks and muscles on the upper limb.

The Teacher will guide the students through palpation techniques, providing feedback and reinforcing the importance of surface anatomy in clinical assessment.

Activity 3: Independent Practice (30 Min)

Students will individually perform a physical exam on their peers or models, locating and identifying key bony landmarks and muscles of the upper limb.

Students will practice relating these landmarks to normal and abnormal clinical findings, such as joint mobility, muscle strength, and signs of injury.

Activity 4: Reflection and Q&A (30 Min)

Students will reflect on their practice and discuss any challenges faced during the exam.

A Q&A session will follow, where the Teacher clarifies concepts and answers questions, reinforcing the clinical relevance of surface anatomy in physical exams.

Practical Training 29.3 Anatomy-Based Accuracy in Nerve Blocks

Total Learning Hours: 3:00Hours

Activity 1: Teacher Demonstration (30 Min)

The teacher will demonstrate the anatomical landmarks relevant to upper limb nerve blocks, such as the brachial plexus, and show how surface anatomy aids in precise needle placement for various nerve blocks (e.g., axillary, supraclavicular, and interscalene blocks).

The teacher will explain how to integrate surface anatomy with clinical protocols to enhance the accuracy and safety of nerve blocks.

Activity 2: Protocol Development (60 Min)

Students, in small groups, will be tasked with developing a clinical protocol that incorporates surface anatomical landmarks for specific upper limb nerve blocks.

Each group will design their protocol, considering factors such as patient positioning, identification of anatomical landmarks, needle insertion angles, and potential complications.

Activity 3: Protocol Presentation and Feedback (60 Min)

Groups will present their clinical protocols to the class, explaining how they incorporated surface anatomy into the procedure to improve accuracy.

The Teacher and peers will provide constructive feedback on each protocol, with a focus on enhancing clinical application and safety.

Activity 4: Refinement and Finalization (30 Min)

Based on feedback, students will refine their protocols and finalize them.

The Teacher will provide additional guidance and help students integrate any changes or improvements to ensure the protocol's clinical effectiveness.

Practical Training 29.4 Upper Limb Surface Modeling

Total Learning Hours: 3:00Hours

Activity 1: Teacher Demonstration (30 Min)

The teacher will demonstrate how to construct a 3D model of the upper limb using materials such as clay, foam, or 3D modeling software.

The teacher will highlight the key surface landmarks critical for venesection, intramuscular injections, and intravenous injections, explaining their clinical significance in various procedures.

Activity 2: Group Practice (60 Min)

Students will be divided into groups and guided in constructing their own 3D models of the upper limb, incorporating the critical surface landmarks like the brachial, radial, and ulnar veins, as well as muscle groups and bony prominences.

The Teacher will circulate, providing feedback and ensuring accuracy in model construction and anatomical landmark placement.

Activity 3: Independent Practice (60 Min)

Each student will independently construct a 3D model or modify their group model, applying their knowledge of anatomical landmarks for venesection and injections.

Students will identify and mark the relevant veins and structures on their models, ensuring the correct positioning for simulated procedures.

Activity 4: Reflection and Q&A (30 Min)

Students will present their 3D models to the class, explaining their choices of landmarks and their relevance to clinical procedures.

A Q&A session will follow, where the Teacher addresses any challenges or questions, reinforcing the importance of accurate anatomical knowledge for successful clinical procedures.

Practical Training 29.5 Mapping Bony Landmarks & Soft Tissues

Total Learning Hours: 4:00

Activity 1: Demonstration: (60 Min)

The Teacher will provide an overview of the importance of surface anatomy in clinical assessments, focusing on key bony landmarks and soft tissue structures of the lower limb. The Teacher will demonstrate how to palpate important structures such as the iliac crest, patella, tibial tuberosity, quadriceps, hamstrings, and other relevant soft tissues.

Activity 2: Practical Observation: (60 Min)

Students will closely observe the Teacher's palpation techniques. During this step, the Teacher will also explain the clinical significance of each structure and how identifying these landmarks can aid in diagnosing musculoskeletal or neurological conditions.

Activity 3: Student Practice: (60 Min)

Students will practice palpating the identified landmarks on themselves or a partner, applying the techniques demonstrated by the Teacher. They will receive individual feedback and corrections to ensure proper technique and accuracy in identifying both bony and soft tissue structures.

Activity 4: Interactive Reflection and Feedback: (60 Min)

In this final step, students will participate in a group discussion or Q&A session. They will reflect on their palpation experience and receive additional guidance. The Teacher will also clarify any questions related to clinical applications, helping students understand the relevance of these landmarks in real-world assessments.

Practical Training 29.6 Anatomical Correlations: Surface to Depth

Total Learning Hours: 3:00

Activity 1: **Teacher Presentation:** (30 Min)

The Teacher will provide a detailed demonstration of palpating critical surface anatomical landmarks of the lower limb, explaining their significance in relation to underlying muscles, vessels, and nerves. Key areas like the femoral artery, tibial nerve, and hamstring muscles will be highlighted, with a focus on their clinical importance.

Activity 2: **Guided Observation:** (60 Min)

Students will observe the Teacher's techniques and gain an understanding of how surface anatomy relates to deeper anatomical structures. The Teacher will explain how identifying these landmarks are crucial in clinical practice for accurate assessment and diagnosis.

Activity 3: **Hands-On Practice:** (60 Min)

will engage in hands-on practice, palpating the key muscles, blood vessels, and nerves of the lower limb. With guidance from the Teacher, they will identify and correlate these structures using surface anatomy, focusing on proper technique and anatomical accuracy.

Activity 4: **Interactive Discussion:** (30 Min)

A Q&A session will be held to encourage students to discuss their findings, clarify any doubts, and explore clinical applications of their new knowledge. This will help them understand the role of surface anatomy in diagnosing conditions and how it contributes to effective clinical examinations.

Practical Training 29.7 Lower Limb Exam Techniques

Total Learning Hours: 3:00

Activity 1: **Teacher Demonstration:** (30 Min)

The teacher will begin by demonstrating clinical examination techniques related to the surface anatomy of the lower limb, including palpation of key bony landmarks, muscles, and vascular structures. The teacher will emphasize the correct technique for assessing muscle tone, joint mobility, and vascularity, explaining their clinical relevance.

Activity 2: **Student Practice:** (60 Min)

Students will practice these examination techniques under supervision, palpating key anatomical structures like the femoral pulse, tibial tuberosity, and patella. They will also assess joint movements such as flexion and extension, while applying knowledge of muscle and joint function.

Activity 3: Analysis and Application: (60 Min)

Students will apply their findings from the palpation and joint assessments to diagnose potential conditions like muscle imbalances, nerve compression, or vascular abnormalities. Students will also recognize how variations in surface anatomy may affect clinical findings.

Activity 4: Q&A and Reflection: (30 Min)

After the practical activity, a Q&A session will be held to address any challenges students faced and to ensure clear understanding of clinical examination techniques. Students will be encouraged to discuss the relevance of their findings in clinical settings and share experiences.

Experiential Learning Activity

Experiential-Learning Learning 29.1: Mastering Palpation & Neurological Tests

Total Learning Hours: 4:00Hours

Activity 1: Conduct Palpation and Neurological Tests (60 Min)

Students will independently practice palpating key structures of the upper limb (e.g., pulses, muscles, joints) while performing neurological tests (e.g., reflexes, sensation, motor function) on themselves or peers.

They will combine both palpation and neurological testing to assess the overall function of the upper limb and identify any abnormalities.

Activity 2: Complete Functional Assessment (90 Min)

Students will perform a comprehensive upper limb functional assessment, documenting their findings from both palpation and neurological tests.

Based on their assessments, they will formulate a potential diagnosis or highlight areas requiring further clinical investigation.

Activity 3: Reflection and Peer Feedback (90 Min)

Students will reflect on their combined palpation and neurological assessments, discussing their process and results.

In peer groups, they will exchange feedback on techniques and findings, offering suggestions for improvement and sharing insights to enhance their understanding of functional assessments.

Experiential-Learning Learning 29.2: Surface-Based Insights for Upper Limb Injuries

Total Learning Hours: 5:00Hours

Activity 1: Assess Upper Limb Injuries Using Surface Anatomy (90 Min)

Students will independently examine upper limb injuries, identifying surface anatomical landmarks (e.g., bones, joints, muscles) to assess injury severity, location, and impact on underlying structures.

Activity 2: Perform Clinical Evaluations and Document Findings (120 Min)

Students will apply their surface anatomy knowledge to conduct detailed clinical evaluations, focusing on the relationship between visible injuries and internal structures.

They will document their findings, including possible diagnoses and next steps for treatment or referral.

Activity 3: Discuss Case Scenarios and Review (90 Min)

Students will discuss various upper limb injury case scenarios in small groups, comparing their assessment approaches and evaluating the clinical implications of their surface anatomy findings.

Peer feedback and self-reflection will help refine their ability to apply surface anatomy in clinical practice.

Experiential-Learning Learning 29.3: **Palpating the Arterial Pulse of the Upper Limb**

Total Learning Hours: 4:00Hours

Activity 1: Palpate Arterial Pulses (60 Min)

Students will practice palpating the arterial pulses of the upper limb (e.g., radial, brachial, ulnar) on themselves or peers, focusing on accurate location, technique, and palpation strength.

Activity 2: Integrate Pulse Findings into Clinical Assessments (90 Min)

Students will apply their findings from pulse palpation to assess circulatory health, identifying abnormalities such as weak or absent pulses, and correlate them with clinical conditions (e.g., arterial occlusion, peripheral artery disease).

Activity 3: Reflect and Document Clinical Implications (90 Min)

Students will reflect on their assessment techniques and document their findings, discussing the clinical significance of pulse palpation in diagnosing cardiovascular and vascular conditions. They will also review potential treatment strategies or further diagnostic steps based on their assessments.

Experiential-Learning Learning 29.4: Mechanics of Movement in Athletics

Total Learning Hours: 5:00

Activity 1: **Identify Key Muscles Involved:** (120 Min)

Students will first identify the primary muscles involved in common sports movements, such as squatting, jumping, and running. They will relate these muscles to their function during each movement, understanding how muscle activation changes with different phases of the motion.

Activity 2: **Observe and Analyze Movements:** (90 Min)

Students will observe demonstrations of these sports movements and analyze the mechanics involved. They will use their theoretical knowledge of muscle function to identify which muscles are activated and how they contribute to the efficiency and effectiveness of each movement.

Activity 3: **Apply and Assess in Practice:** (90 Min)

Students will perform the movements themselves while actively engaging the muscles involved. They will assess their own muscle activation through feedback, both from the Teacher and through self-reflection, refining their technique to ensure proper muscle engagement for optimal performance and injury prevention.

Experiential-Learning Learning 29.5:

Body Mapping Through Art

Total Learning Hours: 4:00

Activity 1: **Design and plan the body painting:** (60 Min)

Students will identify key anatomical structures like dermatomes, muscle groups, and vascular pathways, and plan how to represent them visually on the body using colors and markers.

Activity 2: **Apply body painting:** (120 Min)

Students will apply the body paint to their own or a peer's body, accurately marking the identified anatomical structures and ensuring proper placement for each group. Activity 3: Evaluate and discuss the painted model: (60 Min) Students will analyze the body painting, comparing it with anatomical references to ensure accuracy, and discuss how the visual map can aid in clinical assessments and understanding of human anatomy.	
Experiential-Learning Learning 29.6: Case-Based Surface Anatomy Interpretation	
Total Learning Hours: 4:00 Activity 1: Analyze Symptoms: (90 Min) Review and analyze a real-life case scenario, such as a patient with foot drop or sciatica, focusing on the specific symptoms presented. Activity 2: Correlate Symptoms with Anatomy: (90 Min) Identify and correlate the symptoms with the relevant surface anatomical landmarks, such as nerve pathways and muscle groups involved. Activity 3: Formulate Diagnosis: (60 Min) Based on the analysis, hypothesize a diagnosis and propose a plan for further clinical investigation or management, integrating surface anatomy knowledge.	
Modular Assessment	
Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Total Hours of the Assessment: 4:00 Hours	4

1.Surface Anatomy Identification & Practical Assessment – 20 Marks Live demonstration: Students will be asked to identify and palpate specific bony landmarks, muscles, joints, or neurovascular structures on a peer or model. Functional assessment: Students demonstrate and describe joint movements (e.g., elbow flexion, knee extension) and associated muscles. 2. Clinical Case-Based Analysis – 15 Marks Students will be presented with a case involving limb dysfunction, nerve injury, or vascular impairment. They must describe the affected anatomical structures, possible causes, and clinical implications. 3. Objective Structured Practical Examination (OSPE) – 10 Marks Short station-based practical tasks such as: - Identifying key surface landmarks using palpation. - Demonstrating muscle testing techniques. - Marking vascular structures on a diagram or model. 4. Reflective Report on Experiential Learning – 5 Marks A short written reflection (250 words) on a practical session, clinical case discussion, or imaging correlation or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	
Module 30 : تشریح قانونی (Tashreeh-e-Qanooni) Forensic Anatomy.	
Module Learning Objectives (At the end of the module, the students should be able to)	

1 Describe the key principles of forensic anatomy, focusing on the identification of human bones and their role in determining sex, age, and height for medico-legal purposes.

2 conduct Conduct a hands-on examination of skeletal remains or models to identify and analyze anatomical features and estimate demographic characteristics (e.g., sex, age, height).

3 Identify the anatomical markers used to determine the sex, age, and height of human remains from skeletal remains.

Unit 1 تشریح قانونی (Tashreeh -e-Qanooni) Forensic Anatomy. بدنی عظام کی شناخت انکی نش کے ذریعے کرنا (Badni Eza'm ki Shinakht unki Na'sh ke Zariye karna) Identification of human bones from their remains.

30.1.1. تشریح قانونی (Tashreeh -e-Qanooni) Forensic Anatomy.

30.1.2. بدنی عظام کی شناخت انکی نش کے ذریعے کرنا (Badni Eza'm ki Shinakht unki Na'sh ke Zariye karna) Identification of human bones from their remains.

References: 127,128,129,130,131

3A	3B	3C	3D	3E	3F	3G
CO1,CO5	Describe key concepts in forensic anatomy, including forensic osteology, odontology, and soft tissue analysis.	2	Lecture	CAP	Knows-how	L&GD,L,L&PPT ,L_VC
CO1,CO5	Describe the role of Forensic Anatomy in the Criminal Legal Procedures.	1	Lecture	CC	Knows-how	L&PPT ,L,L&GD,L_VC
CO1,CO5, CO7	Identify and differentiate between antemortem, perimortem, and postmortem bone trauma.	4	Practical30.1	CAN	Shows-how	CD,BL,L_VC,DIS,SIM
CO1,CO5, CO7	Apply forensic techniques to estimate the time since death based on bone decomposition and preservation.	4	Experiential-Learning30.1	CAP	Does	BL,IBL,FC
CO1,CO5, CO7	Differentiate burned, fragmented, or commingled skeletal remains for forensic identification.	3	Practical30.2	CAN	Shows-how	BS,DIS,PT,FC

CO1,CO5, CO7	Document forensic reports based on anatomical observations and evidence interpretation	5	Experiential- Learning30.2	AFT- RES	Does	JC,BS,FC,DIS,PAL
CO1,CO5	Describe the identification of human bones from their remains.	2	Lecture	CAP	Knows-how	L,L&PPT ,L_VC,L&GD
CO1,CO5, CO7	Discuss real-world forensic cases where skeletal remains played a critical role in solving crimes or identifying missing persons.	4	Experiential- Learning30.3	CC	Does	FC,BL,PAL,DIS,CBL
CO1,CO5, CO7	Differentiate between human and non-human bones based on morphological characteristics	3	Practical30.3	CAN	Shows-how	CD,D,FC,DIS,PT
Unit 2 تشریح کو طبی وقانونی نظریہ میں استعمال کرتے ہوئے جنس، عمر، قد کا تعین کرنا۔ (Tahreeh ko Tibbi wa Qanooni Nazariye me Iste'mal karte hue Jins, Umar wa Qa'd ka Ta'yyun karna) Determination of sex, age, and height. for medico legal application of Anatomy. 30.2.1. تشریح کو طبی وقانونی نظریہ میں استعمال کرتے ہوئے جنس، عمر، قد کا تعین کرنا۔ (Tahreeh ko Tibbi wa Qanooni Nazariye me Iste'mal karte hue Jins, Umar wa Qa'd ka Ta'yyun karna) Determination of sex, age, and height. for medico legal application of Anatomy. References: 127,128,129,130,131,132,133,134,135						
3A	3B	3C	3D	3E	3F	3G
CO1,CO5	Discuss the significance of age, sex, and height estimation in medicolegal and forensic investigations.	2	Lecture	CC	Knows-how	L&PPT ,L_VC,L&GD,L
CO1,CO5, CO7	Demonstrate the process of determining age and sex from a given set of skeletal remains, highlighting key anatomical features that aid in identification for Medico legal purposes.	3	Practical30.4	PSY- SET	Shows-how	D,BL,JC,CD,FC

CO1,CO5, CO7	Assess cranial features and pelvic morphology for sex determination in forensic cases.	5	Experiential- Learning30.4	CAN	Does	BL,DIS,PAL,JC,SDL
CO1,CO5	Describe sex determination techniques in medicolegal investigations, particularly in cases involving unidentified bodies and gender-related crimes.	2	Lecture	CC	Knows-how	L,L_VC,L&GD,L&PPT
CO1,CO5, CO7	Compare sexual dimorphism in skeletal remains by studying morphological differences between male and female pelvises, skulls, and long bones.	4	Practical30.5	CAN	Shows-how	D- M,DIS,L&GD,L&PPT ,TBL
CO1,CO5	Evaluate international and national forensic guidelines for age, sex, and height estimation in legal cases.	1	Lecture	CE	Know	L&PPT ,L,L&GD,L_VC
CO1,CO5, CO7	Demonstrate the process of determining age and sex from a given set of skeletal remains, highlighting key anatomical features that aid in identification.	4	Experiential- Learning30.5	AFT- RES	Does	CD,PAL,IBL,BL,FC
CO1,CO5, CO7	Investigate how postmortem changes and environmental conditions can affect the accuracy of sex, age, and height determinations in Medico legal cases.	3	Practical30.6	CAP	Shows-how	CD,FC,D,L_VC
CO1,CO5, CO7	Analyze the influence of postmortem changes and environmental factors on the accuracy of sex, age, and height estimations in forensic cases.	4	Experiential- Learning30.6	CAN	Does	DIS,PL,CD,L_VC,PAL
Practical Training Activity						
Practical Training 30.1 Markers of Antemortem, Perimortem & Postmortem Trauma						

Total Learning Hours: 4:00 Hours

Activity 1: Teacher Demonstration (60 Min)

The teacher will demonstrate how to identify and differentiate between antemortem, perimortem, and postmortem bone trauma by showing various bone samples and explaining key characteristics of each type of trauma.

