

FACULTY OF MEDICAL SCIENCES
UNIVERSITY OF DELHI
दिल्ली विश्वविद्यालय

FMDS/330/10(2)/Minutes/2022

MINUTES

An emergent meeting of the Faculty of Medical Sciences, University of Delhi was held on Friday, the 28th January, 2022 at 12:00 Noon in the Committee Room, Ist Floor, University College of Medical Sciences, Delhi - 110095.

The following members were present:

1.	Prof. Anil Kr. Jain	Dean (Medical)- Chairperson
2.	Dr. Renu Chauhan	HOD (Anatomy), DU
3.	Prof., Archana Singhal	HOD (Dermatology), DU
4.	Prof. Neelam Vaney	Prof. (Physiology) UCMS
5.	Prof. S.K. Bhasin	HOD (Community Medicine), DU
6.	Prof. Anju Jain	HOD (Bio- Chemistry) DU
7.	Prof., N.P. Singh	HOD (Medical Microbiology), DU
8.	Prof. Sonal Sharma	HOD (Pathology), DU
9.	Prof. V.P. Varshney	HOD (Physiology) DU
10.	Prof. Jolly Rohtagi	HOD (Ophthalmology), DU
11.	Prof. Tulika Tripathi	HOD (Dental Sciences) MAIDS
12.	Prof. Vivek Aggarwal	HOD (Surgery), UCMS
13.	Prof. Ramachandra	Director, LHMC
14.	Prof. Anju Aggarwal	Prof. (Pediatrics) LHMC
15.	Prof. K Rajeshwari	Prof. (Pediatrics) MAMC
16.	Prof. Anuradha Chowdhary	Prof. (Medicine) MAMC
17.	Prof., Shukla Das	Prof (Microbiology) UCMS
18.	Prof. Ram Anand	Prof. (Radiology) LHMC
19.	Prof. Sonal Saxena	Prof. (Microbiology) MAMC
20.	Prof. Dinesh Puri	Prof. (Biochemistry) UCMS
21.	Prof. Vandana Roy	Prof. (Pharmacology) MAMC
22.	Prof. Namita Kalra	Prof. (Dental Sciences) UCMS

Members from Serial no. 05 to 22 attended the meeting through virtual mode.

The following member regretted their inability to attend the meeting due to prior commitments.

1. **Prof. Amita Suneja, HOD (Obstt & Gynae.), UCMS**

Shri Deepak Vats, Joint Registrar, Faculty of Medical Sciences was present in the meeting.

Sh. Ashwani Kumar, Assistant Registrar assisted the Faculty in its deliberations.


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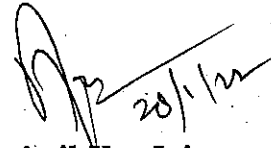
The Faculty considered the recommendations of the Committee of Courses and Studies (CCS) of the following departments regarding course curriculum prepared on competency based UG curriculum for MBBS Course- IInd Professional (New Scheme) in the light of Regulations on Graduate Medical Education (Amendment), 2019, published in the Gazette of India dated 06.11.2019:

1. Microbiology
2. Pharmacology
3. Pathology

The Faculty after a detailed discussion approved the Course Curriculum of MBBS IInd Professional (New Scheme) applicable to the Batch of MBBS students admitted in the Academic Session 2019-2020 and onwards and recommended it to the Academic Council for consideration.

The meeting ended with a vote of thanks to the Chair.


Deepak Vats
Joint Registrar (Medical)


Prof. Anil Kr. Jain
Dean, Faculty of Medical Sciences
(Chairperson)

MINUTES


A meeting of the Committee of Courses & Studies in the Department of Pharmacology was held on Thursday the 13th January, 2022 at 02:00 P.M. through online mode due to pandemic Covid-19.

The following members were present:

1. Prof. H.S. Rehan, HOD, Pharmacology, D.U. C/o LHMC - Chairperson
2. Dr. Vandana Roy, Head, Department of Pharmacology, MAMC.
3. Dr. Rachna Gupta, Head, Department of Pharmacology, UCMS.
4. Dr. Anita kotwani, Sr. Associate Prof., Department of Pharmacology, VPCI.
5. Dr. Lalit Kumar Gupta, Sr. Professor, Department of Pharmacology, LHMC.
6. Dr. Shalini Chawla, Sr. Professor, Department of Pharmacology, MAMC
7. Dr. Kavita Gulati, Sr. Professor, Department of Pharmacology, VPCI
8. Dr. Seema Jain, Sr. Professor, Department of Pharmacology, UCMS
9. Dr. Krishna, Sr. Associate Professor, Deptt. of Pharmacology, LHMC
10. Dr. Vandana Tayal, Sr. Associate Professor, Deptt. of Pharmacology, MAMC
11. Dr. Sumita Halder, Sr. Associate Professor, Deptt. of Pharmacology, UCMS

