















## COMMON POOL OF GENERIC ELECTIVES (GE) COURSES

**NOTE:** The core papers offered in the B.Tech. Course at CIC are Mathematics and Information Technology. Therefore, the students will choose GE offered by Physics, Chemistry, Management and Computational Biology faculty members of CIC.

### GENERIC ELECTIVES (GE-3.1): Economic Behaviour

#### Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course	Department offering the course
		Lecture	Tutorial	Practical/ Practice			
<b>GE 3.1: Economic Behaviour</b>	4	3	1	0	Class XII pass	NIL	Management Faculty of CIC

#### Learning Objectives

The purpose of this course is to familiarize the student with the present day modern economics that is both intuitive and relevant to the students. The course introduces the generally accepted concepts of economics both at the micro and macro level. In addition to this, the purpose of this course is to analyse how individual decision-makers, both consumers and producers and the government policies, behave in a variety of economic environments.

#### Learning outcomes

After completing this course, student should be able to:

- Understand of the basic structure of the economic ecosystem.
- Conception, of how individuals and firms allocate resources and how market prices are determined.
- Able to understand shifts in supply and demand and their implications for price and quantity sold.
- Understand of how to analyse firms' decisions mathematically using a production function and calculate their optimal level of production, costs, and profits.



- Learn to model the decisions made by firm in a monopoly and an oligopoly, and the implications of these alternate structures for consumer welfare.
- Learn to perceive the nation's economy as a whole and compare the views of Keynes and the classical economists.
- Learn various techniques measuring and tracking macroeconomics using GDP and CPI.
- Analyse the model of full employment and use it to examine important macroeconomic issues, such as the extent to which taxes may depress economic activity and lower the level of GDP.

## SYLLABUS

**Unit I:** The Economic Problem: Scarcity and Choice; Market economies and the price system; Variables, correlation and causation; Recommending appropriate policies **[9 hours]**

**Unit II:** The supply and demand model; Elasticity of supply and demand; Market equilibrium; Demand curve and behaviour of consumers; Supply curve and behaviour of firms **[12 hours]**

**Unit III:** Efficiency of markets; Rise and fall of industries; Monopoly; Antitrust policy; Taxes, transfers and income distributions **[12 hours]**

**Unit IV:** Unemployment, inflation and interest rates; Macroeconomic theory and policies; Measuring theoretical and actual GDP **[12 hours]**

### Essential/recommended readings

1. Principles of Economics, J.B. Taylor and A. Weerapana, Flatworld, 9<sup>th</sup> Edition, 2021.
2. Principles of Economics, K. E. Case, R. C. Fair and S. C. Oster, Pearson Education, 13<sup>th</sup> Edition, 2019.
3. Principles of Economics, N. G. Mankiw, Cengage, 9<sup>th</sup> Edition, 2021.

**Note:** Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

**GENERIC ELECTIVES (GE-3.2): Electronic Circuit elements and innovation lab**

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course	Department offering the course
		Lecture	Tutorial	Practical/ Practice			
<b>GE 3.2: Electronic Circuit Elements and Innovation Lab</b>	4	2	0	2	Class XII pass	<b>Mathematics till XII</b>	Physics/ Electronics Faculty of CIC

**Learning Objectives**

This module involves interactive learning of A.C. fundamentals. It helps to understand the basic network analysis of electronic circuits. It also provides the interface to understand the working of various electronic devices and its characteristics. Working of electronic instruments will also be understood.

**Learning outcomes**

- After completing this course, student should be able to;
- Concepts of AC fundamentals
- Good knowledge of Network Analysis
- Basics of Diodes and Transistor based devices
- Knowledge of instruments like CRO, Function Generator, Multimeter, etc.

**SYLLABUS**

**Unit I:** AC Fundamentals - Concept of voltage and current sources - KVL and KCL - Node voltage analysis and method of mesh currents - Network theorems **[8 hours]**

**Unit II:** PN Junction: variants and applications - Bipolar Junction Transistor (BJT) biasing and amplifier design - Field Effect Transistor (FET) variants – FET biasing and amplifier design **[6 hours]**

**Unit III:** Structure and working of SCR. Structure and operation of LDR, Photo voltaic cell, Photo diode, Photo transistors & LED **[8 hours]**

**Unit IV:** Operational Amplifiers basics and practical circuits - Feedback and oscillator circuits - Voltmeters-Multimeters-Function generator- Cathode ray oscilloscope - Cathode Ray Tube **[8 hours]**

**Practical component – [60 hours]**

- Engineering Kitchen Activity (matrix based numerical mathematics software) [Laboratory]
- Characteristics of PN junction and Zener diode filters
- Half wave rectifier.
- Full wave rectifier with 2 diodes.
- LC and Pi filters
- Full wave rectifier with 4 diodes (Bridge rectifier). Input, Output and Transfer characteristics of CE and CC Amplifier.
- Amplifiers and Oscillator characteristics.
- Characteristics of LDR, Photo-diode and Phototransistor.
- Transfer characteristics of JFET.
- Transfer characteristics of MOSFET (with depletion and enhancement mode)
- Characteristics of LED with three different wavelengths.
- Series voltage Regulator.
- Shunt voltage Regulator.
- Characteristics of Thermistor.

#### **Essential/recommended readings**

1. Circuits and Networks - A.Sudhakar & Shyammoan S. Palli ,TMH, 2010
2. Principles of Electronics- V.K. Mehta and Rohit Mehta, S Chand &Co,2009
3. Electronic Devices and Circuit Theory-R.L.Boylestad and L.Nashelsky, Pearson Education, 2009.