Activity 2: Student Practice (60 Min)

Students will examine provided bone samples and classify the trauma based on the characteristics demonstrated, focusing on identifying signs such as healing (antemortem), fracture patterns (perimortem), and discoloration (postmortem).

Activity 3: Group Discussion (60 Min)

Students will engage in a group discussion to compare their findings and share reasoning behind their classifications, helping to solidify their understanding of the trauma types.

Activity 4: Q&A Session (60 Min)

The teacher will facilitate a Q&A session to address any uncertainties, clarify specific features, and deepen understanding of trauma types in forensic analysis.

Practical Training 30.2 Skeletal Remains: Forensic Differentiation

Total Learning Hours: 3:00 Hours

Activity 1: Teacher Demonstration (30 Min)

The teacher will demonstrate how to identify and differentiate burned, fragmented, or commingled skeletal remains by showcasing examples of each type, highlighting key features such as fracture patterns, burn marks, and signs of commingling.

Activity 2: Student Practice (60 Min)

Students will be provided with skeletal remains that are burned, fragmented, or commingled. They will apply the demonstrated techniques to classify and differentiate the remains based on visual and tactile examination, focusing on characteristics like color changes from burning or breakage patterns.

Activity 3: Group Discussion and Analysis (60 Min)

After individual practice, students will discuss their findings in small groups, comparing their observations to reinforce correct identification techniques and further understanding of forensic identification processes.

Activity 4: Q&A Session (30 Min)

A Q&A session will follow the practice and group discussion, where students can clarify doubts, ask questions about complex cases, and engage in discussions to deepen their understanding of forensic skeletal analysis.

Practical Training 30.3 Human vs. Non-Human: Skeletal Insights

Total Learning Hours: 3:00 Hours

Activity 1: Demonstration (30 Min)

The teacher will demonstrate how to differentiate human bones from non-human bones by examining key morphological characteristics such as bone size, shape, and structure.

Activity 2: Student Practice (60 Min)

Students will practice identifying and differentiating human and non-human bones using a variety of skeletal samples, paying attention to specific features like bone density, joint structure, and surface texture.

Activity 3: Independent Assessment (60 Min)

Students will independently assess various bone samples, documenting their findings and justifying their identification of human versus non-human bones based on the observed characteristics.

Activity 4: Q&A Session (30 Min)

The teacher will facilitate a Q&A session, addressing any questions or challenges the students encountered during their identification process, ensuring clarity and reinforcing learning. Students will practice differentiating human bones from non-human bones by examining key morphological features, such as size, shape, and structure. They will apply this knowledge through hands-on analysis of skeletal samples, followed by a Q&A session to reinforce understanding.

Practical Training 30.4 Anatomy of Age & Sex Determination

Total Learning Hours: 3:00 Hours

Activity 1: Teacher Demonstration (30 Min)

The teacher will demonstrate how to identify key anatomical features from skeletal remains, including the pelvis, skull, and long bones, to determine age and sex for medico-legal purposes, explaining the significance of each feature.

Activity 2: Guided Practice (60 Min)

Students will practice identifying these anatomical features on skeletal remains or replicas, using the demonstration as a reference to assess age and sex.

Activity 3: Independent Practice (60 Min)

Students will apply the techniques learned to additional skeletal remains or replicas, attempting to determine the age and sex independently while ensuring accuracy.

Activity 4: Q&A and Discussion (30 Min)

The teacher will facilitate a Q&A session, addressing any challenges or questions students encountered during the activity and providing additional insights into the application of these techniques in medico-legal cases.

Practical Training 30.5 Skeletal Clues: Male vs. Female

Total Learning Hours: 4:00 Hours

Activity 1: Teacher Demonstration (60 Min)

The teacher will introduce the concept of sexual dimorphism and demonstrate how to identify morphological differences between male and female pelvises, skulls, and long bones. The teacher will highlight key features such as the pelvic inlet, sacrum, and skull characteristics.

Activity 2: Guided Practice (60 Min)

Students will observe the teacher's demonstration and then, under guidance, practice identifying the sexual dimorphism features on provided skeletal remains. They will compare pelvises, skulls, and long bones for male and female traits.

Activity 3: Independent Practice (60 Min)

Students will work independently to assess additional skeletal remains, using the knowledge gained to identify and document sexual dimorphism in the bones. They will analyze specific features and make accurate determinations.

Activity 4: Q&A Session (60 Min)

The activity will conclude with a Q&A session, where students can ask questions, clarify doubts, and discuss any challenges they faced while comparing skeletal remains. The teacher will provide further insights into refining their skills and knowledge.

Practical Training 30.6 Forensic Estimation Challenges

Total Learning Hours: 3:00 Hours

Activity 1: Demonstration (30 Min)

The teacher will introduce postmortem changes and environmental factors that affect the accuracy of determining sex, age, and height. They will demonstrate how decomposition, environmental conditions (e.g., temperature, humidity), and other factors can alter skeletal remains, using real case examples.

Activity 2: Student Observation (30 Min)

Students will observe the teacher's demonstration of how to assess skeletal remains for age, sex, and height, considering the impact of postmortem changes and environmental influences.

Activity 3: Student Practice (60 Min)

Students will investigate a set of skeletal remains, applying their knowledge of anatomical landmarks and forensic techniques while considering the effects of postmortem changes and environmental factors on the accuracy of the findings.

Activity 4: Q&A and Discussion (60 Min)

The teacher will lead a Q&A session to discuss students' observations and findings, exploring challenges in estimating sex, age, and height in medico legal cases. Students will reflect on their experiences and ask questions regarding real-world forensic cases.

Students will investigate how postmortem changes and environmental conditions impact the accuracy of determining sex, age, and height from skeletal remains in medico legal cases, through teacher demonstration, guided practice, and a Q&A discussion.

Experiential Learning Activity

Experiential-Learning Learning 30.1: Estimating Time: Bone Preservation Insights

Total Learning Hours: 4:00 Hours

Activity 1: **Review Theory** (60 Min)

Students will study the principles behind estimating the time of death, including the factors affecting bone decomposition and preservation.

Activity 2: **Examine Decomposed Bone Samples** (60 Min)

Students will apply their knowledge by examining bone samples, noting characteristics such as color, texture, and presence of insect activity, and assess the extent of decomposition.

Activity 3: **Analyze Findings** (60 Min)

Based on their examination, students will use established forensic techniques to estimate the time since death by comparing their observations with known decomposition timelines.

Activity 4: **Discussion & Q&A** (60 Min)

Students will present their findings to the class, and engage in a discussion about the challenges, ethical considerations, and variables that can affect the accuracy of postmortem interval estimation.

Experiential-Learning Learning 30.2: Forensic Report Essentials

Total Learning Hours: 5:00 Hours

Activity 1: **Analyze Forensic Evidence** (60 Min)

Students will review a set of skeletal remains or anatomical evidence, focusing on key observations such as bone structure, fractures, and markings relevant to the case.

Activity 2: **Interpret Evidence** (90 Min)

Using their knowledge, students will interpret the findings, drawing conclusions about factors like age, sex, cause of death, or trauma based on anatomical analysis. Step 1:

Activity 3: **Prepare Forensic Report** (90 Min)

Students will compile their observations and interpretations into a structured forensic report, detailing the evidence, methods, and conclusions in a clear and concise manner.

Activity 4: Review and Reflect (60 Min)

Students will present their reports to peers or instructors for feedback and engage in a Q&A session to refine their report-writing skills and critical thinking in forensic analysis.

Experiential-Learning Learning 30.3: Skeletal Clues in Forensics

Total Learning Hours: 4:00 Hours

Activity 1: Review Case Studies (60 Min)

Students will review real-world forensic cases where skeletal remains were critical in solving crimes or identifying missing persons. They will analyze the methodology used and the role of skeletal evidence in the investigation.

Activity 2: Identify Key Forensic Techniques (60 Min)

Students will identify and discuss the forensic techniques employed in these cases, such as skeletal analysis, age, sex, and ancestry determination, and how they contributed to solving the cases.

Activity 3: Group Discussion and Analysis (60 Min)

In groups, students will present a case study, explaining the forensic techniques used and evaluating their effectiveness in the case. They will discuss the challenges faced during the investigation and how they were overcome.

Activity 4: Q&A Session (60 Min)

Students will engage in a Q&A session to clarify concepts, discuss the implications of skeletal evidence in forensic science, and reflect on how similar methods could be applied in hypothetical future cases.

Experiential-Learning Learning 30.4: Cranial & Pelvic Insights in Forensics

Total Learning Hours: 5:00 Hours

Activity 1: Exploration (60 Min)

Students will independently examine cranial features (such as brow ridge, mastoid process, and external occipital protuberance) and pelvic morphology (including pelvic inlet shape, sacrum curvature, and pelvic arch) to identify characteristics that help determine sex.

Activity 2: Data Recording (90 Min)

Students will document their observations and record the anatomical features they identify for sex determination.

Activity 3: Peer Review: (90 Min)

Students will compare their findings with peers, discussing the accuracy of their assessments and any challenges they faced during the evaluation process.

Activity 4: Q&A Session (60 Min)

A question-and-answer session will allow students to clarify any doubts and engage in further discussion to refine their understanding of sex determination through cranial and pelvic features.

Experiential-Learning Learning 30.5: Sex and Age Determination from Skeletal Remains

Total Learning Hours: 4:00 Hours

Activity 1: Analysis of Skeletal Remains (60 Min)

Students will begin by analyzing a set of skeletal remains, identifying key anatomical features such as the pelvis, skull, and long bones, which are crucial for determining age and sex. They will apply theoretical knowledge on skeletal markers.

Activity 2: Demonstration and Practice (90 Min)

The instructor will demonstrate how to identify and measure these key features for accurate age and sex determination. Then, students will practice these techniques using the provided skeletal remains, refining their skills through hands-on application.

Activity 3: Discussion and Evaluation (90 Min)

Following the hands-on practice, a Q&A session will be conducted. Students will discuss their findings, compare them with known reference data, and engage in discussions about the potential limitations and challenges in determining age and sex from skeletal remains.

Experiential-Learning Learning 30.6: Postmortem Influences on Estimations	
Total Learning Hours: 4:00 Hours Activity 1: Examine and analyze postmortem changes (60 Min) Students will explore how factors such as decomposition and environmental conditions (e.g., temperature, humidity) influence skeletal remains and can impact the accuracy of sex, age, and height estimations in forensic cases. Activity 2: Conduct comparative studies (90 Min) Students will investigate case studies or simulated forensic cases where environmental variables or postmortem changes affected the skeletal remains, comparing results from different scenarios and documenting variations in determinations of sex, age, and height. Activity 3: Apply critical thinking and problem-solving skills (90 Min) Students will discuss and debate the limitations and challenges of forensic estimation methods when influenced by external conditions, and propose strategies to improve the accuracy of these assessments in real-world forensic investigations.	
Modular Assessment	
Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Total Hours of the Assessment: 4:00 Hours 1. Forensic Case Analysis – 20 Marks Students will be presented with a forensic case scenario involving human skeletal remains. They will be required to determine sex, age, height, and possible cause of skeletal changes based on given markers.	4

2.Skeletal Identification & Practical Assessment – 15 Marks Hands-on identification of skeletal elements (or images of bones if physical specimens are unavailable). Application of key anatomical landmarks to determine sex, age, or stature. 3.Objective Structured Practical Examination (OSPE) – 10 Marks Short station-based assessments (e.g., measuring long bones for stature estimation, identifying skull features for sex determination, assessing skeletal maturity). 4.Reflective Report on Experiential Learning – 5 Marks Students will write a short reflection (250 words) on a forensic case study, a skeletal analysis activity, or a forensic reconstruction exercise. or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	
Semester No : 6	
Module 31 : تشریح میں جدید تحقیقات (Tashreeh men Jadeed Tahqeeqaat) Recent Advances in Anatomy Module Learning Objectives (At the end of the module, the students should be able to) 1 Describe the fundamental principles and techniques of various imaging modalities, including Intravenous Urography (IVU), Angiography, Fluoroscopy, Barium Studies, Cholecystography, and Hysterosalpingography. 2 conduct the preparation and administration of contrast media for IVU, Angiography, and Barium studies, ensuring correct dosage, technique, and safety measures.	

3 Identify the indications for each imaging technique and how they contribute to diagnosing specific conditions in different organs and systems (e.g., renal, cardiovascular, gastrointestinal, reproductive).

Unit 1 (Tashreeh Men Jadeed Tahqeeqaat Jisse Saakht-o-af'al ke bahmi ta'luqaat ko Samajhney Mem Ma'dad Milti Hai Aur Sareeryati mas'lo ko hal karney mai iste'mal hotay hai) Recent advances in Anatomy which facilitate comprehension of structure function correlations and applications in clinical problem solving. (Tasveer-e-Auiyyah) Angiography.

31.1.1. (Tashreeh Men Jadeed Tahqeeqaat Jisse Saakht-o-af'al ke bahmi ta'luqaat ko Samajhney Mem Ma'dad Milti Hai Aur Sareeryati mas'lo ko hal karney mai iste'mal hotay hai) Recent advances in Anatomy which facilitate comprehension of structure function correlations and applications in clinical problem solving.

31.1.2. (Tasveer-e-Auiyyah) Angiography.

References: 132,133,134,139,140

3A	3B	3C	3D	3E	3F	3G
CO1,CO5	Interpret the conventional IVU images with CT urography (CTU) and MR urography (MRU) through a case-based approach to determine the most suitable imaging modality for different clinical scenarios.	4	Experiential-Learning31.1	CAN	Does	BL,DL,CBL,DIS,L&PP T
CO1,CO5, CO7	Interpret real patient case studies involving angiography, IVU, and fluoroscopy, formulating diagnostic impressions and proposing imaging-based treatment approaches.	5	Experiential-Learning31.2	CAN	Does	C_L,D,CBL,D- BED,L&PPT
CO1,CO5	Apply artificial intelligence (AI) and machine learning in anatomical studies.	1	Lecture	CC	Knows-how	L&PPT ,BL,L_VC,L&GD,SY

CO1,CO5, CO7	Discuss how AI and machine learning are revolutionizing anatomical imaging, angiographic diagnostics, and fluoroscopic image processing, leading to improved precision and efficiency.	3	Practical31.1	CC	Shows-how	L&PPT ,SY,D
CO1,CO5	Define angiography and its role in vascular imaging and Compare angiography with non-invasive vascular imaging techniques like Doppler ultrasound, CT angiography, and MR angiography.	2	Lecture	CC	Knows-how	L&PPT ,BL,L_VC,L&GD
CO1,CO5, CO7	Evaluate the impact of digital subtraction angiography (DSA), CT angiography (CTA), and MR angiography (MRA) on vascular imaging and their advantages over conventional anatomical studies.	3	Practical31.2	CE	Shows-how	PL,PT,PAL
CO1,CO5, CO7	Analyze the role of recent anatomical imaging advancements, including 3D reconstruction, virtual dissection, and functional imaging, in enhancing diagnostic accuracy in angiography, IVU, and fluoroscopy.	4	Practical31.3	CAN	Knows-how	CBL,D
CO1,CO5, CO7	Compare & present traditional angiography with non-invasive CTA and MRA, discussing the advantages and limitations of each modality.	4	Experiential- Learning31.3	CAN	Does	DIS,JC,PER
CO1,CO5	Describe the anatomy of the urinary system as visualized in IVU and evaluate the advantages and limitations of IVU in modern radiology.	2	Lecture	CE	Knows-how	L&GD,L&PPT ,L_VC

Unit 2 اشعاع مع بیریم (Tasveer-e-Talawwun Flori wa Iske Mukhtalif Aqsa'm wa Isharaat) fluoroscopy its different types and indications. اشعاع مع بیریم (ish'aa'a ma'a barium) Barium studies. تصویر مراره شعاعی (Tasweer mrarah shua'ei) Cholecystography. تصویر شعاعی رحمی قاذنی (Tasweer-e- shua'ei qazifi) Hystero-salpingography.

31.2.1. تصویر تلون فلوری واس کے مختلف اقسام و اشارات (Tasveer-e-Talawwun Flori wa Iske Mukhtalif Aqsa'm wa Isharaat) fluoroscopy its different types and indications.

31.2.2. اشعاع مع بیریم (ish'aa'a ma'a barium) Barium studies.

31.2.3. تصویر مراره شعاعی (Tasweer mrarah shua'ei) Cholecystography.

31.2.4. تصویر شعاعی رحمی قاذنی (Tasweer-e- shua'ei rahmi-qazifi) Hystero-salpingography.

References: 141,142,143,144,145

3A	3B	3C	3D	3E	3F	3G
CO1,CO5, CO7	Assess Sensitivity, Specificity, and Limitations of Barium Swallow, Cholecystography, and Salpingography.	4	Practical31.4	CE	Shows-how	L&PPT
CO1,CO5, CO7	Evaluate the Accuracy and Safety of Contrast Agents vs. Other Imaging Modalities for GIT & Gallbladder Evaluation.	3	Practical31.5	CK	Shows-how	L&PPT ,C_L
CO1,CO5	Describe fluoroscopy, types and indications.	1	Lecture	CC	Knows-how	BL,L&GD,L_VC,L&PP T
CO1,CO5	Describe different types of barium studies and their clinical applications.	2	Lecture	CK	Knows-how	L_VC,L&GD,BL,L&PP T
CO1,CO5	Demonstrate the appropriate selection, preparation, and administration of contrast media for each procedure, considering patient safety and contraindications.	5	Experiential-Learning31.4	AFT-SET	Does	D,DIS,L&PPT

CO1,CO5	Describe hysterosalpingography (HSG) and its role in reproductive medicine.	1	Lecture	CC	Knows-how	BL,L_VC,L&GD,L&PP T
CO1,CO5	Discuss cholecystography and its historical role in gallbladder imaging.	1	Lecture	CC	Knows-how	L_VC,BL,L&GD,L&PP T
CO1,CO5, CO7	Analyse Patient Discomfort in Salpingography, Cholecystography, and Barium Studies: A Study on Pain Reduction Strategies and Sedation Alternatives.	4	Experiential- Learning31.5	AFT- RES	Does	D,D-M,DL,JC
CO1,CO5, CO7	Design a Patient Information Pamphlet for Salpingography, Cholecystography, and Barium Studies.	4	Experiential- Learning31.6	AFT- SET	Does	PAL,JC,PBL
CO1,CO5, CO7	Analyze Contrast Agents in GIT, Uterine Tube, and Gallbladder Imaging.	3	Practical31.6	CAN	Shows-how	D,PER

Practical Training Activity

Practical Training 31.1 Smart Imaging: The AI Advantage

Total Learning Hours: 3:00 Hours

Activity 1: Teacher Demonstration (30 Min)

The Teacher will present an overview of AI and machine learning applications in anatomical imaging, angiography, and fluoroscopy.