1. The Committee recommended the names of Examiners for Pharmacology (PG) (Annual/Supplementary) to be held during the year 2022 (Batch-2019) (List not enclosed being confidential).
2. The Committee recommended the names of examiners to evaluate thesis submitted by the students admitted during the year 2020 in Pharmacology (PG) (List not enclosed being confidential).
3. The Committee recommended the names of 15 teachers from different medical colleges other than Delhi University for Panel of Experts.

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The meeting ended with a vote of thanks to the chair.


(Prof. H.S. Rehan)
(Chairperson)

No.F. IV/3/2021/MC/Pharma/406

Date:- 23/7/21

The Dean
University of Delhi
Faculty of Medical Sciences
6th Floor, V.P.C.I. Building
Delhi-110007

Subject:- Revised CBME Curriculum in Pharmacology

Reference No. MDS/086/MBBS-BDS/2021/497 Dated 08/07/2021
No. FMDS/247/PG/2019/1149-12, Dated 25.10.2019

Dear Professor Jain

Please find enclosed revised curriculum in Pharmacology (CBME) as prepared by the Courses Committee of Studies (Pharmacology) through on line discussions. Both the soft and hard copy are being sent.

Thanking You

Yours Sincerely

Vandana Roy
Dr. Vandana Roy
Head
Department of Pharmacology
Faculty of Medical Sciences
University of Delhi
Delhi

Encl: Copy of Revised curriculum in Pharmacology (CBME)

Email acknowledgement & approval of new curriculum

*FMDS/1026
4.8.21*

*Ms Kavita
02/08/2021*

*Jub
24/7/22*

*Sunshelva
24/8/22*

*Dipte
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**Revised Pharmacology Curriculum(CBME)
2020 Onwards**

**Department of Pharmacology
Faculty of Medical Sciences
University of Delhi**

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Dypte
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Sushil Kumar
24/1/22

Vandana Roy
23/7/2021

CURRICULUM OF PHARMACOLOGY FOR MEDICAL STUDENTS

Preamble

Pharmacology is the science of medicines. The knowledge of the molecular basis of drug action, its therapeutic applications, the adverse effects caused by the medications, their prevention and treatment and the effects of administering two or more drugs to a patient will be learnt in the context of its clinical application and not just as facts. The use of medicines for treating patients with the required medications, at the right dose, in the right way, for the right duration and at an appropriate cost, with consideration for all social, environmental and economic factors that may impact the therapy. The emphasis will be on clinical relevance of pharmacology knowledge.

1. VISION / GOAL

The broad goal of teaching pharmacology to under graduate students is to inculcate rational and scientific basis of therapeutics. To provide knowledge of pharmacology based on evidence and to foster the development of a highly knowledgeable, skilled and competent Indian Medical Graduates imbued with the concept of rational Pharmaco-therapeutics. Simultaneously focus is to impart requisite skills, attitudes, values and responsiveness, so that the students are able to function appropriately and effectively as doctors at the community level while being globally relevant.

2. LEARNING OBJECTIVES (overall)

- i. To equip the Indian Medical Graduate (IMG) with the knowledge of scientific basis of therapeutics and the skills of rational prescribing.
- ii. The student should acquire knowledge of the principles and application of Pharmacotherapy.
- iii. The student should be able to demonstrate appropriate use of medicines in disease with consideration to its efficacy, safety, suitability and cost for the individual and mass therapy.
- iv. The student should have an understanding of general considerations of antimicrobial resistance and antibiotic stewardship program

Access knowledge about medicines through reliable resources to enable the students to fulfill their roles of an Indian Medical Graduate as a clinician, leader, communicator, lifelong learner and professional

3. COMPETENCIES

The student during the training program should acquire the following competencies:

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7/ **(a) Knowledge /Cognitive Domain**

At the end of the course the learner shall be able to:

1. Understand the general principles of drug action and handling of drugs by the body in all the individuals including children, elderly, lactating and pregnant women and those having a renal and/or hepatic disease and genetic variations.
2. Prescribe drugs rationally by:
 - a. Understanding the importance of both the non pharmacological(non drug) and pharmacological (drug) treatment
 - b. Selection of drugs based on suitability, tolerability, efficacy and cost.
3. Apply pharmacokinetic principles in clinical practice pertaining to the drugs used in commonly encountered conditions, National Health Programmes and emergency medical conditions.
4. Foresee, prevent and manage adverse drug events and drug drug/food/traditional medicine interactions.
5. Use antimicrobials judiciously for therapy and prophylaxis, understanding the rapid development of Antimicrobial resistance(AMR).
6. Understand and implement the concepts of essential medicines, pharmacoeconomics and evidence-based medicine for improving the community health care.
7. Describe the clinical presentation and management of common poisoning including bites and stings.
8. Understand the basic concepts of new drug development with emphasis on design and conduct of clinical trials and interpretation of their results.

(b) Skills/ Psychomotor Domain

At the end of the course the learner shall be able to perform and interpret following skills

1. Write a correct, complete and legible prescription for common ailments including those in the National health Programmes and emergency medical conditions. And should be able to modify the prescription in case of drug interactions.
2. Calculate the drug dosage using appropriate formulae for an individual patient.
3. Administer the required dose of different drug formulations using appropriate devices and techniques (.e.g injections, inhalers, transdermal patches etc.).
4. Advice and interpret the therapeutic monitoring reports of important drugs.
5. Identify, analyze and report adverse drug reactions to appropriate authorities.
6. Retrieve drug information from appropriate sources including the electronic resources.
7. Analyse critically drug promotional literature in terms of pharmacological actions of the ingredients, rational/irrational nature of the preparation, economics of the use and claims by the pharmaceutical companies.

(c) Communication affective attitude Domain

1. Effectively explain to patients, the effects and side effects of drugs, including the need for medication adherence.
2. Communicate effectively with pharmacological reasoning with health care team on rational use of drugs and improving spontaneous reporting of adverse events.
3. Motivate patients with chronic diseases to adhere to the line of management as outlined by the health care provider.
4. Demonstrate respect in interactions with peers, and other healthcare professionals.
5. Demonstrate ethical behavior and integrity in one's work.

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6. Demonstrate ability to generate awareness about the use of generic drugs in patients.
7. Understand the legal and ethical aspects of prescribing drugs.
8. Acquire skills for self-directed learning to keep up with developments in the field and to continuously build to improve on skills, expertise and perpetual professional development.

4. COURSE

Course content for detailed competencies given below in Appendix 1

PH	Competency
1.1	Define and describe the principles of pharmacology and pharmacotherapeutics
1.2	Describe the basis of Evidence based medicine and Therapeutic drug monitoring
1.3	Enumerate and identify drug formulations and drug delivery systems
1.4	Describe absorption, distribution, metabolism & excretion of drug
1.5	Describe general principles of mechanism of drug action
1.6	Describe principles of Pharmacovigilance & ADR reporting systems
1.7	Define, identify and describe the management of adverse drug reactions (ADR)
1.8	Identify and describe the management of drug interactions
1.9	Describe nomenclature of drugs i.e. generic, branded drug
1.10	Describe parts of a correct, complete and legible generic prescription. Identify errors in prescription and correct appropriately
1.11	Describe various routes of drug administration, eg. oral, SC, IV, IM, SL
1.12	Calculate the dosage of drugs using appropriate formulae for an individual patient, including children, elderly and patient with renal dysfunction
1.13	Describe mechanism of action, types, doses, side effects, indications and contraindications of adrenergic and anti-adrenergic drugs
1.14	Describe mechanism of action, types, doses, side effects, indications and contraindications of cholinergic and anticholinergic drugs
1.15	Describe mechanism/s of action, types, doses, side effects, indications and contraindications of skeletal muscle relaxants
1.16	Describe mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act by modulating autacoids, including: anti-histaminic, 5-HT modulating drugs, NSAIDs, drugs for gout, anti-rheumatic drugs, drugs for migraine
1.17	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of local anesthetics
1.18	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of general anesthetics, and preanesthetic medications
1.19	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act on CNS, (including anxiolytics, sedatives & hypnotics, anti-psychotic, antidepressant drugs, anti-maniacs, opioid agonists and antagonists, drugs used for neurodegenerative disorders, anti-epileptics drugs)
1.20	Describe the effects of acute and chronic ethanol intake