Demonstrate AI-based image processing techniques, showcasing real-time enhancements, automated segmentation, and diagnostic assistance.

Activity 2: Guided Student Practice (60 Min)

Students will explore AI-powered imaging software, learning how to interpret AI-assisted angiographic and fluoroscopic images.

Perform side-by-side comparisons of traditional vs. AI-enhanced diagnostic images to assess accuracy and efficiency.

Activity 3: Independent Hands-on Application (60 Min)

Students will use simulated datasets to apply AI-based tools for anatomical structure identification and anomaly detection.

Practice adjusting AI parameters to optimize image clarity and enhance diagnostic precision.

Activity 4: Analysis and Discussion (30 Min)

Students analyze AI-generated diagnostic reports and compare them with human interpretations.

Engage in a Q&A session discussing the benefits, limitations, and ethical considerations of AI in medical imaging

Practical Training 31.2 Advancing Angiography: DSA, CTA & MRA

Total Learning Hours: 3:00 Hours

Activity 1: Introduction & Demonstration (30 Min)

The teacher explains the principles of DSA, CTA, and MRA, demonstrating their applications in vascular imaging and comparing them with conventional methods.

Activity 2: Hands-on Image Analysis (60 Min)

Students examine case studies featuring DSA, CTA, and MRA scans, identifying vascular structures and assessing image clarity, contrast, and diagnostic advantages.

Activity 3: Comparative Evaluation (60 Min)

Students analyze key differences between the techniques, discussing their benefits in clinical settings, including reduced invasiveness, enhanced visualization, and diagnostic accuracy.

Activity 4: Discussion & Q&A (30 Min)

A guided discussion follows where students critically evaluate when to use each modality, addressing real-world applications, limitations, and advancements in vascular imaging.

Practical Training 31.3 Angiography, IVU, and Fluoroscopy

Total Learning Hours: 4:00 Hours

Activity 1: Teacher Demonstration (60 Min)

The teacher will provide an overview of recent advancements in anatomical imaging, such as 3D reconstruction, virtual dissection, and functional imaging, explaining how they are used in angiography, IVU, and fluoroscopy to improve diagnostic accuracy.

Activity 2: Student Exploration (60 Min)

Students will explore different case studies where these imaging advancements have been applied in angiography, IVU, and fluoroscopy, identifying how the technologies enhance diagnostic precision.

Activity 3: Hands-on Practice (60 Min)

Students will use simulation software or available tools to practice interpreting 3D reconstructions, virtual dissections, and functional imaging, applying them to real or simulated patient data to enhance their understanding of diagnostic applications.

Activity 4: Q&A Session (60 Min)

After completing the activity, students will engage in a Q&A session, discussing challenges, advantages, and real-world implications of these imaging techniques in improving diagnostic accuracy in clinical practice.

Practical Training 31.4 Imaging Insights: Barium, Cholecystography & Salpingography

Total Learning Hours: 4:00 Hours

Activity 1: Teacher Demonstration (60 Min)

The Teacher will explain the principles, indications, and limitations of barium swallow, cholecystography, and salpingography.

Demonstrate of image interpretation techniques and discussion on sensitivity and specificity for detecting normal and abnormal anatomical structures.

Activity 2: Case-Based Image Analysis (60 Min)

Students will analyze provided radiographic images from barium swallow, cholecystography, and salpingography.

They will assess the diagnostic accuracy of each modality in detecting abnormalities and differentiate normal vs. pathological findings.

Activity 3: Independent Evaluation and Report Writing (60 Min)

Students will independently evaluate a set of imaging cases, calculate sensitivity and specificity where applicable, and identify limitations. They will draft a short report summarizing their findings and diagnostic considerations.

Activity 4: Group Discussion and Teacher Feedback (60 Min)

Students will present their evaluations, compare findings, and discuss clinical decision-making based on imaging results.

The Teacher will provide feedback, clarify key concepts, and highlight best practices in using these imaging modalities.

Practical Training 31.5 Contrast Agents vs. Other Imaging Modalities for GIT & Gallbladder Evaluation

Total Learning Hours: 3:00 Hours

Step 1: Teacher Demonstration (30 Min)

The Teacher will explain the use of oral and intravenous contrast agents in GIT and gallbladder imaging, highlighting their mechanisms, benefits, risks, and contraindications.

A comparative overview of contrast-enhanced imaging (CT, MRI, fluoroscopy) versus non-contrast modalities like ultrasonography will be provided.

Step 2: Case-Based Image Analysis (60 Min)

Students will examine radiological images from contrast-based studies and ultrasonography to assess diagnostic accuracy.

They will compare findings, identifying cases where contrast-enhanced imaging is superior or where non-contrast imaging is sufficient.

Step 3: Independent Evaluation and Risk Assessment (60 Min)

Students will assess the risks and benefits of contrast agents in given clinical scenarios, considering factors like allergies, renal function, and radiation exposure.

They will draft a comparative analysis summarizing accuracy, safety, and clinical applicability.

Step 4: Group Discussion and Teacher Feedback (30 Min)

Students will present their evaluations, debating the advantages and risks of contrast use versus ultrasonography or other imaging modalities.

The Teacher will provide feedback, reinforcing best practices in selecting appropriate imaging techniques.

Practical Training 31.6 Contrast Agents in GIT, Uterine Tube, and Gallbladder Imaging.

Total Learning Hours: 3:00 Hours

Activity 1: Teacher Demonstration (30 Min)

The Teacher will explain how contrast agents enhance visualization of different segments of the GIT, uterine tube, and gallbladder.

Live or recorded demonstrations of contrast-enhanced imaging techniques (e.g., barium studies, hysterosalpingography, and cholecystography) will be presented, highlighting their diagnostic significance.

Activity 2: Image Analysis and Interpretation (60 Min)

Students will review radiographic images showing normal and pathological findings in contrast-enhanced studies.

They will identify key anatomical landmarks and assess how contrast agents aid in diagnosing abnormalities.

Activity 3: Case-Based Application (60 Min)

Students will analyze real or simulated patient cases, correlating clinical symptoms with contrast-enhanced imaging findings.

They will discuss the role of contrast in differentiating normal vs. pathological conditions.

Activity 4: Group Discussion and Teacher Feedback (30 Min)

Students will present their findings, debating the advantages and limitations of contrast-enhanced imaging in different clinical scenarios.

The Teacher will provide feedback, emphasizing best practices for interpretation and diagnosis.

Experiential Learning Activity

Experiential-Learning Learning 31.1: IVU vs. CTU vs. MRU: A Case-Based Analysis

Total Learning Hours: 4:00 Hours

Activity 1: Review of theoretical concepts (60 Min)

Students will first be briefed on the differences between conventional IVU, CT urography (CTU), and MR urography (MRU), focusing on their principles, advantages, and limitations in clinical use.

Activity 2: Case-based analysis (60 Min)

Students will analyze a series of real-world patient cases where both conventional IVU and advanced imaging techniques (CTU and MRU) are used, identifying the clinical scenarios for which each modality is most appropriate.

Activity 3: Comparison and contrast (60 Min)

Students will actively compare the diagnostic capabilities of conventional IVU, CTU, and MRU in the context of the cases, evaluating the strengths and weaknesses of each technique in terms of diagnostic accuracy, patient safety, and clinical outcomes.

Activity 4: Clinical decision-making (60 Min)

Based on their analysis, students will propose the most suitable imaging modality for each case scenario, justifying their decisions with evidence from the case studies and their theoretical knowledge of the imaging techniques

Experiential-Learning Learning 31.2: Case-Based Imaging Analysis

Total Learning Hours: 5:00 Hours

Activity 1: (60 Min)

Student will review theoretical concepts and the procedural knowledge of angiography, IVU, and fluoroscopy, understanding their applications, strengths, and limitations in clinical diagnosis.

Activity 2: (60 Min)

Student will analyze real patient case studies, identifying key diagnostic features from angiographic, IVU, and fluoroscopic images and formulating possible clinical impressions based on the imaging findings.

Activity 3: (90 Min)

Student will assess various diagnostic approaches and propose appropriate imaging-based treatment strategies, taking into account the patient's condition, imaging results, and relevant medical history.

Activity 4: (90 Min)

Student will discuss their diagnostic impressions and treatment proposals in a group or class setting, justifying their decisions based on evidence from the case studies and theoretical knowledge.

Experiential-Learning Learning 31.3: Comparative Analysis of Traditional Angiography, CTA, and MRA: Advantages and Limitations

Total Learning Hours: 4:00 Hours

Activity 1: Analyze the modalities (60 Min)

Student will review the theoretical concepts and technical aspects of traditional angiography, CTA, and MRA, focusing on their principles, procedures, and clinical uses in vascular imaging.

Activity 2: Compare and contrast (90 Min)

Student will compare and contrast the advantages and limitations of each modality by assessing factors such as accuracy, safety, invasiveness, patient comfort, and diagnostic efficiency, using practical examples and case studies.

Activity 3: Apply knowledge (90 Min)

Student will apply their knowledge by analyzing real-world clinical scenarios and recommending the most suitable imaging modality, considering factors like patient condition, required resolution, and procedure risks.

Experiential-Learning Learning 31.4: Contrast Essentials: Safety & Selection

Total Learning Hours: 5:00 Hours

Activity 1: Selection of Contrast Media (90 Min)

Students will assess the patient's medical history and the specific imaging procedure to determine the appropriate contrast media, considering factors like allergies, kidney function, and the type of imaging required (e.g., CT, MRI, angiography).

Activity 2: Preparation: (90 Min)

Students will prepare the contrast media by ensuring proper dilution (if applicable), checking the expiration date, and verifying the volume required for the procedure, all while adhering to aseptic techniques.

Activity 3: Administration (60 Min)

Students will practice the safe administration of contrast media, following correct protocols for intravenous, intra-arterial, or oral delivery, ensuring proper technique, and monitoring the patient for any signs of adverse reactions.

Activity 4: Post-Administration Monitoring and Documentation (60 Min)

Students will monitor the patient for any potential reactions, documenting the procedure accurately, including the type and amount of contrast media used, patient response, and any adverse events or complications.

Experiential-Learning Learning 31.5: Salpingography, Cholecystography and Barium Studies.

Total Learning Hours: 4:00 Hours

Activity 1: Literature Review and Understanding (60 Min)

Quickly review existing research on patient discomfort during salpingography, cholecystography, and barium studies. Focus on identifying common pain points and current sedation protocols.

Activity 2: Design Research Study (90 Min)

Develop a quick, practical study design to assess patient discomfort. This could be a brief survey or interview format, with questions centered on pain levels, anxiety, and satisfaction with current sedation protocols.

Activity 3: Propose Improvements (90 Min)

Analyze the findings based on theoretical knowledge, and then propose practical recommendations to minimize patient discomfort. This could include alternative sedation methods or procedural modifications.

Experiential-Learning Learning 31.6: **Salpingography, Cholecystography, and Barium Studies**

Total Learning Hours: 4:00 Hours

Activity 1: Research and Content Development (60 Min)

Students will research the procedures of salpingography, cholecystography, and barium studies, focusing on their risks, benefits, and procedural steps. They will gather relevant information, aiming to explain each procedure in simple, layman's terms, ensuring the language is patient-friendly.

Activity 2: Pamphlet Design and Creation (90 Min)

Students will design a visually appealing pamphlet that incorporates essential information such as procedure description, preparation steps, risks, and benefits.

They will ensure that the content is clear, concise, and uses simple language with illustrations where necessary to aid understanding.

Activity 3: Peer Review and Final Refinement (90 Min)

Students will present their pamphlets to peers for feedback, evaluating the clarity and accessibility of the information.

Based on peer input and Teacher feedback, students will refine and finalize the pamphlets, ensuring the content is accurate, easy to understand, and informative.

Modular Assessment

Assessment

Hour

Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C.

Total Hours of the Assessment: 4:00 Hours

1. Case-Based Problem Solving – 20 Marks

Provide students with a real-life patient scenario involving IVU, angiography, or fluoroscopy. They must analyze the case, select the appropriate imaging technique, justify their choice, and interpret the expected findings.

2. Radiographic Image Interpretation – 15 Marks

Students will be presented with 2–3 radiographic images (e.g., IVU, angiography, fluoroscopy) and will describe key features, identify abnormalities, and provide possible diagnoses.

3. Objective Structured Clinical Examination (OSCE) – 10 Marks

A short station-based assessment where students may be asked to:

Demonstrate patient positioning for a fluoroscopy or IVU procedure.

Explain the steps of contrast media administration.

Discuss safety precautions related to radiation exposure.

4

4. Reflective Writing on Clinical Observation – 5 Marks Students will reflect on a real or simulated clinical imaging procedure they observed, discussing key takeaways, challenges, and the role of the radiologic technologist. or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)						
Module 32 : قانون تشریح و تشریح اخلاقیات (Qanoon-e-Tashreeh wa Tashreehi Akhlaqiyat) Anatomy Law & Anatomical Ethics						
Module Learning Objectives (At the end of the module, the students should be able to) 1 Describe Describe the ethical, legal, and anatomical principles involved in organ donation, focusing on the processes, criteria, and legal requirements governing the procurement of organs. 2 conduct a clinical scenario analysis to address ethical challenges in organ donation, including evaluating situations where donor consent is ambiguous, and how to handle them. 3 Identify Identify the key anatomical structures involved in organ donation and demonstrate accurate understanding of the surgical techniques involved in harvesting organs from deceased donors.						
Unit 1 تبرع بالاعضاء (Tabarr'u bil A'aza) organ donation. 32.1.1. تبرع بالاعضاء (Tabarr'u bil A'aza) organ donation. 32.1.2. حالیہ حاصل شدہ اعضاء کی متعلق تبرع بالاعضاء کے اصول (Haliya Hasil Shuda Aa'za ke Muta'lliq Tabarr'u bil A'aza ke Usool) Principles of organ donation from recently procured. References: 155,156,157,158,159,160,161						
3A	3B	3C	3D	3E	3F	3G

CO1,CO2, CO7	Describe key terms related to organ donation, including brain death, circulatory death and transplantation.	1	Lecture	CC	Knows-how	L_VC,L&GD,BL,L&PP T
CO1,CO2, CO7	Describe the Principles of organ donation from recently procured.	2	Lecture	CC	Knows-how	BL,L_VC,L&GD
CO1,CO5	Apply ethical principles in decision-making regarding organ procurement from recently deceased donors.	4	Experiential- Learning32.1	CAP	Does	L&GD
CO1,CO5	Discuss the ethical and legal issues involved in the allocation of organs, focusing on priority criteria, fairness, and the role of the law.	5	Experiential- Learning32.2	AFT- RES	Does	L&PPT
CO1,CO5, CO7	Perform accurate organ preservation techniques.	5	Practical32.1	PSY- GUD	Shows-how	DIS,D-M,DL
CO1,CO5, CO7	Demonstrate appropriate donor evaluation technique	5	Practical32.2	PSY- SET	Shows-how	BL,D,CBL
CO1,CO7	Examine the ethical considerations surrounding embalming and the preservation of human bodies for anatomical study, public display, or historical purposes.	4	Experiential- Learning32.3	CAN	Does	JC,DIS
CO1,CO2, CO7	Evaluate the principles and ethical considerations of organ donation.	2	Lecture	CE	Knows-how	L&PPT ,L&GD

Unit 2 تشریح اخلاقیات (Tashreehi Akhlaqiyaat) Ethics of Anatomy. قانون تشریح (Qanoon-e-Tashreeh) Anatomy Law.

32.2.1. تشریح اخلاقیات (Tashreehi Akhlaqiyaat) Ethics of Anatomy.

32.2.2. قانون تشریح (Qanoon-e-Tashreeh) Anatomy Law.

References: 155,156,157,158,159,160,161						
3A	3B	3C	3D	3E	3F	3G
CO1,C06,CO7	Describe the medical ethics and anatomical ethics in the Unani system of medicine.	1	Lecture	CC	Knows-how	L&GD,L&PPT, BL, L_VC
CO1,CO5,CO7	Demonstrate proper handling, preservation, and respectful treatment of human anatomical specimens following legal and ethical guidelines.	5	Practical32.3	PSY-GUD	Shows-how	DL,DIS,D,C_L
CO1,CO5,CO7	Examine and compare anatomy laws from different countries to understand how cultural, legal, and ethical standards influence anatomy education and research.	4	Experiential-Learning32.4	CAN	Does	D-BED,D-M,DL
CO1,C06,CO7	Describe key ethical principles related to the study and teaching of anatomy.	2	Lecture	CC	Knows-how	L&GD,BL,L&PPT, L_VC
CO1,CO5,CO7	Demonstrate appropriate ethical behaviors in handling human remains.	5	Practical32.4	PSY-SET	Shows-how	
CO1,CO5,CO7	Discuss ethical concerns in anatomical research, particularly around cadaveric dissections and the use of human tissue.	4	Experiential-Learning32.5	AFT-RES	Does	
CO1,C06,CO7	Describe the Anatomical laws and the legal frameworks governing human body donation for anatomical studies.	2	Lecture	CC	Knows-how	L&PPT, L_VC
CO1,CO7	Participate in a mock trial involving a hypothetical legal case concerning the unlawful use of human remains for anatomical research or education.	5	Experiential-Learning32.6	PSY-SET	Does	L_VC,FC

Practical Training Activity
Practical Training 32.1 Mastering Organ Preservation
Total Learning Hours: 5:00 Hours Activity 1: Teacher Demonstration (60 Min) The teacher will demonstrate the proper organ preservation techniques, explaining the key steps such as using preservation solutions, maintaining the right temperature, and handling the organs with care. The teacher will discuss how to preserve organ viability for transplantation by emphasizing aseptic technique and cold storage. Activity 2: Student Observation (90 Min) Students will observe the teacher's demonstration closely, taking notes on the preservation process and understanding the rationale behind each step. The teacher will also explain how preservation techniques ensure the organ remains viable and suitable for transplantation. Activity 3: Student Practice (90 Min) Students will then practice the preservation techniques under supervision. They will flush the organs with preservation solutions, ensure they are properly stored in cold conditions, and follow aseptic procedures to handle the organs with care. Activity 4: Reflection and Q&A (60 Min) After the practice session, students will reflect on their experience, discussing challenges and key takeaways. The teacher will answer any questions and guide students through troubleshooting and improving their techniques, ensuring they understand the importance of precision in organ preservation.
Practical Training 32.2 Ethical Donor Assessment
Total Learning Hours: 5:00 Hours Activity 1: Teacher Demonstration (60 Min)

The teacher will demonstrate the process of donor evaluation, emphasizing the importance of assessing the suitability of an organ donor. This will include monitoring vital signs, performing necessary lab tests, and visually and physically assessing the condition of organs for transplantation. The teacher will also highlight the key factors influencing organ viability and transplant success.