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1.21	Describe the symptoms and management of methanol and ethanol poisonings
1.22	Describe drugs of abuse (dependence, addiction, stimulants, depressants, psychedelics, drugs used for criminal offences)
1.23	Describe the process and mechanism of drug deaddiction
1.24	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs affecting renal systems including diuretics, antidiuretics- vasopressin and analogues
1.25	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs acting on blood, like anticoagulants, antiplatelets, fibrinolytics, plasma expanders
1.26	Describe mechanisms of action, types, doses, side effects, indications and contraindications of the drugs modulating the renin-angiotensin and aldosterone system
1.27	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antihypertensive drugs and drugs used in shock
1.28	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in ischemic heart disease (stable, unstable angina and myocardial infarction), peripheral vascular disease
1.29	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in congestive heart failure
1.30	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the antiarrhythmics
1.31	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in the management of dyslipidemias
1.32	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in bronchial asthma and COPD
1.33	Describe the mechanism of action, types, doses, side effects, indications and contraindications of the drugs used in cough (antitussives, expectorants/ mucolytics)
1.34	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs used as below: 1. Acid-peptic disease and GERD 2. Antiemetics and prokinetics 3. Antidiarrhoeals 4. Laxatives 5. Inflammatory Bowel Disease 6. Irritable Bowel Disorders, biliary and pancreatic diseases
1.35	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in hematological disorders like: 1. Drugs used in anemias 2. Colony Stimulating factors
1.36	Describe the mechanism of action, types, doses, side effects, indications and contraindications of drugs used in endocrine disorders (diabetes mellitus, thyroid disorders and osteoporosis)
1.37	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used as sex hormones, their analogues and anterior Pituitary hormones

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1.38	Describe the mechanism of action, types, doses, side effects, indications and contraindications of corticosteroids
1.39	Describe mechanism of action, types, doses, side effects, indications and contraindications the drugs used for contraception
1.40	Describe mechanism of action, types, doses, side effects, indications and contraindications of 1. Drugs used in the treatment of infertility, and 2. Drugs used in erectile dysfunction
1.41	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of uterine relaxants and stimulants
1.42	Describe general principles of chemotherapy
1.43	Describe and discuss the causes, extent and burden of Antimicrobial Resistance(AMR). Rational use of antimicrobials including antibiotic stewardship program
1.44	Describe the first line antitubercular dugs, their mechanisms of action, side effects and doses.
1.45	Describe the drugs used in MDR and XDR Tuberculosis
1.46	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antileprotic drugs
1.47	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in malaria, KALA-AZAR, amebiasis and intestinal helminthiasis
1.48	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in UTI/ STD and viral diseases including HIV
1.49	Describe mechanism of action, classes, side effects, indications and contraindications of anticancer drugs
1.50	Describe mechanisms of action, types, doses, side effects, indications and contraindications of immunomodulators and management of organ transplant rejection
1.51	Describe occupational and environmental pesticides, food adulterants, pollutants and insect repellents
1.52	Describe management of common poisoning, insecticides, common sting and bites
1.53	Describe heavy metal poisoning and chelating agents
1.54	Describe vaccines and their uses
1.55	Describe and discuss the following National Health Programmes including Immunisation, Tuberculosis, Leprosy, Malaria, HIV, Filariasis, Kala Azar, Diarrhoeal diseases, Anaemia & nutritional disorders, Blindness, Non-communicable diseases, cancer and Iodine deficiency
1.56	Describe basic aspects of Geriatric and Pediatric pharmacology
1.57	Describe drugs used in skin disorders
1.58	Describe drugs used in Ocular disorders
1.59	Describe and discuss the following: Essential medicines, Fixed dose combinations, Over the counter drugs, Herbal medicines
1.60	Describe and discuss Pharmacogenomics and Pharmacoeconomics
1.61	Describe and discuss dietary supplements and nutraceuticals
1.62	Describe and discuss antiseptics and disinfectant
1.63	Describe Drug Regulations, acts and other legal aspect
1.64	Describe overview of drug development, Phases of clinical trials and

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	Good Clinical Practice
	CLINICAL PHARMACY
2.1	Demonstrate understanding of the use of various dosage forms (oral/local/parenteral; solid/liquid)
2.2	Prepare oral rehydration solution from ORS packet and explain its use
2.3	Demonstrate the appropriate setting up of an intravenous drip in a simulated environment
2.4	Demonstrate the correct method of calculation of drug dosage in patients including those used in special situations
	CLINICAL PHARMACOLOGY
3.1	Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient
3.2	Perform and interpret a critical appraisal (audit) of a given prescription
3.3	Perform a critical evaluation of the drug promotional literature
3.4	To recognise and report an adverse drug reaction
3.5	To prepare and explain a list of P-drugs for a given case/condition
3.6	Demonstrate how to optimize interaction with pharmaceutical representative to get authentic information on drug
3.7	Prepare a list of essential medicines for a healthcare facility
3.8	Communicate effectively with a patient on the proper use of prescribed medication
	EXPERIMENTAL PHARMACOLOGY
4.1	Administer drugs through various routes in a simulated environment using mannequins
4.2	Demonstrate the effects of drugs on blood pressure (vasopressor and vaso-depressors with appropriate blockers) using computer aided learning
	COMMUNICATION
5.1	Communicate with the patient with empathy and ethics on all aspects of drug use
5.2	Communicate with the patient regarding optimal use of a) drug therapy, b) devices and c) storage of medicines
5.3	Motivate patients with chronic diseases to adhere to the prescribed management by the health care provider
5.4	Explain to the patient the relationship between cost of treatment and patient compliance
5.5	Demonstrate an understanding of the caution in prescribing drugs likely to produce dependence and recommend the line of management
5.6	Demonstrate ability to educate public & patients about various aspects of drug use including antimicrobials as prescription drugs, drug dependence and OTC drugs
5.7	Demonstrate an understanding of the legal and ethical aspects of prescribing drugs

RECOMMENDED HOURS of Pharmacology Teaching

Total - 230 hours
Lectures - 80 hours
Practicals - 138 hours
Self Directed Learning - 12 hours

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Dr. D. K. Dey
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Dr. S. K. Dey
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V. Ray
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5. TEACHING LEARNING METHODS

Teaching Learning methods used would include both for large group teaching and small group teaching. Approximately one third of time will be for didactic lectures.

Large group -Any instructional large group method including traditional lecture and interactive lecture.

Small Group – Any instructional method involving small groups of students in an appropriate learning context. These topics included are those where more intensive and interactive learning sessions are required.

Will be as follows

-Demonstration-Observation-Assistance-Performance(DOAP)-Sessions:A practical session that allows the student to observe a demonstration, assist the performer, perform in a simulated environment, perform under supervision or perform independently.

Demonstration of different routes of drug administration i.e Intravenous, Intramuscular, subcutaneous, Inhalation, Drug formulation exercises (Clinical Pharmacy)

- Problem based learning for Small Group Discussions - Drug nomenclature, Home remedies and house hold measures, Fixed dose drug combinations, Prescription writing, Rational Use of Medicines, Drug Advertisement, Drug dose calculation, Drug interaction, Drug food interactions and interaction of drugs of modern & traditional medicines, Antimicrobial Stewardship Program & Rational Use of antimicrobials, Essential Medicine concept, P Medicine exercises for treatment of common disease conditions, Monitoring drug therapy, Ethics in Human Volunteer Experiment, Adverse Drug Reaction(ADR) form filling exercise

- Computer Assisted Learning- Experiments showing effects of drugs on physiological systems. For example Effect of drugs on Rabbit Eye, Effect of drugs on Dog Blood Pressure, Effect of drugs on Frog Rectus abdominis muscle.

- Student Presentations - Evolution of Medicine and Pharmacology, Sources of Medicines, Drug formulations, Pharmacological basis of House hold remedies, Indian Systems of Medicines , Systemic Pharmacology etc

-Preparation of Charts and Models - Evolution of Medicine and Pharmacology, House hold remedies, Drug dosage forms

- Clinical Exposure - Clinical case discussions on common disease conditions, ADR monitoring and reporting

- Self Directed Learning -A process in which individuals take the initiative, with or without the help of others in diagnosing their learning needs, formulating learning goals, identifying human and material sources for learning, choosing and implementing appropriate learning methods.

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Preparation for seminars, projects, student presentations on areas of interest and relevant to learning of Pharmacology

6. ASSESSMENT

a) Formative Assessment: Formative assessment shall be done periodically throughout the course.

b) Internal Assessment:

i) No less than three internal assessment exams shall be conducted during the course.

ii) **Certifiable competencies:** Achievement of certifiable competencies would also be recorded in logbooks. The student must have completed the required certifiable competencies and completed the log book to be eligible for appearing at the final university examination. (Appendix 2: List of Certifiable competencies)

iii) **Log Book:** Log book is to be maintained to record all activities like Drug formulations, Computer Assisted Learning exercises, Experimental Pharmacology, Clinical Pharmacology and other academic activities. It has to be submitted to the department regularly and would be assessed regularly (Appendix 3) .