Activity 2: Student Practice (90 Min)

Students will practice performing clinical evaluations under the teacher's supervision. This includes monitoring vital signs (e.g., blood pressure, heart rate, oxygen saturation), reviewing lab test results, and assessing organs such as the heart, liver, and kidneys for signs of suitability for transplantation.

Activity 3: Reflection and Discussion (90 Min)

Students will reflect on their practice and discuss the challenges and clinical decision-making involved in donor evaluation. The teacher will guide students in identifying potential red flags in donor suitability and the importance of accurate assessments for successful organ transplants.

Activity 4: Q&A Session (60 Min)

A Q&A session will follow, allowing students to ask questions and clarify any doubts regarding the evaluation process, including ethical considerations, limitations, and complications that may arise during donor assessment.

Practical Training 32.3 Ethical Treatment in Anatomy Labs

Total Learning Hours: 5:00 Hours

Activity 1: Introduction & Demonstration (60 Min)

The Teacher will explain the legal and ethical principles governing human anatomical specimens.

Demonstrate proper handling, preservation techniques, and respectful treatment.

Activity 2: Supervised Hands-on Practice (90 Min)

Students, under Teacher guidance, will practice handling and preserving specimens.

Emphasis on following ethical guidelines, labeling, and storage protocols.

Activity3: Independent Skill Application (90 Min)

Students will work individually to apply handling and preservation techniques.

Perform tasks such as proper documentation, storage, and specimen maintenance.

Activity 4: Case Study Discussion & Reflection (60 Min)

Group discussion on ethical dilemmas in anatomy labs.

Students will analyze real-world cases and propose solutions to reinforce ethical decision-making.

Practical Training 32.4 Ethics in Handling Human Remains

Total Learning Hours: 5: Hours

Activity 1: Demonstration (90 Min)

The Teacher will demonstrate the ethical guidelines and proper procedures for handling human remains, emphasizing respect for dignity, privacy, and adherence to legal and institutional protocols.

Activity 2: Explanation and Discussion (90 Min)

The Teacher will explain the ethical and cultural considerations involved in handling human remains, discussing potential dilemmas and ethical challenges.

Activity 3: Student's Role (60 Min)

Students will Observe and take notes on proper techniques and practice handling human remains under supervision, applying the demonstrated techniques while ensuring compliance with ethical standards, safety protocols, and respect for the deceased.

Activity 4: Q&A Session (60 Min)

After the practice session, students will engage in a Q&A session with the Teacher, discussing any questions or concerns regarding the ethical handling of human remains, reinforcing understanding and clarification.

Experiential Learning Activity

Experiential-Learning Learning 32.1: Organ Procurement

Total Learning Hours: 4:00 Hours

Activity 1: Case Analysis and Ethical Frameworks (60 Min)

Students will review real-world and hypothetical cases involving organ procurement, analyzing ethical dilemmas related to consent, timing of retrieval, and medical necessity. They will apply ethical principles such as autonomy, beneficence, and justice to evaluate different perspectives.

Activity 2: Simulated Ethical Decision-Making (60 Min)

Through role-playing exercises, students will take on the roles of healthcare providers, legal experts, and family members to navigate complex decision-making scenarios. They will debate conflicting interests and justify their decisions based on ethical guidelines and legal considerations.

Activity 3: Reflection and Policy Discussion (60 Min)

Students will critically assess how ethical principles are applied in practice, discussing challenges in balancing donor and recipient rights. They will propose potential improvements in organ procurement policies while reflecting on real-world implications.

Activity 4: Q&A and Expert Insights (60 Min)

A guided discussion with an expert panel will allow students to ask questions and explore emerging issues in organ donation ethics.

Experiential-Learning Learning 32.2: Laws and Lives: Organ Allocation

Total Learning Hours: 5:00 Hours

Activity 1: Examine Ethical and Legal Frameworks (60 Min)

Students will explore global and national organ allocation policies, analyzing ethical theories and legal precedents that shape organ distribution systems.

Activity 2: Compare Allocation Criteria (90 Min)

Through case studies, students will assess different organ allocation criteria such as medical urgency, waiting time, donor-recipient compatibility, and social factors, debating their ethical and legal implications.

Activity 3: Simulate Ethical Decision-Making (90 Min)

Students will engage in role-playing activities where they act as policymakers, clinicians, or patients, making real-time decisions on organ allocation while considering ethical dilemmas and resource limitations

Activity 4: Q&A and Critical Reflection (60 Min)

A guided discussion will allow students to challenge allocation models, propose reforms, and reflect on how ethical considerations influence legal policies, healthcare equity, and public trust in organ donation systems.

Experiential-Learning Learning 32.3: Ethics of Embalming

Total Learning Hours: 4:00 Hours

Activity 1: Research and Understand Ethical Principles (90 Min)

Students will review the ethical guidelines and principles surrounding the use of embalming and body preservation for anatomical study, public display, and historical purposes. They will explore varying cultural and legal perspectives on these practices.

Activity 2: Analyze Real-World Case Studies (90 Min)

Students will examine case studies where embalming and body preservation were applied, analyzing the ethical dilemmas and controversies involved. They will critically assess the balance between scientific/educational benefits and ethical concerns.

Activity 3: Engage in Discussion and Debate (60 Min)

Students will participate in group discussions or debates, articulating their perspectives on the ethical issues surrounding embalming, drawing conclusions based on their research, and proposing ethical guidelines for handling human remains in various contexts.

Experiential-Learning Learning 32.4: Anatomy Laws Across Borders

Total Learning Hours: 4:00 Hours

Activity 1: Research & Analysis (90 Min)

Students will explore anatomy laws from different countries, examining legal frameworks, cultural perspectives, and ethical considerations that shape anatomy education and research.

Activity 2: Comparative Discussion (90 Min)

They will compare key differences in regulations, highlighting how these variations impact medical education, research practices, and the respectful use of human remains.

Activity 3: Application & Reflection (60 Min)

Students will present case studies or propose policy recommendations to improve ethical and legal standards, followed by a Q&A session to discuss global best practices and challenges.

Experiential-Learning Learning 32.5: The Ethics of Dissection

Total Learning Hours: 4:00 Hours**Activity 1: Analyze Ethical Principles (60 Min)**

Students will review and analyze ethical guidelines related to anatomical research, focusing on cadaveric dissection and the use of human tissue. They will explore historical cases, legal frameworks, and ethical considerations in medical education and research.

Activity 2: Evaluate Real-World Scenarios (60 Min)

Students will apply their knowledge to case studies involving ethical dilemmas in anatomical research. They will assess issues such as informed consent, donor anonymity, and the respectful handling of human remains, formulating reasoned ethical arguments.

Activity 3: Propose Ethical Solutions (60 Min)

Based on their analysis, students will develop recommendations or best practices for ethically conducting anatomical research. They may present their findings through discussions, written reflections, or debates, ensuring an applied understanding of ethical concerns in this field.

Experiential-Learning Learning 32.6: Trial of Ethics

Total Learning Hours: 5:00 Hours**Activity 1: Case Analysis & Preparation (90 Min)**

Students will review legal and ethical guidelines concerning the use of human remains in anatomical research, analyze the mock case details, and prepare arguments for prosecution or defense.

Activity 2: Mock Trial Participation (90 Min)

Acting as legal representatives, expert witnesses, or jurors, students will present evidence, question witnesses, and debate the ethical and legal aspects of the case.

Activity3: Reflection & Discussion (60 Min) Students will analyze the trial outcome, compare perspectives, and discuss key ethical and legal takeaways in relation to real-world anatomical research and education.

Activity 4: Q&A Session (60 Min) An open forum where students ask questions, clarify legal concepts, and engage in critical discussions about ethical dilemmas in anatomy education and research.

Modular Assessment

Assessment	Hour
Instructions - Conduct a structured Modular assessment. Assessment will be for 50 marks. Keep a structured marking pattern. Use different assessment methods in each module for the semester. Keep record of the structured pattern used for assessment. Calculate the Modular grade point as per table 6 C. Total Hours of the Assessment: 4:00 Hours 1. Multiple-Choice Questions (MCQs) – 15 Marks 15 MCQs (1 mark each) covering key topics such as consent, donor selection, organ procurement, and legal regulations. 2. Short Answer Questions – 10 Marks 2-3 short answer questions (3-5 marks each) requiring brief explanations or listing key points. 3. Case-Based Analysis – 15 Marks A case study on an ethical or legal dilemma in organ donation, requiring students to analyze the situation, discusses ethical concerns, and proposes appropriate solutions. 4. Practical/Scenario-Based Discussion – 10 Marks	4

A brief oral or written reflection on an organ donation scenario, such as ethical issues in brain death determination or legal aspects of living versus deceased donation. or Any practical in converted form can be taken for assessment. (25 Marks) and Any of the experiential as portfolio/ reflections / presentations can be taken as assessment. (25 Marks)	

Table 4 : Practical Training Activity

(*Refer table 3 of similar activity number)

Practical No*	Practical name	Hours
1.1	General Embryology	5
1.2	Fertilization and Implantation.	5
1.3	The placenta	5
1.4	Early Embryonic Development.	5
2.1	General Systemic embryology.	5
2.2	Development of organ systems.	5
2.3	Congenital abnormalities with teratogenesis.	5
2.4	Congenital Anomalies	5
3.1	Cell Biology.	5
3.2	Cellular organelles.	5
3.3	Cellular structures.	5
3.4	Stem Cells and Cryobanking.	5
4.1	The nucleus.	5
4.2	Chromatin and protein synthesis.	5
4.3	Cellular activity.	5
4.4	Microscopic organization of the cell.	5
5.1	Human Chromosomes.	5
5.2	Cytogenetics..	5
5.3	Basics of molecular genetics.	5

5.4	Histochemimcal and Immunohistochemical Techniques.	5
6.1	Single gene pattern inheritance.	5
6.2	Sex chromosomal pattern and intermediate pattern of inheritance.	5
6.3	Alleles,Non-Mendelian inheritance and Mitochondrial inheritance.	5
6.4	Genome Imprinting and Parental Disomy.	5
7.1	Multifactorial pattern of inheritance	5
7.2	Teratology and Gene structure	5
7.3	Molecular Screening and Cancer Genetics.	5
7.4	Haematological malignancies and Pharmacogenetics.	5
8.1	Reproductive Genetics and Infertility.	5
8.2	Comprehensive Genetic Applications	5
8.3	Ethics of Genetics and Gene therapy	5
8.4	Defense Dynamics and Immune System	5
9.1	Arthrology of head region.	3
9.2	The head region.	5
9.3	Myology of head region.	4
9.4	Gross and applied anatomy of head region.	4
9.5	Anatomy of brain.	4
10.1	Osteology of neck region.	4
10.2	Arthrology of neck region.	3
10.3	Myology of neck region.	3
10.4	Splanchnology of neck region.	3
10.5	Gross and applied anatomy of neck region.	4

10.6	Spinal Cord.	3
11.1	Osteology of upper limb	5
11.2	Arthrology of upper limb	5
11.3	Myology of upper limbs.	5
11.4	Anatomy of upper limbs.	5
12.1	Osteology of lower limbs.	5
12.2	Arthrology of lower limbs.	5
12.3	Myology of lower limbs.	5
12.4	Gross and applied anatomy of lower limbs.	5
13.1	Osteology of thorax.	4
13.2	Arthrology of thorax.	3
13.3	Splanchnology of thorax.	4
13.4	Myology of thorax.	5
13.5	Gross anatomy, surgical and clinical anatomy of thorax.	4
14.1	Osteology of lumbar spine.	3
14.2	Arthrology of lumbar spine.	3
14.3	Myology of abdominal wall.	4
14.4	Anatomy of inguinal region	3
14.5	Splanchnology of abdomen.	4
14.6	Gross, surgical and clinical anatomy of abdomen.	3
15.1	Osteology of Pelvis and perineum.	3
15.2	Arthrology of Pelvis and perineum.	2
15.3	Myology of Pelvis and perineum.	4

15.4	Anatomy of male and female, internal and external genitalia.	3
15.5	Splanchnology of Pelvis and perineum.	5
15.6	Gross,surgical and clinical anatomy of Pelvis and perineum.	3
16.1	General Anatomy of Human Body	5
16.2	Applied Anatomy for Unani Procedures and its treatment/Management.	4
16.3	Embalming Procedures	4
16.4	Museum preparation for the display of anatomical structures.	2
16.5	Embalming of Cadaver.	2
16.6	Preservation of Cadaver and specimen	3
17.1	Neurons and Classification of Neurons	5
17.2	Synapses, Neurotransmitters and Neuroglia.	5
17.3	Enteric nervous system.	3
17.4	Autonomic Nervous System.	3
17.5	Somatic Nervous System	4
18.1	Development of Central Nervous System	5
18.2	Development of the Peripheral Nervous System	5
18.3	Development of the Autonomic Nervous System	5
18.4	Development of the Enteric Nervous System	5
19.1	Olfactory Pathways.	5
19.2	Optic Pathways.	5
19.3	Cochleovestibular Pathways	5
19.4	Gustatory Pathway.	5
20.1	The Sensory Pathway	5

20.2	The Motor Pathway	5
20.3	The HPA Axis and Hypothalamic-Sympathetic Pathway	5
20.4	The Brainstem-parasympathetic pathway and Spinal-sympathetic reflex.	5
21.1	Hypothalamo-Hypophyseal System.	5
21.2	Limbic System.	5
21.3	Basal Nuclei	5
21.4	Reticular System.	5
22.1	Cross Sectional Anatomy of the Brain	5
22.2	Cross Sectional Anatomy of the Spinal Cord.	5
22.3	Applied Aspects of the Peripheral Nervous System	5
22.4	Applied Aspects of the Central Nervous System.	5
23.1	Applied Aspects of Central Nerves.	4
23.2	Peripheral nerves and nerve plexuses	3
23.3	Applied Aspects of Peripheral Nerves and Nerve Plexuses	3
23.4	Applied Aspects of Upper motor Neurons	5
23.5	Applied aspect of lower motor neurons (LMNs).	5
24.1	Dorsal Thalamus.	5
24.2	Ventral Thalamus.	5
24.3	Applied Aspects of the Ventricular System	5
24.4	Applied Aspects of Sub Arachnoid Spaces	5
25.1	Cranial Nerves and Surface Anatomy Integration	2
25.2	Anatomical Landmarks of the Head & Palpation	2
25.3	3D	2

25.4	Temporo Mandibular Joint Palpation and Assessment	2
25.5	Ear Canal Palpation	2
25.6	Clinical Positioning Practice	2
25.7	Neck Range of Motion (ROM) Palpation	2
25.8	Cervical Lymph Nodes	3
25.9	Palpation of Major Blood Vessels of Neck	3
26.1	Identification of Normal Anatomical Structures	3
26.2	X-ray & USG Interpretation	4
26.3	CT Imaging Principles & CECT Evaluation	3
26.4	Mammographic Image Evaluation	3
26.5	MRI Sequence Interpretation	4
26.6	Nuclear Medicine Scan Interpretation	3
27.1	X-ray vs. USG Effectiveness Comparison	4
27.2	Integrated Clinical Imaging Report	4
27.3	Anatomy-Pathology Integration	2
27.4	Imaging Safety Protocols	4
27.5	Diagnostic Accuracy of CECT, MRI & Radionuclide Imaging	3
27.6	CECT, MRI & Radionuclide Imaging Comparison	3
28.1	Thoracic Surface Landmarks Map	3
28.2	Surface Anatomy & Thoracic Internal Pathology	4
28.3	Clinical Significance of Thoracic Surface Anatomy	3
28.4	Hand Positioning & Palpation Techniques	2
28.5	Practical Guide for Abdominal Examination Using Surface Anatomy	3

28.6	Abdominal surface landmarks (e.g., umbilicus, iliac crest, and costal margin etc)	2
28.7	Surface anatomical landmarks on a patient presenting with abdominal pain.	3
29.1	Palpating Arterial Pulses of the Upper Limb	2
29.2	Mapping Muscles & Bones of the Upper Limb	2
29.3	Anatomy-Based Accuracy in Nerve Blocks	3
29.4	Upper Limb Surface Modeling	3
29.5	Mapping Bony Landmarks & Soft Tissues	3
29.6	Anatomical Correlations: Surface to Depth	4
29.7	Lower Limb Exam Techniques	3
30.1	Markers of Antemortem, Perimortem & Postmortem Trauma	4
30.2	Skeletal Remains: Forensic Differentiation	3
30.3	Human vs. Non-Human: Skeletal Insights	3
30.4	Anatomy of Age & Sex Determination	3
30.5	Skeletal Clues: Male vs. Female	4
30.6	Forensic Estimation Challenges	3
31.1	Smart Imaging: The AI Advantage	3
31.2	Advancing Angiography: DSA, CTA & MRA	3
31.3	Angiography, IVU, and Fluoroscopy	4
31.4	Imaging Insights: Barium, Cholecystography & Salpingography	4
31.5	Contrast Agents vs. Other Imaging Modalities for GIT & Gallbladder Evaluation	3
31.6	Contrast Agents in GIT, Uterine Tube, and Gallbladder Imaging.	3
32.1	Mastering Organ Preservation	5
32.2	Ethical Donor Assessment	5

32.3	Ethical Treatment in Anatomy Labs	5
32.4	Ethics in Handling Human Remains	5

Table 5 : Experiential learning Activity

(*Refer table 3 of similar activity number)

Experiential learning No*	Experiential name	Hours
1.1	Fertilization and Implantation.	7
1.2	Basics of General Embryology	6
1.3	The Placenta	7
1.4	Early Embryonic Development.	6
2.1	Developmental Anatomy of Organ systems.	7
2.2	General systemic embryology	6
2.3	Congenital abnormalities with Teratogenesis.	7
2.4	Anatomical Basis Of Congenital Anomalies.	6
3.1	Cellular biology.	7
3.2	Cellular organelles.	6
3.3	Cytoskeleton and Cell inclusions.	6
3.4	Stem Cells and Cryobanking.	7
4.1	Basics of nucleus	7
4.2	DNA and protein synthesis.	6
4.3	Cellular activity.	7
4.4	Microscopic organization of the cell.	6
5.1	Identification of chromosomes.	7
5.2	Chromosomes and their abnormality.	6
5.3	Molecular genetics.	7