Internal assessment will be calculated for Theory (40) marks & Practical (20) marks. 50% combined in theory and practical (not less than 40% in each) for eligibility for appearing for University Examinations.

c) Summative theory practical and Viva voice pattern with distribution of marks :

At the end of the course a final examination will be conducted by the University.

University (Professional) examination: There will be a Theory and Practical + Viva examination .

i) THEORY PAPERS

There shall be two theory papers. .

Each paper shall be of 03 hours duration and of 100 marks.

THEORY PAPER - PHARMACOLOGY

Theory (200 marks) (Paper I – 100, Paper II – 100)

PAPER – I (100 Marks)

Topics: General Pharmacology, Drugs acting on Autonomic nervous system, Drugs acting on Central nervous system, Drugs acting on Peripheral nervous system, Drugs acting on Cardio vascular system, Drugs acting on Kidney, Drugs acting on Respiratory system

PAPER – II (100 Marks)

Topics: Chemotherapy of infective, parasitic disorders and malignancy, Drugs acting on Reproductive system, Drugs related to Endocrinal system, Drugs acting on Gastrointestinal system, skin and mucous membrane, Autacoids, Drugs affecting Blood and blood formation, Vitamins, Antiseptics and disinfectant, Diagnostic agents, Chelating agents, Vaccines and sera, Environmental pollutants

THEORY QUESTION PAPER FORMAT

Each paper will have three Parts. Part I of 20 marks, & Part II of 40 marks each.

Each part will have two questions

Each paper 100 marks

Part I

20 marks

Objective type questions

- Q1. Multiple type questions of inferential, reasoning type (5 x 2 marks=10)
Q2. State True or False / Fill in the blanks, Match the following (5 x 2 marks =10)
Mechanism of action/Therapeutic uses/ adverse effects of drugs,
Drug of choice type of questions

Part II

40 marks

- Q 3. Explain why (rationale of) giving suitable examples (5 x 4 marks= 20marks)
Q 4. a) Long structured question based on a Case scenario (10 marks)
b) Short notes (2 x 5=10 marks)

Part III

40 marks

- Q5. Discuss the therapeutic status of a medicine (4 x 5marks =20 marks)
Q6. Discuss giving the therapeutic goals the drug treatment of a medical condition (2 x 10 marks=20 marks)

ii) PRACTICALS & VIVA

Total marks -100marks

Practical -70 marks

Viva-voce 30 marks

Practical (70 marks)

- | | |
|------------------------------------|----------|
| 1. Clinical Pharmacy | 20 marks |
| 2. Clinical Pharmacology | 30 marks |
| 3. Attitude, Ethics ,Communication | 10 marks |
| 4. Experimental Pharmacology | 10 marks |

7. RECOMMENDED READING

(A) TEXT

1. Essentials of Medical Pharmacology by K.D. Tripathi latest ed. Jaypee brothers, Medical Publishers, India.
2. Sharma and Sharma's Principles of Pharmacology latest ed by H. L. Sharma and K. K. Sharma Publishers: Paras Medical Publishers, New Delhi
3. Basic & Clinical Pharmacology Bertram G. Katzung, Susan B. Masters, Anthony J. Trevor, latest ed McGraw-Hill Companies

(B) REFERENCE BOOKS

1. Lippincott's Illustrated Reviews : Pharmacology : by Mary J Mycek , Richard A Harvey , Pamela C Champe latest ed Lippincott Williams & Wilkins

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2. Goodman & Gilman's the Pharmacological Basis of Therapeutics by Joel Griffith Hardman, Alfred Goodman Gilman, Lee Limbird, Theodore W. Rall latest ed, McGraw-Hill Professional.

(C) AETCOM module

1. Johnson AR, Siegler M, Winslade WJ. Clinical Ethics: A Practical Approach to Ethical Decisions in Clinical Medicine. New York: Mc Graw Hill Inc, 2015 (latest edition)

2. Timms O. Biomedical Ethics. Elsevier India, 2019(latest edition)

8. ELECTIVES

May be offered to students in the subject. A student has a choice of four weeks of elective posting after 3rd MBBS part I Professional examination. The departments can offer options for a student to do the same in Pharmacology.