5.4	Various histochemimcal and Immunohistochemical Techniques.	6
6.1	Single gene pattern inheritance.	7
6.2	Sex chromosomal pattern and intermediate pattern of inheritance.	6
6.3	Alleles,Non-Mendelian inheritance and Mitochondrial inheritance.	7
6.4	Genome Imprinting and parental Disomy.	6
7.1	Multifactorial Pattern of Inheritance.	7
7.2	Teratology and Gene structure.	6
7.3	Molecular Screening and Cancer Genetics.	7
7.4	Haematological malignancies and Pharmacogenetics.	6
8.1	Reproduction Genetics and Male and Female Infertility.	7
8.2	Genes and Ethics	6
8.3	Applied Gene Therapy and Defense Systems Analysis.	7
8.4	Cell Types in Defence Mechanism	6
9.1	Osteology of head region.	6
9.2	Arthrology of head region.	4
9.3	Myology of head region	6
9.4	Anatomy of brain.	6
9.5	Gross and applied anatomy of head region	4
10.1	Osteology of neck region.	5
10.2	Arthrology of neck region.	3
10.3	Myology of neck region.	3
10.4	Splanchnology of neck region.	6
10.5	Gross and applied anatomy of neck region.	5

10.6	Spinal cord.	4
11.1	Osteology of upper limbs.	7
11.2	Arthrology of upper limbs.	6
11.3	Myology of upper limbs.	7
11.4	Gross and applied anatomy of upper limbs.	6
12.1	Osteology of lower limbs.	6
12.2	Arthrology of lower limbs	7
12.3	Myology of lower limbs.	6
12.4	Gross and applied anatomy of lower limbs.	7
13.1	Osteology of thorax.	5
13.2	Arthrology of thorax.	4
13.3	Myology of thorax.	5
13.4	Splanchnology of thorax.	7
13.5	Gross anatomy, surgical and clinical anatomy of thorax.	5
14.1	Osteology of lumbar spine	4
14.2	Arthrology of lumbar spine	4
14.3	Myology of abdomen.	5
14.4	Anatomy of inguinal region.	3
14.5	Gross, surgical and clinical anatomy of abdomen.	4
14.6	Splanchnology of abdomen.	6
15.1	Osteology of Pelvis and perineum.	5
15.2	Arthrology of Pelvis and perineum.	3
15.3	Myology of pelvis and perineum.	4

15.4	Gross, surgical and clinical anatomy of Pelvis and perineum	3
15.5	Splanchnology of Pelvis and perineum.	7
15.6	Anatomy of male and female, internal and external genitalia.	4
16.1	Applied Anatomy for Unani Procedures of treatment/Management.	5
16.2	Embalming Procedures	5
16.3	General Anatomy of Human Body.	6
16.4	Embalming of Cadaver.	3
16.5	Preservation of Cadaver and specimen	4
16.6	Museum preparation for the display of anatomical structures.	3
17.1	Structure and function of synapses	7
17.2	Neuron structure, classification neurons	6
17.3	Autonomic Nervous System (ANS)	4
17.4	Enteric Nervous System	4
17.5	Somatic Nervous System.	5
18.1	Development of the Central Nervous System	7
18.2	Development of Peripheral Nervous System	6
18.3	Development of Autonomic Nervous System	7
18.4	Development of Enteric Nervous System	6
19.1	Structure and function of the olfactory pathway	6
19.2	Optic pathway	7
19.3	Cochleovestibular Pathway	6
19.4	Gustatory pathway	7
20.1	The Motor Pathway	7

20.2	The Sensory Pathway	6
20.3	The hypothalamic-pituitary-adrenal (HPA) axis and Hypothalamic-sympathetic pathway	7
20.4	Brainstem-parasympathetic pathway and Spinal-sympathetic reflex	6
21.1	Hypothalamo-Hypophyseal System	7
21.2	Limbic System	6
21.3	Reticular System	6
21.4	Basal Nuclei	7
22.1	Cross Sectional Anatomy of the Brain.	7
22.2	Cross Sectional Anatomy of Spinal Cord	6
22.3	Applied Aspects of the Peripheral Nervous System	6
22.4	Applied Aspects of the Central Nervous System.	7
23.1	Central Nerve and its applied aspects	5
23.2	Peripheral nerves and Nerve Plexuses	4
23.3	Applied Aspects of Peripheral nerves and nerve plexuses	4
23.4	Applied aspect of Upper Motor Neuron	6
23.5	Applied aspect of Lower Motor Neuron (LMN) lesions.	7
24.1	Ventral Thalamus	6
24.2	Dorsal Thalamus	7
24.3	Applied Aspects of Ventricular System	7
24.4	Applied Aspects of Sub Arachnoid Spaces	6
25.1	Cranial Nerve Examination Protocol	3
25.2	Neurovascular Injury Prediction	4
25.3	Scalp & Forehead Assessment	3

25.4	Referred Pain Hypothesis	3
25.5	Neck Pain Referral Mapping	4
25.6	Neck Anatomy & Clinical Variations	5
25.7	Neck Anatomy Research Proposal	4
26.1	Structured Imaging Reporting Across Modalities	5
26.2	Structured Medical Image Interpretation	4
26.3	Imaging Modalities Strengths & Limitations	4
26.4	Structured Imaging Reporting	5
26.5	Imaging Case Discussions	4
26.6	Imaging Modalities Comparison	4
27.1	Imaging Case Scenarios for Peer Teaching	5
27.2	Imaging-Based Differential Diagnosis	4
27.3	Research on X-ray, CT & USG in Disease Diagnosis	4
27.4	Advancements in CECT, MRI & Radionuclide Imaging	4
27.5	Radiology Report Construction	4
27.6	Evidence-Based Imaging Strategy for Diagnosis	5
28.1	Thoracic Surface Landmarks & Underlying Structures	3
28.2	Accuracy of Imaging Modalities in Thoracic Surface Anatomy	3
28.3	Effectiveness of Thoracic Palpation Techniques	4
28.4	Surgical Entry Points & Surface Anatomy	3
28.5	Abdominal Anatomy & Referred Pain Correlation	3
28.6	Surface Anatomy & Abdominal Imaging Correlation	3
28.7	Surface Anatomy in Clinical Procedures	3

28.8	3D	4
29.1	Mastering Palpation & Neurological Tests	4
29.2	Surface-Based Insights for Upper Limb Injuries	5
29.3	Palpating the Arterial Pulse of the Upper Limb	4
29.4	Mechanics of Movement in Athletics	5
29.5	Body Mapping Through Art	4
29.6	Case-Based Surface Anatomy Interpretation	4
30.1	Estimating Time: Bone Preservation Insights	4
30.2	Forensic Report Essentials	5
30.3	Skeletal Clues in Forensics	4
30.4	Cranial & Pelvic Insights in Forensics	5
30.5	Sex and Age Determination from Skeletal Remains	4
30.6	Postmortem Influences on Estimations	4
31.1	IVU vs. CTU vs. MRU: A Case-Based Analysis	4
31.2	Case-Based Imaging Analysis	5
31.3	Comparative Analysis of Traditional Angiography, CTA, and MRA: Advantages and Limitations	4
31.4	Contrast Essentials: Safety & Selection	5
31.5	Salpingography, Cholecystography and Barium Studies.	4
31.6	Salpingography, Cholecystography, and Barium Studies	4
32.1	Organ Procurement	4
32.2	Laws and Lives: Organ Allocation	5
32.3	Ethics of Embalming	4
32.4	Anatomy Laws Across Borders	4

32.5	The Ethics of Dissection	4
32.6	Trial of Ethics	5

Table 6 : Assessment Summary: Assessment is subdivided in A to H points

6 A : Number of Papers and Marks Distribution

Subject Code	Paper	Theory	Practical	Total
UNIPG-TB	4	100 x 4 Papers = 400	400	800

6 B : Scheme of Assessment (Formative and Summative Assessment)

Credit frame work

UNIPG-TB consists of 32 modules totaling 64 credits, which correspond to 1920 Notional Learning Hours. Each credit comprises 30 Hours of learner engagement, distributed across teaching, practical, and experiential learning in the ratio of 1:2:3. Accordingly, one credit includes 5 hours of teaching, 10 hours of practical training, 13 hours of experiential learning, and 2 hours allocated for modular assessment, which carries 25 marks.

Formative Assessment :Module wise Assessment: will be done at the end of each module. Evaluation includes learners active participation to get Credits and Marks. Each Module may contain one or more credits.

Summative Assessment: Summative Assessment (University examination) will be carried out at the end of Semester VI.

6 C : Calculation Method for Modular Grade Points (MGP)

Module Number & Name (a)	Credits (b)	Actual No. of Notional Learning Hours (c)	Attended Number of notional Learning hours (d)	Maximum Marks of assessment of modules (e)	Obtained Marks per module (f)	MGP $=d*f/c*e*100$
Semester No : 3						
Paper No : 1 (تشریح جنینی، خوردبینی و علم نسل) (Tashreeh-e-Janeeni, Khurd-Beeni wa Ilmul Nasal) Embryology, Microscopic Anatomy and Genetics)						
M 1 علم الجنین عمومی (Ilmul Janeen Umoomi) General Embryology.	2	60		50		
M 2 علم الجنین نظامی (Ilmul Janeen Nizami) Systemic Embryology.	2	60		50		
Paper No : 2 (تشریح البدن و تشریح اطلاق) (Tashreeh ul Badan wa Tashreeh-e- Itlaqi) Gross and Applied Anatomy)						
M 9 خط راس کی ظاہری واطلاقی تشریح (Khitt'a-e- Ra's ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Head Region.	2	60		50		
M 10 خط عنق کی ظاہری واطلاقی تشریح (khitt'a Unq ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Neck Region.	2	60		50		
Paper No : 3 (تشریح اعصابی) (Tashreeh-e-A'sabi) Neuroanatomy)						
M 17 نظام عصبی کا تعارف (Nizam -e-A'sabi ka ta'aruf) Introduction of Nervous System	2	60		50		
M 18 نظام اعصاب کی بالیدگی (Nizam-e- A'asab ki Baleedgi) Development of the Nervous System.	2	60		50		
Paper No : 4 (تشریح سطحی، شعاعی، قانونی و جدید تشریحی تحقیقات) (Tashreeh-e-Satahi ,Shua'ei wa Qanooni wa Jadeed Tashreehi Tahqeeqat) Surface, Radiological, Forensic Anatomy and Recent Advances)						
M 25 خطہ راس و عنق کی سطحی تحدید (Khitta-e-Ra's wa Unq ki satahi Tahdeed) Surface marking of Head and Neck region.	2	60		50		
M 26 تشریح شعاعی (Tashreeh-e- Shua'ei) Radiological Anatomy.	2	60		50		
	16	480		400		

Semester No : 4						
Paper No : 1 (تشریح جنینی، خوردبینی و علم نسل) (Tashreeh-e-Janeeni, Khurd-Beeni wa Ilmul Nasal) Embryology, Microscopic Anatomy and Genetics)						
M 3 خوردبینی تشریح (Tashreeh-e- Khurd-beeni) Microscopic Anatomy. علم حیات خلوی (Ilm-e-Hayat-e-Khalwi) Cell Biology.	2	60		50		
M 4 نواۃ (Nawat) Nucleus (Daurah-e-Khaliyah) cell cycle. جسم کی خوردبینی ساخت (Jism ki Khurdbeeni Sakhten) Microscopic Structures of the body.	2	60		50		
Paper No : 2 (تشریح البدن و تشریح طلاقی) (Tashreeh ul Badan wa Tashreeh-e- Itlaqi) Gross and Applied Anatomy)						
M 11 طرف اعلیٰ کی ظاہری واطلاقی تشریح (Taraf-e-A'ala ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Upper limbs.	2	60		50		
M 12 طرف اسفل کی ظاہری واطلاقی تشریح (Taraf-e-Asfal ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Lower limbs.	2	60		50		
Paper No : 3 (تشریح اعصابی) (Tashreeh-e-A'sabi) Neuroanatomy)						
M 19 طریق حسی مخصوصہ (Tariq-e- Hissi Makhsoosa) Special Sensory Pathways	2	60		50		
M 20 طرائق عصبی (Taraiq-e- A'sabi) Neural Pathways	2	60		50		
Paper No : 4 (تشریح سطحی، شعاعی، قانونی و جدید تشریکی تحقیقات) (Tashreeh-e-Satahi ,Shua'ei wa Qanooni wa Jadeed Tashreehi Tahqeeqat) Surface, Radiological, Forensic Anatomy and Recent Advances)						
M 27 تصویروں کی تعبیر (Tasveeron Ki Ta'abeer) Interpretation of Radiographs.	2	60		50		
M 28 خطہ صدر و بطن کی سطحی تحدید (Khitta-e-Sadr wa Batan ki Satahi Tahdeed) Surface marking of Thorax and Abdomen region.	2	60		50		
	16	480		400		
Semester No : 5						
Paper No : 1 (تشریح جنینی، خوردبینی و علم نسل) (Tashreeh-e-Janeeni, Khurd-Beeni wa Ilmul Nasal) Embryology, Microscopic Anatomy and Genetics)						
M 5 انسانی کروموسوم (Ajsam-e-Launiyah wa Kimya-e-Naseeji) Human Chromosomes and Histochemistry	2	60		50		

M 6 (Ajsam-e-Launiyah jinsiyah ke naqais) Sex Chromosomal Abnormalities. علم النسل (Ilmul Nasal) Genetics. مختلف نسجی کیبایوی و مناعی تکنیک (Mukhtalif Naseeji Keemyawi wa Mana'ati Takneek) Various Histological and Immunohistochemical Techniques.	2	60		50		
Paper No : 2 (Tashreeh ul Badan wa Tashreeh-e- Itlaqi) Gross and Applied Anatomy)						
M 13 صدر کی ظاہری، جراحی و سریری تشریح (Sadr ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Thorax.	2	60		50		
M 14 لٹن کی ظاہری، جراحی و سریری تشریح (Batan ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Abdomen.	2	60		50		
Paper No : 3 (Tashreeh-e-A'sabi) Neuroanatomy)						
M 21 نظام تحت السریری، جوفی، قاعدی اور شبکی (Nizam-e-Tahataassareeri, Jaufi, Qa'edi and Shabki) Hypothalamo-Hypophyseal System, Limbic system	2	60		50		
M 22 تشریح عصبی اطلاق (Tashreeh-e- A'sabi Itlaqi) Clinical Neuroanatomy	2	60		50		
Paper No : 4 (Tashreeh-e-Satahi ,Shua'ei wa Qanooni wa Jadeed Tashreehi Tahqeeqat) Surface, Radiological, Forensic Anatomy and Recent Advances)						
M 29 طرف اعلیٰ و طرف اسفل کی سطحی تحدید (Taraf-e-Aa'la wa Taraf-e-Asfal ki satahi Tahdeed) Surface Marking of Upper And Lower Limbs.	2	60		50		
M 30 تشریح قانونی (Tashreeh-e-Qanooni) Forensic Anatomy.	2	60		50		
	16	480		400		
Semester No : 6						
Paper No : 1 (Tashreeh-e-Janeeni, Khurd-Beeni wa Ilmul Nasal) Embryology, Microscopic Anatomy and Genetics)						
M 7 علم (Namt-e-Irsi ke muta'addad tarteebi Awamil) Multifactorial Pattern of Inheritance. علم (Ilmul Nasal Sartani wa sai'dali) cancer and Pharmacogenetics.	2	60		50		

M 8 علم النسل تناسلی (Ilmul Nasal Tanasuli) Reproduction genetics. علاج جینی و علم المناعہ (Ilaj-e-Jeeni wa Ilmul Mana'at) Gene therapy and Immunology.	2	60		50		
Paper No : 2 (تشریح البدن و تشریح اطلاق) (Tashreeh ul Badan wa Tashreeh-e- Itlaqi) Gross and Applied Anatomy)						
M 15 کمانہ و عجان کی ظاہری، جراحی و سریری تشریح (Aanah wa ujan ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Pelvis, Perineum, خارجی اعضائے تناسلیہ مردانہ و زنانہ کی تشریح (Kharji Aaz'a-e- Tanasuliyah, Mardanaah wa zananah ki Tashreeh) Anatomy of Male and female external genitalia.	2	60		50		
M 16 عمومی تشریح بدن (Umoomi Tashreeh-e-Badan) General Anatomy of Human Body and cadaver care یونانی تدابیر کے لیے (Unani Tadabeer ke liye itlaqi tashreeh) Applied Anatomy for Unani Procedural Management.	2	60		50		
Paper No : 3 (تشریح اعصابی) (Tashreeh-e-A'sabi) Neuroanatomy)						
M 23 عصبی الیاف (Asab-e-alyaf) Nerve fibres. عصبی ضغیرات (Asabi Zafiraat) Nerve Plexuses.	2	60		50		
M 24 مجموعہ سریری (Majmo'ah-e- Sareeri) Thalamic complex نظام، بطنی و خلاء تحت العنكبوت، (Nizam-e-Batani wa khil'a Tahat-e-Ankabutiyah) Ventricular system and Sub Arachnoid spaces.	2	60		50		
Paper No : 4 (تشریح سطحی، شعاعی، قانونی و جدید تشریحی تحقیقات) (Tashreeh-e-Satahi, Shua'ei wa Qanooni wa Jadeed Tashreehi Tahqeeqat) Surface, Radiological, Forensic Anatomy and Recent Advances)						
M 31 تشریح میں جدید تحقیقات (Tashreeh men Jadeed Tahqeeqat) Recent Advances in Anatomy	2	60		50		
M 32 قانون تشریح و تشریح اخلاقیات (Qanoon-e-Tashreeh wa Tashreehi Akhlaqiyat) Anatomy Law & Anatomical Ethics	2	60		50		
	16	480		400		
MGP = ((Number of Notional learning hours attended in a module) X (Marks obtained in the modular assessment) / (Total number of Notional learning hours in the module) X (Maximum marks of the module)) X 100						

6 D : Semester Evaluation Methods for Semester Grade Point Average (SGPA)

SGPA will be calculated at the end of the semester as an average of all Module MGPs. Average of MGPs of the Semester For becoming eligible for Summative assessment of the semester, student should get minimum of 60% of SGPA

SGPA = Average of MGP of all modules of all papers = add all MGPs in the semester/ no. of modules in the semester Evaluation Methods for Modular Assessment

Semester No : 3

Paper No : 1 تشریح جنینی، خوردبینی و علم النسل (Tashreeh-e-Janeeni, Khurd-Beeni wa Ilmul Nasal) Embryology, Microscopic Anatomy and Genetics

A S.No	B Module number and Name	C MGP
1	M1. علم الجنین عمومی (Ilmul Janeen Umoomi) General Embryology.	C 1
2	M2. علم الجنین نظامی (Ilmul Janeen Nizami) Systemic Embryology.	C 2

Paper No : 2 تشریح البدن و تشریح اطلاق (Tashreeh ul Badan wa Tashreeh-e- Itlaqi) Gross and Applied Anatomy

A S.No	B Module number and Name	C MGP
3	M9. خطہ راس کی ظاہری واطلاقی تشریح (Khitt'a-e- Ra's ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Head Region.	C 3
4	M10. خطہ عنق کی ظاہری واطلاقی تشریح (khitt'a Unq ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Neck Region.	C 4

Paper No : 3 تشریح اعصابی (Tashreeh-e-A'sabi) Neuroanatomy

A S.No	B Module number and Name	C MGP
5	M17. نظام عصبی کا تعارف (Nizam -e-A'sabi ka ta'aruf) Introduction of Nervous System	C 5

6	M18. نظام اعصاب کی بالیدگی (Nizam-e- A'asab ki Baleedgi) Development of the Nervous System.	C 6
Paper No : 4 : تشریح سطحی، شعاعی، قانونی و جدید تشریحی تحقیقات (Tashreeh-e-Satahi ,Shua'ei wa Qanooni wa Jadeed Tashreehi Tahqeeqat) Surface, Radiological, Forensic Anatomy and Recent Advances		
A S.No	B Module number and Name	C MGP
7	M25. خطہ راس و عنق کی سطحی تحدید (Khitta-e-Ra's wa Unq ki satahi Tahdeed) Surface marking of Head and Neck region.	C 7
8	M26. تشریح شعاعی (Tashreeh-e- Shua'ei) Radiological Anatomy.	C 8
	Semester Grade point Average (SGPA)	(C1+C2+C3+C4+C5+C6+C7+C8) / Number of modules(8)
Semester No : 4		
Paper No : 1 : تشریح جنینی، خوردبینی و علم النسل (Tashreeh-e-Janeeni, Khurd-Beeni wa Ilmul Nasal) Embryology, Microscopic Anatomy and Genetics		
A S.No	B Module number and Name	C MGP
1	M3. خوردبینی تشریح (Tashreeh-e- Khurd-beeni) Microscopic Anatomy. علم حیات (Ilm-e-Hayat-e-Khalwi) Cell Biology.	C 1
2	M4. دورہ خلیہ (Daurah-e-Khaliyah) cell cycle. نواة (Nawat) Nucleus جسم کی خوردبینی ساخت (Jism ki Khurdbeeni Sakhten) Microscopic Structures of the body.	C 2
Paper No : 2 : تشریح البدن و تشریح اطلاق (Tashreeh ul Badan wa Tashreeh-e- Itlaqi) Gross and Applied Anatomy		
A S.No	B Module number and Name	C MGP
3	M11. طرف علی کی ظاہری و اطلاقی تشریح (Taraf-e-A'ala ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Upper limbs.	C 3

4	M12. طرف اسفل کی ظاہری واطلاقی تشریح (Taraf-e-Asfal ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Lower limbs.	C 4
Paper No : 3 تشریح اعصابی (Tashreeh-e-A'sabi) Neuroanatomy		
A S.No	B Module number and Name	C MGP
5	M19. طریق حسی مخصوصہ (Tariq-e- Hissi Makhsoosa) Special Sensory Pathways	C 5
6	M20. طرائق عصبی (Taraiq-e- A'sabi) Neural Pathways	C 6
Paper No : 4 تشریح سطحی، شعاعی، قانونی و جدید تشریح کی تحقیقات (Tashreeh-e-Satahi , Shua'ei wa Qanooni wa Jadeed Tashreehi Tahqeeqat) Surface, Radiological, Forensic Anatomy and Recent Advances		
A S.No	B Module number and Name	C MGP
7	M27. تصویروں کی تعبیر (Tasveeron Ki Ta'abeer) Interpretation of Radiographs.	C 7
8	M28. لخطہ صدر و بطن کی سطحی تحدید (Khitta-e-Sadr wa Batan ki Satahi Tahdeed) Surface marking of Thorax and Abdomen region.	C 8
	Semester Grade point Average (SGPA)	(C1+C2+C3+C4+C5+C6+C7+C8) / Number of modules(8)
Semester No : 5		
Paper No : 1 تشریح جنینی، خوردبینی و علم النسل (Tashreeh-e-Janeeni, Khurd-Beeni wa Ilmul Nasal) Embryology, Microscopic Anatomy and Genetics		
A S.No	B Module number and Name	C MGP
1	M5. جسمانہ لونیہ و کیمیائے نسجی (Ajsam-e-Launiyah wa Kimya-e-Naseeji) Human Chromosomes and Histochemistry	C 1

2	M6. (Ajsam-e-Launiyah jinsiyah ke naqais) Sex Chromosomal Abnormalities. مختلف نسیجی (Ilmul Nasal) Genetics. (Mukhtalif Naseeji Keemyawi wa Mana'ati Takneek) Various Histological and Immunohistochemical Techniques.	C 2
Paper No : 2 (Tashreeh ul Badan wa Tashreeh-e- Itlaqi) Gross and Applied Anatomy		
A S.No	B Module number and Name	C MGP
3	M13. (Sadr ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Thorax.	C 3
4	M14. (Batan ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Abdomen.	C 4
Paper No : 3 (Tashreeh-e-A'sabi) Neuroanatomy		
A S.No	B Module number and Name	C MGP
5	M21. (Nizam-e-Tahataassareeri, Jaufi, Qa'edi and Shabki) Hypothalamo-Hypophyseal System, Limbic system	C 5
6	M22. (Tashreeh-e- A'sabi Itlaqi) Clinical Neuroanatomy	C 6
Paper No : 4 (Tashreeh-e-Satahi ,Shua'ei wa Qanooni wa Jadeed Tashreehi Tahqeeqat) Surface, Radiological, Forensic Anatomy and Recent Advances		
A S.No	B Module number and Name	C MGP
7	M29. (Taraf-e-Aa'la wa Taraf-e-Asfal ki satahi Tahdeed) Surface Marking of Upper And Lower Limbs.	C 7
8	M30. (Tashreeh-e-Qanooni) Forensic Anatomy.	C 8
	Semester Grade point Average (SGPA)	(C1+C2+C3+C4+C5+C6+C7+C8) / Number of modules(8)

Semester No : 6		
Paper No : 1 (Tashreeh-e-Janeeni, Khurd-Beeni wa Ilmul Nasal) Embryology, Microscopic Anatomy and Genetics		
A S.No	B Module number and Name	C MGP
1	M7. (Namt-e-Irsi ke muta'addad tarteebi Awamil) Multifactorial Pattern of Inheritance. (Ilmul Nasal Sartani wa sai'dali) cancer and Pharmacogenetics.	C 1
2	M8. (Ilmul Nasal Tanasuli) Reproduction genetics. (علاج جینی و علم (Ilaj-e-Jeeni wa Ilmul Mana'at) Gene therapy and Immunology.	C 2
Paper No : 2 (Tashreeh ul Badan wa Tashreeh-e- Itlaqi) Gross and Applied Anatomy		
A S.No	B Module number and Name	C MGP
3	M15. (Aanah wa ujan ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Pelvis, Perineum, (Kharji Aaz'a-e- Tanasuliyah, Mardanaah wa zananah ki Tashreeh) Anatomy of Male and female external genitalia.	C 3
4	M16. (Umoomi Tashreeh-e-Badan) General Anatomy of Human Body and cadaver care (Unani Tadabeer ke liye itlaqi tashreeh) Applied Anatomy for Unani Procedural Management.	C 4
Paper No : 3 (Tashreeh-e-A'sabi) Neuroanatomy		
A S.No	B Module number and Name	C MGP
5	M23. (Asab-e-alyaf) Nerve fibres. (عصبی ضغیرات Nerve Plexuses.	C 5

6	M24. نظام البطني وخلاء تحت, مجموعہ سریری (Majmo'ah-e- Sareeri) Thalamic complex (Nizam-e-Batani wa khil'a Tahat-e-Ankabutiyah) Ventricular system and Sub Arachnoid spaces.	C 6
Paper No : 4 (Tashreeh-e-Satahi, Shua'ei wa Qanooni wa Jadeed Tashreehi Tahqeeqat) Surface, Radiological, Forensic Anatomy and Recent Advances		
A S.No	B Module number and Name	C MGP
7	M31. تشریح میں جدید تحقیقات. (Tashreeh men Jadeed Tahqeeqaat) Recent Advances in Anatomy	C 7
8	M32. قانون تشریح و تشریح اخلاقیات. (Qanoon-e-Tashreeh wa Tashreehi Akhlaqiyat) Anatomy Law & Anatomical Ethics	C 8
	Semester Grade point Average (SGPA)	(C1+C2+C3+C4+C5+C6+C7+C8) / Number of modules(8)
S. No	Evaluation Methods	
1.	Method explained in the Assessment of the module or similar to the objectives of the module.	

6 E : Question Paper Pattern

MD/MS Unani Examination

UNIPG-TB

Sem VI

Time: 3 Hours ,**Maximum Marks:** 100

INSTRUCTIONS: All questions compulsory

		Number of Questions	Marks per question	Total Marks
Q 1	Application-based Questions (ABQ)	1	20	20
Q 2	Short answer questions (SAQ)	8	5	40
Q 3	Analytical based structured Long answer question (LAQ)	4	10	40
				100

6 F : Distribution for summative assessment (University examination)

S.No	List of Module/Unit	ABQ	SAQ	LAQ
Paper No : 1 (تشریح جنینی، خوردبینی و علم النسل) (Tashreeh-e-Janeeni, Khurd-Beeni wa Ilmul Nasal) Embryology, Microscopic Anatomy and Genetics)				
(M-1) علم الجنین عمومی (Ilmul Janeen Umoomi) General Embryology. (Marks: Range 5-20)				
1	(U-1) علم الجنین عمومی (Ilmul Janeen Umoomi) General Embryology -1	Yes	Yes	Yes
2	(U-2) علم الجنین عمومی (Ilmul Janeen Umoomi) General Embryology -II	No	Yes	No
(M-2) علم الجنین نظامی (Ilmul Janeen Nizami) Systemic Embryology. (Marks: Range 5-20)				
1	(U-1) علم الجنین نظامی (Ilmul Janeen Nizami) Systemic Embryology-I	Yes	Yes	No
2	(U-2) علم الجنین نظامی (Ilmul Janeen Nizami) Systemic Embryology-II	Yes	Yes	Yes
(M-3) علم حیات خلوی (Ilm-e-Hayat-e-Khalwi) Cell Biology. (Marks: Range 5-20)				
1	(U-1) علم حیات خلوی (Ilm-e-Hayat-e-Khalwi) Cell Biology	No	Yes	Yes
2	(U-2) خوردبینی تشریح (Tashreeh-e- Khurd-beeni) Microscopic Anatomy	Yes	Yes	No
(M-4) نواۃ (Nawat) Nucleus دورہ خلیہ (Daurah-e-Khaliyah) cell cycle. جسم کی خوردبینی ساخت (Jism ki Khurdbeeni Sakhten) Microscopic Structures of the body. (Marks: Range 5-20)				
1	(U-1) نواۃ (Nawat) Nucleus	Yes	Yes	No
2	(U-2) دورہ خلیہ (Daurah-e-Khaliyah) cell cycle	Yes	Yes	No
(M-5) انسانی نسیجی (Ajsam-e-Launiyah wa Kimya-e-Naseeji) Human Chromosomes and Histochemistry (Marks: Range 5-10)				
1	(U-1) انسانی نسیجی (Ajsam-e-Launiyah)	Yes	Yes	Yes
2	(U-2) انسانی نسیجی (Kimya-e-Naseeji)	Yes	Yes	No
(M-6) علم النسل (Ilmul Nasal) (Ajsam-e-Launiyah jinsiyah ke naqais) Sex Chromosomal Abnormalities. مختلف نسیجی کیمیائی و مناعی تکنیک (Mukhtalif Naseeji Keemyawi wa Mana'ati Takneek) Various Histological and Immunohistochemical Techniques. (Marks: Range 5-20)				

1	(U-1) علم النسل (Ilmul Nasal Juzvi) Molecular Genetics	Yes	Yes	No
2	(U-2) کیمیائی تکنیک مناعی (Naseeji Keemyawi Mana'ati Takneek) Immunohistochemical techniques	Yes	Yes	Yes
(M-7) علم النسل سرطان و صیدی (Namt-e-Irsi ke muta'addad tarteebi Awamil) Multifactorial Pattern of Inheritance. (Ilmul Nasal Sartani wa sai'dali) cancer and Pharmacogenetics. (Marks: Range 5-20)				
1	(U-1) نمط ارثی (Inheritance)	Yes	Yes	Yes
2	(U-2) فحس جزوی (Fa'hs al Juzyi)	Yes	Yes	No
(M-8) علم النسل تناسلی (Ilmul Nasal Tanasuli) Reproduction genetics. (Ilaj-e-Jeeni wa Ilmul Mana'at) Gene therapy and Immunology. (Marks: Range 5-20)				
1	(U-1) علم النسل تناسلی (Ilmul Nasal Tanasul) Reproductive Genetics	Yes	Yes	No
2	(U-2) علاج جینی واطلاقی معلومات (Ilaj-e-Jeeni wa Itlaqi Ma'alumat) Gene therapy and its applied knowledge	No	Yes	Yes
S.No	List of Module/Unit	ABQ	SAQ	LAQ
Paper No : 2 (Tashreeh ul Badan wa Tashreeh-e- Itlaqi) Gross and Applied Anatomy)				
(M-9) خطہ راس کی ظاہری واطلاقی تشریح (Khitt'a-e- Ra's ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Head Region. (Marks: Range 5-10)				
1	(U-1) خطہ راس (Khitt'a-e- Ra's) Head Region-I	No	Yes	No
2	(U-2) خطہ راس (Khitt'a-e- Ra's) Head Region-II	No	Yes	No
(M-10) خطہ عنق کی ظاہری واطلاقی تشریح (khitt'a Unq ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Neck Region. (Marks: Range 5-20)				
1	(U-1) خطہ عنق (khitt'a Unq)- Neck region-I	Yes	Yes	No
2	(U-2) خطہ عنق (khitt'a Unq)- Neck region-II	Yes	Yes	Yes
(M-11) طرف اعلیٰ کی ظاہری واطلاقی تشریح (Taraf-e-A'ala ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Upper limbs. (Marks: Range 5-20)				
1	(U-1) طرف اعلیٰ (Taraf-e-A'ala) upper limb-I	Yes	Yes	Yes

2	(U-2) طرف اعلیٰ (Taraf-e-A'ala) upper limb-II	Yes	Yes	Yes
(M-12) طرف اسفل کی ظاہری واطلاقی تشریح (Taraf-e-Asfal ki Zahiri wa Itlaqi Tashreeh) Gross and Applied Anatomy of Lower limbs. (Marks: Range 5-20)				
1	(U-1) طرف اسفل (Taraf-e-Asfal) Lower limb-I	Yes	Yes	Yes
2	(U-2) طرف اسفل (Taraf-e-Asfal) Lower limb-II	Yes	Yes	Yes
(M-13) صدر کی ظاہری، جراحی و سریری تشریح (Sadr ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Thorax. (Marks: Range 5-20)				
1	(U-1) صدر (Sadr) Thorax-I	Yes	Yes	Yes
2	(U-2) صدر (Sadr) Thorax-II	Yes	Yes	Yes
(M-14) بطن کی ظاہری، جراحی و سریری تشریح (Batan ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Abdomen. (Marks: Range 5-20)				
1	(U-1) بطن (Batan) Abdomen-I	Yes	Yes	Yes
2	(U-2) بطن (Batan) Abdomen-II	Yes	Yes	Yes
(M-15) کمانہ و عجان کی ظاہری، جراحی و سریری تشریح (Aanah wa ujan ki Za'hiri, Jarahi wa Sariri Tashreeh) Gross, Surgical and Clinical Anatomy of Pelvis, Perineum, Kharji Aaz'a-e- Tanasuliyah, Mardanah wa zananah ki Tashreeh) Anatomy of Male and female external genitalia. (Marks: Range 5-20)				
1	(U-1) نظام تناسلیہ (Nizam-e-Tanasuliya) Reproductive System-I	Yes	Yes	Yes
2	(U-2) نظام تناسلیہ (Nizam-e-Tanasuliya) Reproductive System-II	Yes	Yes	Yes
(M-16) یونانی تدابیر کے لیے اطلاقی تشریح (Umoomi Tashreeh-e-Badan) General Anatomy of Human Body and cadaver care (Unani Tadabeer ke liye itlaqi tashreeh) Applied Anatomy for Unani Procedural Management. (Marks: Range 5-10)				
1	(U-1) عمومی تشریح بدن (Umoomi Tashreeh-e-Badan) General Anatomy of Human Body یونانی تدابیر کے لیے اطلاقی تشریح (Unani Tadabeer ke liye itlaqi tashreeh) Applied Anatomy for Unani Procedural Management, مختلف تحنیطی اعمال کا بیان (Mukhtalif Tahneeti Ama'al ka bayan) Descriptions Of Different Embalming Procedures.	No	Yes	No