REFERENCES

1. Syllabus Of Pharmacology For Undergraduate Medical Students. <https://www.fmsh.ac.in/curriculum/Curriculum%20for%20UG%20Pharmacology.pdf>

2. Assessment Module for Undergraduate Medical Education 2019. <https://www.nmc.org.in/wp-content/uploads/2020/01/Module-Competence-based-02.09.2019.pdf>

3. Competency Based Undergraduate Curriculum For The Indian Medical Graduate 2018. <https://www.nmc.org.in/wp-content/uploads/2020/01/UG-Curriculum-Vol-II.pdf>

Appendix 1

(I) Concepts of General and Clinical Pharmacology

1. Introduction: definition, historical perspective, branches and scope of the subject of pharmacology and its relation with other medical disciplines

2. Nature and sources of Drugs, Drug nomenclature and dosage forms

3. Routes of drugs' administration; advantages and disadvantages of different routes

4. Pharmacokinetic considerations: drug absorption, distribution, biotransformations and excretion

5. Pharmacokinetic concepts of bioavailability, apparent volume of distribution (aVd), half life ($t_{1/2}$), and clearance (CL) that are used to decide the doses and rational dosing during the drug treatment.

6. Pharmacodynamics; site and mechanism of drug action, drug receptors and receptor regulation, concepts of agonists, antagonists, partial agonist and inverse agonist drugs

7. Quantitative aspect of drug action: analysis of dose response curve and therapeutic index (safety index)

8. Factors affecting drug action and doses, how to prolong or shorten the drug action and effects

9. Drug interactions and concept of pharmacogenomics/-genetics in drug action, effects and ADRs

10. Adverse drug reactions (ADRs) and role of pharmacovigilance activity in ADR monitoring

11. Concept of evidence-based medicine, essential medicines, pharmacoconomics,

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1 Pdrugs and rational prescribing

12. Development of new drugs : pre-clinical and clinical phases of drug evaluation
13. Scope and relevance of Clinical Pharmacology
14. Essential medicine, rationality of fixed dose combinations
15. Drug regulation acts and other legal aspects

(b) Systemic Pharmacology – Drug oriented teaching

(Here a core information about drugs is to be given that should include pharmacological actions, mechanism of action, indications, contraindications, side effects, drug interactions, precautions etc.)

(II) Drugs Affecting Autonomic Nervous System (ANS)

16. Introduction to Pharmacology of ANS
17. Cholinergic drugs: cholinceptor agonist and cholinesterase inhibiting drugs
18. Anticholinergic drugs: cholinceptor blocking agents
19. Adrenergic drugs: adrenoceptor agonist and sympathomimetic drugs
- 20 Anti-adrenergic drugs: adrenoceptor antagonists and sympatholytic agents

(III) Drugs Affecting Peripheral Nervous System (PNS)

- 21 Local anaesthetics
22. Skeletal muscle relaxants

(IV) Drugs Affecting Cardiovascular System (CVS)

23. Drugs affecting vascular tone and volume of circulation, renin angiotensin system and other mechanisms affecting this system
24. Antihypertensive drugs
25. Anti-anginal drugs, management of Myocardial Infarction
26. Drugs for heart failure
27. Anti-arrythmic agents
28. Anti-dyslipidemic agents, drugs used in peripheral vascular disease
29. Nitric oxide donors and inhibitors and basic concepts of treatment of shock

(V) Drugs Affecting Autacoids, Inflammation and Gout

30. Histamine, serotonin & their antagonists, treatment of migraine
31. Prostaglandins, Leukotrienes, Platelet activating factor
32. Non Steroidal Anti inflammatory Drugs
34. Drug treatment of gout, rheumatoid arthritis & other autoimmune diseases

(VI) Drugs Affecting Kidney Function

35. Diuretics
36. Antidiuretics

(VII) Drugs Affecting Respiratory System

37. Antitussives, expectorants, mucolytics
38. Drug treatment of bronchial asthma, Chronic Obstructive Pulmonary disease

(VIII) Drugs Affecting Gastro-intestinal System

39. Drugs for gastric acidity, peptic ulcer & Gastro esophageal reflux disease

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40. Antiemetic and prokinetic agents
41. Drugs for constipation and Inflammatory Bowel Disease
42. Antidiarrhoeal agents

(IX) Drugs Acting on Blood

43. Agents used to treat anemias and haematopoietic growth factors
44. Coagulants and anticoagulants
45. Antiplatelet drugs
46. Fibrinolytic, antifibrinolytic, plasma expanders