2	تھنیت المیت (Tahneetul maiyit) Embalming of Cadaver, تحفظ نعش و (Tahaffuz-e-N'ash wa Einah-e-Tashreeh) Preservation of Cadaver and specimen, تحذیر متحف (Tahzeer-e-Mat-haf) Museum preparation.	No	Yes	No
S.No	List of Module/Unit	ABQ	SAQ	LAQ
Paper No : 3 (تشریح اعصابی) (Tashreeh-e-A'sabi) Neuroanatomy)				
(M-17) نظام عصبی کا تعارف (Nizam -e-A'sabi ka ta'aruf) Introduction of Nervous System (Marks: Range 5-20)				
1	(U-1) مرکزی نظام عصبی و محیطی کا تعارف (Markazi, Nizam e A'sabi wa Muheeti ka ta.aruf) Introduction of Central and Peripheral Nervous System. عصب و (Asab wa Aqsam-e Asab) Neurons and classification of Neurons. مشابک (Mashabik) Synapses. (Naqlaat –e-As'abi) نقلات عصبی Neurotransmitters. خلا یا دبقیہ (khalaya-e-Dabqiya) Neuroglia.	No	Yes	Yes
2	(U-2) نظام عصبی غیر ارادی (Nizam e A'sabi Ghair Iradi) Autonomic nervous system. شریکی نظام عصبی (Shirkee Nizam e A'sabi) sympathetic nervous system. غیر شریکی نظام عصبی (Ghair Shirkee Nizam e A'sabi) para sympathetic nervous system. نظام عصبی معوی (Nizam e A'sabi Mew) enteric nervous system. نظام عصبی جسدی (Nizam e A'sabi Jasdi) Somatic nervous system.	Yes	Yes	Yes
(M-18) نظام اعصاب کی بالیدگی (Nizam-e- A'sab ki Baleedgi) Development of the Nervous System. (Marks: Range 5-20)				
1	(U-1) نظام عصبی مرکزی کی بالیدگی (Nizam e A'sabi Markazi ki Baleedgi) Development of central nervous system. محیطی عصبی کی بالیدگی (Nizam e A'sabi Muheeti ki Baleedgi) Development of peripheral nervous system.	Yes	Yes	Yes
2	(U-2) نظام عصبی غیر ارادی کی بالیدگی (Nizam e A'sabi Ghair Iradi ki Baleedgi) Development of Autonomic nervous system. معوی عصبی کی بالیدگی (Nizam e A'sabi Mewi ki Baleedgi) Development of Enteric nervous system.	Yes	Yes	Yes
(M-19) طریق حسی مخصوصہ (Tariq-e- Hissi Makhsoosa) Special Sensory Pathways (Marks: Range 5-15)				
1	(U-1) شمی طریق (Tariq-e- Shammi) Olfactory pathway. بصری طریق (Tariq-e- Basari) optic pathway.	No	Yes	Yes

2	طریق ذوقی (Tariq-e- Qauqa'ei) Cochleovestibular Pathway. (U-2) (Tariq-e- Zawaqa) Gustatory pathway.	No	Yes	Yes
(M-20) طرائق عصبی (Tariq-e- A'sabi) Neural Pathways (Marks: Range 5-20)				
1	(U-1) طریقی حسی (Tariq-e- Hissi) Motor Pathways. طریقی حرکتی (Tariq-e- Harki) Sensory Pathways.	Yes	Yes	Yes
2	(U-2) طریقی مرکزی غیر ارادی کا تعارف (Tariq-e- Markazi Ghair iradi ka Ta'aruf) Introduction of Central Autonomic Pathways. محور کظری نخاعی تختانی (Mehwar-e- Kuzri tahtani) Hypothalamic-pituitary-adrenal (HPA) axis. طریقی شری تختانی (Tareeq-e- shirki Tahtani) Hypothalamic-sympathetic pathway. طریقی ساقی (Tareeq-e- saqi jar shirki) Brainstem-parasympathetic pathway. (Tareeq-e- saqi jar shirki) Brainstem-parasympathetic pathway. اندکاس شری نخاعی (Ine'ikas-e-shirki nukhae'i) Spinal-sympathetic reflex.	Yes	Yes	Yes
(M-21) نظام تحت السریری، جوفی، قاعدی اور شبکی (Nizam-e-Tahataassareeri, Jaufi, Qa'edi and Shabki) Hypothalamo-Hypophyseal System, Limbic system (Marks: Range 5-15)				
1	(U-1) نظام تحت السریری و تحت النخاعی (Nizam-e-Tahataassareeri wa Tahtan-Nukha,ei) Hypothalamo-Hypophyseal System. نظام جوفی (Nizam e Jaufi) Limbic system.	No	Yes	Yes
2	(U-2) نواة شبکی (Nizam-e-Shabki) Basal Nuclei. نواة قاعدی (Nawat-e-Qa'edi) Reticular System.	No	Yes	Yes
(M-22) تشریح عصبی اطلاقی (Tashreeh-e- A'sabi Itlaqi) Clinical Neuroanatomy (Marks: Range 5-20)				
1	(U-1) دماغ و نخاع کا مستعرض تراشه (Dimagh wa Nukha ka Tashreehi Musta'raz Tarsha) Cross Sectional anatomy of Brain and Spinal cord.	No	Yes	Yes
2	(U-2) نظام عصبی کے اطلاقی پہلو (Nizam e-A'sbi ke Itlaqi Pehlu) Applied aspects of Nervous System.	Yes	Yes	Yes
(M-23) عصبی الیاف (Asab-e-alyaf) Nerve fibres. عصبی ضفیرات (Asabi Zafiraat) Nerve Plexuses. (Marks: Range 5-20)				
1	(U-1) عصب محیطی (Asab-e- Muheeti) Central Nerve. عصب مرکزی (Asab-e- Markazi) Peripheral Nerve. عصبی ضفیرات (Asabi Zafiraat) Nerve Plexuses.	Yes	Yes	Yes

2	عصبیہ حرکی اسفل (U-2) (Asbiyah Harki, A'la) Upper motor Neuron. عصبیہ حرکی اعلیٰ (Asbiyah Harki asfal) Lower motor Neuron.	Yes	Yes	Yes
(M-24) (Majmo'ah-e- Sareeri) Thalamic complex , نظام بطنی و خلاء تحت العنكبوت (Nizam-e-Batani wa khil'a Tahat-e-Ankabutiyah) Ventricular system and Sub Arachnoid spaces. (Marks: Range 5-20)				
1	سریر مؤخر (U-1) (Sareer-e-Moakh'ar) Dorsal thalamus. سریر مقدم (Sareer-e-Muqaddam) Ventral thalamus.	No	Yes	Yes
2	نظام بطنی (U-2) (Nizam-e-Batani) Ventricular system. خلاء تحت العنكبوت (Khil'a Tahat-e-Ankabutiyah) Sub Arachnoid spaces.	Yes	Yes	Yes
S.No	List of Module/Unit	ABQ	SAQ	LAQ
Paper No : 4 (Tashreeh-e-Satahi ,Shua'ei wa Qanooni wa Jadeed Tashreehi Tahqeeqat) (شعاعی، قانونی و جدید تشریحی تحقیقات) Surface, Radiological, Forensic Anatomy and Recent Advances)				
(M-25) (Khitta-e-Ra's wa Unq ki satahi Tahdeed) Surface marking of Head and Neck region. (Marks: Range 5-20)				
1	(U-1) (Khitta-e-Ra's ki satahi Tahdeed) Surface marking of Head region.	Yes	Yes	No
2	(U-2) (Khitta-e- Unq ki satahi Tahdeed) Surface marking of Neck region.	Yes	Yes	Yes
(M-26) (Tashreeh-e- Shua'ei) Radiological Anatomy. (Marks: Range 5-20)				
1	تصویر بالموجات (U-1) (Sadah aks srezi) Simple x-rays procedures. تصویر مقطعی حاسوبی (Tasveer Bil Maujatis Sautiya) Ultrasonography. تصویر مقطعی حاسوبی (Tasveer maqta'ei Hasubi) Computed Tomography Scan. مع التباين (Tasveer maqta'ei Hasubi ma'attabaun) Contrast Enhanced Computed Tomography Scan.	Yes	Yes	Yes
2	(U-2) (Tasweer Bil Raneen Al Maqnateesi) Magnetic Resonance Imaging. تصویر شعاعی ثدلی (Tasweer-e-Shu'ai Sadyi) Mammography. تصویر شعاعی نواتی (Tasveer Shu'a'ei Navati) Radionuclide scanning.	No	Yes	Yes

(M-27) (Tasveeron Ki Ta'abeer) Interpretation of Radiographs. (Marks: Range 5-20)				
1	(U-1) (Sadah aks srezi Tasveeron Ki Ta'abeer) plain x-rays. (Tasveer Bil Maujatis Sautiyah Ki Ta'abeer) Ultrasonography. (Tasweer maqta'ei Hasubi Ki Ta'abeer) Interpretation of Computed Tomography Scan.	Yes	Yes	No
2	(U-2) (Tasweer maqta'ei Hasubi ma'attabaun Ki Ta'abeer) Interpretation of Contrast Enhanced Computed Tomography Scan. (Tasweer Bil Raneen Al Maqnateesi Ki Ta'abeer) Interpretation of Magnetic Resonance Imaging. (Tasveer Shua'aei al- Nawavi Ki Ta'abeer) Interpretation of Radionuclide scanning.	No	Yes	Yes
(M-28) (Khitta-e-Sadr wa Batan ki Satahi Tahdeed) Surface marking of Thorax and Abdomen region. (Marks: Range 5-20)				
1	(U-1) (Khitta-e-Sadr ki satahi Tahdeed) Surface marking of Thorax.	Yes	Yes	Yes
2	(U-2) (Khitta-e- Batan ki satahi Tahdeed) Surface marking of Abdomen region	Yes	Yes	No
(M-29) (Taraf-e-Aa'la wa Taraf-e-Asfal ki satahi Tahdeed) Surface Marking of Upper And Lower Limbs. (Marks: Range 5-20)				
1	(U-1) (Taraf-e-Aa'la ki satahi Tahdeed) Surface marking of upper limbs.	Yes	Yes	Yes
2	(U-2) (Taraf-e-Asfal ki satahi Tahdeed) Surface marking of lower limbs	Yes	Yes	No
(M-30) (Tashreeh-e-Qanooni) Forensic Anatomy. (Marks: Range 5-15)				
1	(U-1) (Tashreeh -e-Qanooni) Forensic Anatomy. (Badni Eza'm ki Shinakht unki Na'sh ke Zariye karna) Identification of human bones from their remains.	No	Yes	Yes

2	(U-3) Tahreeh ko Tibbi wa Qanooni Nazariye me Iste'mal karte hue Jins, Umar wa Qa'd ka Ta'yyun karna) Determination of sex, age, and height. for medico legal application of Anatomy.	No	Yes	Yes
(M-31) تشریح میں جدید تحقیقات (Tashreeh men Jadeed Tahqeeqaat) Recent Advances in Anatomy (Marks: Range 5-20)				
1	تشریح میں جدید تحقیقات جس میں ساخت و افعال کے باہمی تعلقات کو سمجھنے میں مدد ملتی ہے اور سریریاتی مسلوں کو (U-1) (Tashreeh Men Jadeed Tahqeeqaat Jisse Saakht-o-af'al ke bahmi ta'luqaat ko Samajhney Mem Ma'dad Milti Hai Aur Sareeryati mas'lo ko hal karney mai iste'mal hotay hai) Recent advances in Anatomy which facilitate comprehension of structure function correlations and applications in clinical problem solving. تصویر (Tasveer-e-Auiyyah) Angiography.	No	Yes	Yes
2	(U-2) (Tasveer-e-Talawwun Flori wa Iske Mukhtalif Aqsa'm wa Isharaat) fluoroscopy its different types and indications. تصویر مرارہ شعاعی (ish'aa'a ma'a barium) Barium studies. تصویر شعاعی رحمی قاذبی (Tasweer mrarah shua'ei) Cholecystography. تصویر شعاعی رحمی قاذبی (Taswee-e-shua'ei qazifi) Hystero-salpingography.	Yes	Yes	Yes
(M-32) قانون تشریح و تشریح اخلاقیات (Qanoon-e-Tashreeh wa Tashreehi Akhlaqiyat) Anatomy Law & Anatomical Ethics (Marks: Range 5-15)				
1	(U-1) (Tabarr'u bil A'aza) organ donation.	No	Yes	No
2	(U-2) (Tashreehi Akhlaqiyaat) Ethics of Anatomy. قانون تشریح (Qanoon-e-Tashreeh) Anatomy Law.	No	Yes	Yes

6 G : Instruction for the paper setting & Blue Print for Summative assessment (University Examination)

Instructions for the paper setting.

1. University examination shall have 4 papers of 100 marks.

Each 100 marks question paper shall contain:-

- Application Based Question: 1 No (carries 20 marks)
- Short Answer Questions: 8 Nos (each question carries 05 marks)
- Long Answer Questions: 4 Nos (each question carries 10 marks)

2. Questions should be drawn based on the table 6F.

3. Marks assigned for the module in 6F should be considered as the maximum marks. No question shall be asked beyond the maximum marks.

4. Refer table 6F before setting the questions. Questions should not be framed on the particular unit if indicated "NO".

5. There will be a single application-based question (ABQ) worth 20 marks. No other questions should be asked from the same module where the ABQ is framed.

6. Except the module on which ABQ is framed, at least one Short Answer Question should be framed from each module.

7. Long Answer Question should be analytical based structured questions assessing the higher cognitive ability.

8. Create Blueprint based on instructions 1 to 7.

6 H : Distribution of Practical Exam (University Examination)

S.No	Heads	Marks
1	Perform a detailed dissection on Cadaver/Artificial Cadaver/Online e-Dissection/Virtual dissection of the specified region to identify and examine key anatomical structures, analyse their spatial relationships and functional connections, while highlighting their clinical relevance in medical practice. Any of the following topics may be assigned to the student for dissection. The student will be randomly assigned one topic by draw of lots. Total Duration: 1:30 Min M11 U1/ M11 U2/ M12 U1/ M12 U2/ M13 U1/ M13 U2/ M14 U1/ M14 U2/ M15 U1/ M15 U2	100
2	Demonstration of Model/Specimen Two models or specimens may be selected from any unit across the four papers for detailed demonstration, each carrying 25 marks. Time: 30 minutes.	50
3	Spotter Examination 10×5=50 marks Time :30 Min (3 Min each) Ten spotters may be selected from any unit across the four papers. Each spotter will include two questions: (i) Identification and (ii) Relevant Features.	50
4	Assessing teaching ability	25
5	Assessing presentation skills	25
6	Viva (4 examiners: 25 marks/each examiner)#	100
7	Logbook (Activity record)	25
8	Practical/Clinical Record: There should be a minimum of one practical from each module.	25
Total Marks		400

No separate marks for dissertation viva.

Reference Books/ Resources

S.No	References
1	Sina Al. Al Qanoon fit Tib. (Urdu translation by Kantoori GH). Vol.1 . part.3. New Delhi: Idara Kitabul Shifa
2	Rushd I. Kitabul Kuliyat. Lahore: Maktabe Daniyal; 2017
3	Majusi A. Kamil-ul- Sanat. Delhi: Idara Kitab-us-Shifa; 2010.
4	Al Kahhal ABA. Tazkaratul Kahalain (Urdu translation by CCRUM). Vol. 1. New Delhi: Ministry of Health and Family Welfare; 1995.
5	Zahrawi AQ. Al Tasreef li man Ajiz an al Taleef 30th treatise (Jarahiyyat e Zahrawi). Urdu translation by Hakeem Nisar Ahmad Alwi Kakorwi. New Delhi: CCRUM; 1947
6	Hakim Mohammed Kabeeruddin, Tashreeh-e-Kabeer, Nazim Daftarul Maseeh Karolbagh Delhi, 1924
7	Hakim Mohammed Kabeeruddin. Tashreeh-e-Sagheer, Nazim Daftarul Maseeh Karolbagh Delhi, 1940
8	Hakim Kabeeruddin. Tashreeh-e-Tasaweer, Nazim Daftarul Maseeh, Karolbagh Delhi, 1934
9	Hamdani K Hussain, Tashreeh Haikal, 2nd Edition NCPUL 1988 Delhi
10	Hamdani K Hussain, Ishraah, National printers company, Aligarh, 1959
11	Prof Ubaidullah. Anatomy- Regional and Applied Head and Neck, Habib Book Depot Sir Syed Nagar Aligarh
12	Prof Ubaidullah. Anatomy- Regional and Applied Osteology, Habib Book Depot Sir Syed Nagar Aligarh
13	Prof Ubaidullah. Anatomy- Regional and Applied Thorax, Habib Book Depot Sir Syed Nagar Aligarh
14	Prof Ubaidullah. Anatomy- Regional and Applied Upper Limb, Habib Book Depot Sir Syed Nagar Aligarh
15	Prof Ubaidullah. Anatomy- Regional and Applied Lower Limb, Habib Book Depot Sir Syed Nagar Aligarh
16	Ishtiyaque Ahmad. Kuliyat e Asri. 1982. New public press, Delhi
17	Dr Anees Ahmad. Ilmul Izam, Naziya printing printers, Lal kuan , Delhi, 1986
18	Ilmul Mafasil, Anees Ahmed, Aligarh Press Doodh pur, Aligarh, 1981
19	Shabbir Ahmad. Osteology. Idara Kitab UI Shifa. 2004

20	Shabbir Ahmad Kitab-al- Azalat (Myology) NCPUL 2010
21	Mosood hafeez rafaee. Tashreeh ul Abdal, Ejaz publication House , New Delhi, 1998
22	Tashreehul badan Haikal AAzmi, Allauddin Khan, New Public press Delhi
23	Tashreehul Badan mafasil wa uzliyat, Allauddin Khan, chaman publications, 1934
24	Birch R, Collins P, Gray H, Standring S. Gray's Anatomy : the Anatomical Basis of Clinical Practice. 42nd ed. Philadelphia: Elsevier Limited; 2021.
25	Moore KL, F A, A M R Agur. Clinically oriented anatomy. 7th ed. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2014.
26	Raymond Jack Last. Anatomy, Regional and Applied. Churchill Livingstone. 1972.
27	Netter FH. Atlas of Human Anatomy. 7th ed. Philadelphia: Elsevier; 2019.
28	Koshi R, Cunningham DJ. Cunningham's manual of practical anatomy. Oxford, United Kingdom: Oxford University Press; 2017.
29	McMinn RMH. Last's Anatomy - Revised Edition. Churchill Livingstone; 2019.
30	Charles J, Basmajian JV, Slonecker CE. Grant's Method of Anatomy. 1989.
31	Anne, Dalley AF. Grant's Atlas of Anatomy. Lippincott Williams & Wilkins; 2023.
32	Chaurasia BD. B D Chaurasia's Handbook of General Anatomy. Delhi, India ; Bangalore, India ; Pune, India: Cbs; 2009.
33	Singh V. Textbook of Anatomy Upper Limb and Thorax; Elsevier Health Sciences; 2014.
34	Singh V. Textbook of Anatomy Abdomen and Lower Limb; Elsevier Health Sciences; 2018.
35	Vishram Singh. Anatomy of head, neck and brain. Elsevier India; 2009.
36	Singh I, Cuta Cēsayyan. Inderbir Singh's Textbook of anatomy. New Delhi: Jaypee, The Health Sciences Publisher; 2016.
37	Singh I. Textbook of Anatomy: Thorex, Abdomen and Pelvis. Jaypee;
38	Sahana SN. Human Anatomy (Descriptie and applied) vol 1&2. K.K. publishers(p) ltd, Howrah 1988.