(X) Drugs Affecting Central Nervous system

47. Introduction and basic concepts of drugs affecting CNS activity: Neurotransmitters and their pathways and important sites of Central Nervous System effect of drugs
48. Sedative hypnotic drugs
49. General anaesthetics with preanaesthetic medications
50. Antiepileptic drugs
51. Antipsychotic drugs
52. Antianxiety drugs
53. Antidepressant and antimaniac drugs
54. Opioid analgesic and antagonists
55. Antiparkinsonian drugs and drugs for other neurodegenerative and movement disorders
56. Pharmacology of ethyl alcohol and other alcohols
57. Pharmacology of CNS stimulants, psychomimetic drugs, drug dependence and substance abuse

(XI) Drugs Affecting Endocrine System and its Diseases

58. Pharmacology of pituitary and hypothalamic hormones
59. Thyroid hormones and antithyroid drugs
60. Estrogen, progesterone and inhibitors
61. Oral contraceptives & Hormone replacement therapy
62. Androgen
63. Drugs for diabetes mellitus: Insulin and oral antidiabetic agents
65. Corticosteroids
66. Parathyroid hormones and drugs affecting calcium balance
67. Drugs acting on uterus
68. Drug treatment for infertility and erectile dysfunctions

(XII) Pharmacology of Chemotherapeutic Agents

69. Introduction and basic principles of chemotherapy of infection, infestation and neoplastic diseases and concepts of resistance to chemotherapeutic agents
70. Sulfonamides
71. Quinolones
72. Beta lactam antibiotics
73. Aminoglycosides
74. Macrolides and ketolides
75. Tetracycline and chloramphenicol
76. Oxazolidinones, streptogramin and other antibiotics
77. Antimycobacterial drugs, antitubercular drugs; treatment of MDR and XDR

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- tuberculosis
78. Antileprosy drugs
 - 79 Antifungal drugs
 80. Antimalarial drugs
 81. Antiamoebic and other antiprotozoal drugs
 82. Drugs used in filariasis and kalaazar
 83. Anthelmintic agents
 84. Antiviral, anti-AIDS drugs
 85. Chemotherapy of Urinary tract infection & Sexually transmitted diseases
 86. Basic principles of cancer chemotherapy
- (XIII) Immunopharmacology**
87. Vaccines, immunomodulators and treatment of transplant rejection disorders

(XIV) Miscellaneous Topics

88. Drugs acting on skin and mucous membrane
89. Vitamins, nutraceuticals and probiotics
90. Pharmacology of Diagnostic agents
91. Paediatric pharmacology
92. Geriatric pharmacology
93. Pharmacology of chelating agents
94. Indian Systems of Medicines

Appendix 2. Certifiable Competencies

	Certifiable competencies	Number required to certify
3.1	Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient	5
3.2	Perform and interpret a critical appraisal (audit) of a given prescription	3
3.3	Perform a critical evaluation of the drug promotional literature	3
3.5	To prepare and explain a list of P-drugs for a given case/condition	3

Appendix 3

M.B.B.S. STUDENT'S LOG BOOK (PHARMACOLOGY)

GENERAL INSTRUCTIONS

1. This logbook is a record of the academic/co-curricular activities in Pharmacology of the designated student.
2. The student is responsible for getting the entries in the logbook verified by the faculty in-charge in the next class.

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3. Entries in the Logbook will reflect the activities undertaken in the department of Pharmacology during your course.

4. The student has to get this logbook verified by the mentor and the Head of the department before submitting the application of the University examination.

The log book must have

- 1) Details of Students
Name
Roll Number
- 2) Details of attendance
- 3) Details of all skill based exercises done
- 4) Details of Certifiable skills
- 5) Details of group discussions/ presentations
- 6) Details of any project work done
- 7) Any other Cocurricular activity related to the subject

A format for **Certifiable skill**

Skill: PH 3.1 Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient

Domain: Skills

Level of competency: Perform

Core: Yes

The student has to perform this activity- Present **five** prescription for common diseases for certification.

Exercise name	Date	Completed		Rating		
		Yes	No	Below expectations	Meet expectations	Exceed expectations

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LOG BOOK CERTIFICATE

This is to certify that the candidate Ms _____ Reg No. _____, admitted in the year _____ in the _____ Medical college, New Delhi, has satisfactorily completed / has not completed all assignments / requirements mentioned in this logbook for Second year MBBS course in the subject of Pharmacology during the period from _____ to _____. She/ is/is not eligible to appear for the summative (University) assessment as on the date given below.

Signature of Faculty Name and Designation

Countersigned by Head of the Department

Jyoti
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Dypte
24/1/22

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Sandeep
24/1/22

V. Ravi
23.7.21