39	Eizenberg N, Briggs C, Adams C, Ahern G. General Anatomy. McGraw-Hill Education Australia; 2007.
40	V Subhadra Devi. Textbook of General Anatomy. JP Medical Ltd; 2018.
41	Garg K. Bd chaurasia's handbook of general anatomy. 2019.
42	Garg K. Manual of Human Anatomy Dissection. CBS Publishers & Distributors Pvt Limited, India; 2022.
43	Kiran S. Human Anatomy. JP Medical Ltd; 2011.
44	Daniel John Cunningham, Romanes GJ. Cunningham's manual of practical anatomy. Vol 2. Oxford: Oxford University Press; 2004.
45	Daniel John Cunningham, Romanes GJ. Cunningham's manual of practical anatomy. Vol 1. Oxford: Oxford University Press; 2004.
46	Daniel John Cunningham, Romanes GJ. Cunningham's manual of practical anatomy. Vol 3. Oxford: Oxford University Press; 2004.
47	ML Ajmani. Embalming. Jaypee Brothers, Medical Publishers Pvt. Limited; 2019.
48	Myers E, Sullivan FA. The Champion Text Book on Embalming. 2018.
49	J.N Gannal. History of Embalming. BoD – Books on Demand; 2020.
50	Tompsett DH. Anatomical Techniques 2nd Edition, Churchill Livingstone, 1970.
51	J. J. and M. J. Edwards. Medical Museum Technology. London: Oxford University Press, 1959; PP. 182. Illustrated. 21S.
52	Standard Operating Procedures for Hijama-978-93-94347-82-3 CCRUM April 2024
53	Standard Unani Medical Terminology-CCRUM-2022
54	Dissection of the Human body. krishna murti A & Gunasegaran J P. Jaypee brothers medical publishers, 2013
55	Tashreehul Ahsha, Hakim Mohammed Ahmed Laari, Jamal Printing Press, Delhi, 1975
56	Jarahi Ittelaqi Tashreeh, Urdu Translation Of Grays Anatomy by Dr. Ghulam Dastagir, Vol 1, 8th Edn, Daare Taba Usmania Sarkari Hyderabad Dakan, 1937

57	Tashreeh Amali, Urdu translation of Gray's Anatomy by Dr. Afzal Kareem Khan, Daare Taba Usmania Sarkari Hyderabad Dakan, Vol1 1925
58	Tashreeh Asbiyaat, urdu translation of Gray's Neuroanatomy by Dr. Fazal Kareem Khan, Daare Taba Usmania Sarkari Hyderabad Dakan, 1934
59	Tashreeh Urooqiyat, Urdu translation of Gray's Anatomy (Angiology) by Hakim Mohammed Kabiruddin, Daare Taba Usmania Sarkari Hyderabad Dakan, 1935
60	Tashreeh Mufassalaat, Dr. Mohammed Ashraful Haq, Daare Taba Usmania Sarkari Hyderabad Dakan, 1934
61	Tashreeh Azmiyat, Dr. Mohammed Ashraful Haq, Daare Taba Usmania Sarkari Hyderabad Dakan, 1931
62	Mubaadi Janeeniyat, Dr. Haji Haider Ali Khan, 1939
63	Tashreeh Amali Rehnumae Taqteeh Naash, Hakim Naziruddin Ahmed, Vol1, Barkhi Press, Delhi
64	Risalae Janeen, Narayan Das janglimal, Iftekhar, Delhi
65	Copenhaver M. Wilfred Et al, 'Bailey's Text Book of Histology', 17th Edn, william and Wilkins, 1978
66	Difiore. S.H. Mariano, 'Atlas of Human Histology' - 5th Edn. Lea - Febiger Publishers, 1985.
67	Jungueira. C. Luis Etal, 'Basic Histology' - 2nd Edn. Large Medical Publication, 1971.
68	Drury R.A.B., Wallington. E.A. Carlcon's, 'Histological Technique' 5th Edn. Oxford University, Preces, 1980. Cullings, 'Histological Technique' - 3rd Edn. 1994 Butterworths.
69	Michael H. Ross, 'Histology - A Text & Atlas' - 3rd Edn. 1985 williams&wilking
70	Young B, O'dowd G, Woodford P. Wheater's functional histology: a text and colour atlas. Philadelphia: Churchill Livingstone/Elsevier; 2014
71	Ross MH, Reith EJ. A visual study guide to atlas of descriptive histology : histology of tissues. Hagerstown, Md.: Harper & Row; 1973
72	Ross MH, Pawlina W. Histology: a Text and Atlas : with Correlated Cell and Molecular Biology. 8th ed. Philadelphia: Wolters Kluwer Health; 2020
73	Cormack DH. Essential histology. Philadelphia: Lippincott Williams & Wilkins; 2001.

74	Bailey FR, Copenhaver WM, Johnson DD, Smith PE. Bailey's Text-book of Histology, Rev. by Philip E. Smith and Wilfred M. Copenhaver, with the Assistance of Dorothy D. Johnson. 1953
75	Eroschenko VP. DiFiore's atlas of histology with functional correlations. 12th ed. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins 2013
76	Bancroft JD, Cook HC. Manual of Histological Techniques and Their Diagnostic Application. 1994
77	Hamilton W.J. and Mossman H.W. 'Human Embryology' - 4th Edn. Williams and Wilkins Company, 1972
78	Sadler T.W. 'Langman's Medical Embryology' - 5th & 7th Edn. Williams and Wilkins company, 1995.
79	A. K. Datta, 'Essentials of Human Anatomy, Human Embryology, - 2nd Edn. Current Books International 1991
80	Moore Persaud, 'The Developing Human' - 6th Edn. 1998, W.B. Souders Company
81	Larsen 'Human Embryology' - 2nd Edn. 1997 Churchill Livingstone
82	Arey L brainerd. Developmental anatomy, by l.b. arey, 7th edition. 1974
83	Dudek RW. Embryology. 6th ed. Philadelphia: Wolters Kluwer Health; 2014
84	Coalson RE, Tomasek JJ. Embryology. New York; Berlin: Springer-Verlag, Cop; 1992
85	Thomas Hastie Bryce. Embryology. London: Longmans And Green; 1908
86	. Robert F. Mueller, 'Emery's Elements of Medical Genetics' - 9th Edn. 1995, Churchill Living stone
87	Nora & Frazer, 'Medical Genetics Principles' - 1974 Lee & Gebiger, Philladelphia
88	Friedman, 'NMS Genetics' - 2nd Edn; 1996
89	Alfred. G. Kudson Jr. 'Genetics & Disease' - MC Graw Hill Book Company, N.Y.
90	Thomas D. Gelehrtar, 'Principles of Medical Genetics' - 2nd Edn. 1990, williams& Wilkins
91	Charma, 'Curt Stern Principles of Human Genetics' - 2nd Edn. 1960
92	Russell PJ. Genetics. San Francisco ; London: Benjamin Cummings; 2002
93	Altenburg E. Genetics. New Delhi: Oxford & Ibh Publishing; 1970.
94	'Banks Histology and Comparative Organalogy' - A Text Book and Atlas -Edn. 1974

95	Wolstenhome, 'Taste & Smell in vertebrates' - Edn.1970.
96	Embryogenesis in Mammals CIBA foundation - Edition 1976
97	George,C. Kent, Comparative Anatomy of the Vertebrates - 3rd Edn. 1983 McGraw Hill Book Company
98	Romer, 'Vertebrate Body' 5th Edn. 1978 V.B. Saunders Company. Physical Anthropology
99	Harrison, 'Human Biology, An Introduction to Human, Evolution and Growth' - 2nd Edn. 1970.
100	Chaurasia BD. REGIONAL AND APPLIED DISSECTION AND CLINICAL : upper limb and thorax. VOI 2, CBS publishers, 2019.
101	BD Chaurasia's human anatomy : regional and applied, dissection and clinical. Vol. 4, Brain-neuroanatomy, Cbs Publishers & Distributors Pvt Ltd; 2017.
102	BD Chaurasia's human anatomy : regional and applied, Lower Limb and abdomen Vol.3, CBS Publishers & Distributors Pvt Ltd; 2017.
103	BD Chaurasia's human anatomy : regional and applied, dissection and clinical. Vol. 1, Head & Neck, CBS Publishers & Distributors Pvt Ltd; 2017.
104	Inderbir singh`s Textbook of Human Osteology wiyh atlas of muscles and attachments. 4th edition Jaypee publishers.2019
105	Inderbir singh`s textbook of Human Neuroanatomy (Fundamental and clinical) . 19th edition, Jaypee publishers.2014
106	Halim A. Surface & Radiological Anatomy, 2e. 2008.
107	J S P Lumley. Surface anatomy : the anatomical basis of clinical examination. Edinburgh ; New York: Churchill Livingstone/Elsevier, Repr; 2011
108	Tunstall R, Seyed Ali Mirjalili. Surface anatomy. London: Jp Medical Publishers; 2019.
109	Tunstall R. Pocket Tutor Surface Anatomy. London: Jp Medical Ltd; 2012
110	Appaji AC, Kulkarni R. Surface and Radiological Anatomy: With a Clinical Perspective. Jaypee Brothers Medical Publishers; 2021.

111	Bo WJ. Basic atlas of sectional anatomy with correlated imaging. Editorial: Philadelphia: Saunders Elsevier; 2007.
112	Butler P, Mitchell A, Healy JC. Applied Radiological Anatomy. Cambridge University Press; 2012.
113	Abdullah M. Radiology in Medical Practice. 2015
114	Wilhelm Firbas, Schmiedl R. Atlas of Radiologic Anatomy. 1979
115	Thayalan Kuppusamy. Handbook of radiology : (for postgraduate students of medical physics, radiology and imaging and radiation oncology). New Delhi, India: Jaypee Brothers Medical Publishers; 2017.
116	Govind Chavhan, Chavhan GB. MRI Made Easy : for beginners. New Delhi, India: Jaypee Brothers Medical Publishers (P) Ltd; 2013.
117	Herring W. Learning radiology : recognizing the basics. Philadelphia, Pa: Elsevier; 2016
118	Cochard LR, Goodhartz LA, Harmath C, Major NM, Srinivasan Mukundan. Netter's Introduction to Imaging E-Book. Elsevier Health Sciences; 2011
119	Sun EX, Shi J, Mandell JC. Core Radiology. Cambridge University Press; 2021
120	Clarke C, Dux A. Chest X-rays for Medical Students. John Wiley & Sons; 2017
121	G Balachandran, (Consultant Radiologist. Interpretation of chest x-ray : an illustrated companion. New Delhi: Jaypee Brothers Medical Publishers; 2014
122	Raby N, Berman L, Morley S, Gerald De Lacey. Accident & emergency radiology : a survival guide. Edinburgh: Saunders; 2015.
123	Ryan S, McNicholas M, Eustace SJ. Anatomy for diagnostic imaging. Edinburgh ; New York: Balliere Tindal/Elsevier; 2011
124	Levitov A, Mayo PH, Slonim AD. Critical Care Ultrasonography. McGraw Hill Professional; 2009
125	Hashemi RH, Lisanti CJ, Bradley WG. MRI : the basics. Philadelphia: Wolters Kluwer; 2018
126	Fanti S, Mohsen Farsad, Mansi L. Atlas of PET-CT. Springer Science & Business Media; 2008
127	Adams BJ, Crabtree PJ. Comparative Skeletal Anatomy : a Photographic Atlas for Medical Examiners, Coroners, Forensic Anthropologists, and Archaeologists. Totowa, Nj: Humana Press; 2008.

128	Nusse G. Craniofacial Anatomy and Forensic Identification. Academic Press; 2022.
129	Rich J. Forensic medicine of the lower Extremity : Human Identification and Trauma Analysis of the Thigh, Leg, and Foot. Totowa, Nj: Humana Press; 2013.
130	Fairgrieve SI. FORENSIC OSTEOLOGICAL ANALYSIS. Charles C Thomas Publisher; 1999.
131	Hristensen AM, Passalacqua NV, Bartelink EJ. Forensic anthropology : current methods and practice. Amsterdam: Academic Press; 2014.
132	Charles Ernest Oxnard. Scientific bases of human anatomy. Hoboken, N.J: Wiley-Blackwell; 2015.
133	Woollard HH. Recent Advances in Anatomy, Etc. 1927.
134	F. Goldby, Harrison RJ. Recent Advances in Anatomy. 1961.
135	Agarwal N, Port JD. Neuroimaging: Anatomy Meets Function. Springer; 2018.
136	Mettler FA, Guiberteau MJ. Essentials of nuclear medicine and molecular imaging. Philadelphia, PA: Elsevier; 2019.
137	Kramer CM. Imaging in peripheral arterial disease : clinical and research applications. Cham: Springer International Publishing; 2020.
138	Freeman and Johnson's Clinical Radionuclide Imaging. 1984.
139	Newton TH, D Gordon Potts. Angiography,. Saint Louis, Mosby; 1974.
140	Baltaxe HA, Amplatz K, Levin DC. Coronary angiography. Springfield, Illinois: Thomas; 1976.
141	Balter S. Interventional fluroscopy : physics, technology, safety. New York: Wiley; 2001.
142	Beranbaum SL. Fluroscopy and radiography of the gastrointestinal tract. Delaware: E.I.Du Pont De Nemours; 1969.
143	Cohan RH, Silverman SG. CT urography : an atlas. Philadelphia, Pa: Lippincott Williams & Wilkins; 2007.
144	Zagoria RJ. Genitourinary radiology : the requisites. Philadelphia, Pa.: Mosby; 2004.
145	Barbaric ZL. Principles of genitourinary radiology. New York: Thieme Medical Publishers ; Stuttgart ; New York; 1994.

146	Nunnamaker AJ, Dhonau CO. Anatomy and Embalming. DigiCat; 2022.
147	Jean-Nicolas Gannal. History of Embalming. Litres; 2021.
148	Romedio Schmitz-Esser, Classen A, Radtke C. The corpse in the Middle Ages : embalming, cremating, and the cultural construction of the dead body. Turnhout: Harvey Miller Publishers, An Imprint Of Brepols Publishers; 2020.
149	Kiernan JA. Histological & Histochemical Methods. Pergamon; 1990.
150	De W. Histochemistry. Berlin De Gruyter; 2017.
151	Histochemistry. Vol. 2. Edinburgh Etc.: Churchill Livingstone; 1972.
152	Wick MR. Diagnostic histochemistry. Cambridge ; New York: Cambridge University Press; 2008.
153	Chayen J, Bitensky L. Practical histochemistry. Chichester: J. Wiley & Sons; 1991.
154	Everson AG. Histochemistry / 1. London: Churchill; 1968.
155	Brown SR, Bureau R. Organ donation. Madison, Wis.? Wisconsin Legislative Reference Bureau; 2004.
156	Brezina C. Organ Donation. The Rosen Publishing Group, Inc; 2009.
157	Brezina C. Organ donation : risks, rewards, and research. New York: Rosen Pub; 2010.
158	Siegel JT, Alvaro EM. Understanding organ donation : applied behavioral science perspectives. Chichester, U.K. ; Malden, Ma: Wiley-Blackwell; 2010.
159	States. U. Questions & answers about organ donation. Rockville, Md. (5600 Fishers Lane, Room 7-29, Rockville 20857): U.S. Dept. Of Health & Human Services, Public Health Service, Health Resources & Services Administration, Bureau Of Health Resources Development, Division Of Transplantation; 1997.
160	Marcovitz H. Organ & body donation. Edina, Minn.: Abdo Pub. Co; 2011.
161	Abadie A, Gay S, Bureau N. The impact of presumed consent legislation on cadaveric organ donation : a cross country study. Cambridge, Ma: National Bureau Of Economic Research; 2004.
162	Sisu AM, editor. Human Anatomy - Reviews and Medical Advances. London: Intech Open; 2017
163	Natale G, Fornai F, editors. Advances in Anatomy and Its History. Basel: MDPI; 2024

164	Shankhdar R. Human Anatomy: Regional and Applied (General, Head, Neck, and Brain). 2nd ed. New Delhi: AITBS Publishers; 2023
165	Netter FH. Atlas of Human Anatomy: A Systems Approach. 8th ed. Philadelphia: Elsevier; 2023.
166	Weston G. Alive: An Alternative Anatomy. London: Jonathan Cape; 2025.
167	Sque M, Payne S. Organ and Tissue Donation: An Evidence Base for Practice. Maidenhead: Open University Press; 2007.

Abbreviations

Domain		T L Method		Level	
CK	Cognitive/Knowledge	L	Lecture	K	Know
CC	Cognitive/Comprehension	L&PPT	Lecture with PowerPoint presentation	KH	Knows how
CAP	Cognitive/Application	L&GD	Lecture & Group Discussion	SH	Shows how
CAN	Cognitive/Analysis	L_VC	Lecture with Video clips	D	Does
CS	Cognitive/Synthesis	REC	Recitation		
CE	Cognitive/Evaluation	SY	Symposium		
PSY-SET	Psychomotor/Set	TUT	Tutorial		
PSY-GUD	Psychomotor/Guided response	DIS	Discussions		
PSY-MEC	Psychomotor/Mechanism	BS	Brainstorming		
PSY-ADT	Psychomotor Adaptation	IBL	Inquiry-Based Learning		
PSY-ORG	Psychomotor/Origination	PBL	Problem-Based Learning		
AFT-REC	Affective/ Receiving	CBL	Case-Based Learning		
AFT-RES	Affective/Responding	PrBL	Project-Based Learning		
AFT-VAL	Affective/Valuing	TBL	Team-Based Learning		
AFT-SET	Affective/Organization	TPW	Team Project Work		
AFT-CHR	Affective/ characterization	FC	Flipped Classroom		
		BL	Blended Learning		
		EDU	Edutainment		
		ML	Mobile Learning		
		ECE	Early Clinical Exposure		
		SIM	Simulation		
		RP	Role Plays		
		SDL	Self-directed learning		

		PSM	Problem-Solving Method		
		KL	Kinaesthetic Learning		
		W	Workshops		
		GBL	Game-Based Learning		
		LS	Library Session		
		PL	Peer Learning		
		RLE	Real-Life Experience		
		PER	Presentations		
		D-M	Demonstration on Model		
		PT	Practical		
		X-Ray	X-ray Identification		
		CD	Case Diagnosis		
		LRI	Lab Report Interpretation		
		DA	Drug Analysis		
		D	Demonstration		
		D-BED	Demonstration Bedside		
		DL	Demonstration Lab		
		DG	Demonstration Garden		
		FV	Field Visit		
		JC	Journal Club		
		Mnt	Mentoring		
		PAL	Peer Assisted Learning		
		C_L	Co Learning		