**Note:** Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

**GENERIC ELECTIVES (GE-3.3): Flow of information in Living Systems**

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course	Department offering the course
		Lecture	Tutorial	Practical/ Practice			
<b>GE 3.3 Flow of Information in Living Systems</b>	4	2	0	2	Class XII pass	NIL	Chemistry / Biology Faculty of CIC

**Learning Objectives**

This module is designed to:

- Introduce students to nuclear events such as replication, transcription, translation, condensation, repair and recombination etc.
- Introduce gene regulation in prokaryotes and eukaryotes
- Introduce various biophysical and biochemical techniques related to these nuclear events

**Learning Outcomes**

Upon completion of the course the students will be able to:

- Understand the structure and function of DNA and RNA
- Build concept about the processes of the Central Dogma of the living systems (replication, transcription, translation, recombination etc.)
- Develop an understanding of prokaryotic and eukaryotic gene regulation

**SYLLABUS**

**Unit I:** Structure of the nucleic acids **[8 hours]**

Structure and biophysical properties of the DNA and RNA, forms of DNA and RNA, DNA binding domains, the evolution of DNA

**Unit II:** Replication, Transcription and Translation **[8 hours]**

DNA replication models, Enzymes of DNA replication, DNA replication in prokaryotes and eukaryotes, regulation of DNA replication;

RNA polymerases, Transcription in prokaryotes, Eukaryotic transcription, Regulation of transcription in Prokaryotes and Eukaryotes, Eukaryotic chromatin

Ribosomes, translation in prokaryotes, translation in eukaryotes

**Unit III:** DNA repair and recombination

**[8 hours]**

Energetics and accuracy of information transfer, DNA damage and repair, Molecular recombination

**Unit IV:** DNA packaging and chromatin structure, regulation of gene expression in eukaryotes

**[6 hours]**

**Practical Component**

**[60 hours]**

- Agarose gel electrophoresis of DNA/ Proteins
- SDS-PAGE Electrophoresis
- Polymerase Chain Reaction (PCR)
- Primer design
- Spectrometry
- Modelling of DNA and RNA forms and motifs through computational tools

**Essential/recommended readings**

- 1 Biology, Raven et al. Tata Mc Graw –Hill, 2013
2. Biology: Global Approach. Reece et al., Pearson Educations, Global edition, 2014

**Note:** Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

## GENERIC ELECTIVES (GE-3.4): Explorations in Living Systems

### CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course	Department offering the course
		Lecture	Tutorial	Practical/ Practice			
<b>*GE 3.4 Explorations in Living Systems</b>	4	2	0	2	Class XII pass	NIL	Chemistry / Biology Faculty of CIC

**\*GE 3.4 can be opted by students in either 3<sup>rd</sup> or 4<sup>th</sup> semester.**

### Learning Objectives

This module is designed to:

- Introduce students to the living system in terms of their hierarchal organization and their distinction from the nonliving.
- The specific objective of the module is to introduce biology even to students with no biology background and enable them to understand living systems.
- To enthuse students with tools and techniques for studying biology.
- Introduce students to the origin and evolution of living systems
- Introduce students to the essence of model organisms for studying biology

### Learning outcomes

After studying this course, the students will be able to:

- Understand the diversity and complexity of living systems
- To comprehend different fields within Bio-Sciences
- To understand experimental processes undertaken in Biology
- Will develop a philosophical understanding of the origin and evolution of living systems, the nature of genetic materials etc.

## SYLLABUS

### **Unit I: Introduction and organization of living systems [6 hours]**

Introduction to living state: (living versus non-living), Hierarchy of organization of living systems and classification (cellular, multicellular and organismic and population levels), Cell as the unit of life.

### **Unit II: Origin and diversification of the living systems [8 hours]**

Nature of the genetic material (DNA versus RNA), Introduction to molecular evolution, Origin of life, Evidence of evolution, Theories of evolution, Creating living systems (synthetic cell).

### **Unit III: Designing living systems [8 hours]**

Nature of biological processes - Approaches to study Biology: Observational and Experimental, Physiology and Behaviour

### **Unit IV: Tools and materials for studying living systems [8 hours]**

Observational, synthetic and reductionist approaches for studying living organisms, Microscopy, Centrifugation and separation techniques as basic tools for studying components of living systems, Model organisms.

### **Practical components [60 hours]**

#### **Basic equipment and techniques**

- a. Observation or permanent slides of pollens, microbes, hydra, Daphnia and bacteria under a microscope
- b. Separation techniques:
  - Fraction of cell organelles through centrifugation
  - Separation of chlorophyll pigments by paper chromatography

#### **Exploring different levels of organization (using model organisms)**

- a. Tissue organization and diversity in cell shapes: studying through plant and animal tissues sections
- b. Inflorescence as a model of organization
- c. Understanding parts of the flower

#### **Studying cells:**

- a. Bacterial growth curve analysis
- b. Genomic DNA isolation
- c. Preparation of metaphase chromosome
- d. Preparation of karyotypes using photographs of metaphase spreads
- e. Demonstration of osmosis and plasmolysis

#### **Essential/recommended readings**

1. *Biology*, Raven et al., Tata McGraw-Hill, 2013.
2. *Biology: Global Approach*. Reece et al., Pearson Educations, Global edition, 2014.

## B.A. Honors (Humanities & Social Sciences)

B.A. Honours (Humanities & Social Sciences) is being run under the meta-college concept. In the 3<sup>rd</sup> semester the DSCs, VACs, SECs, AECs, will be chosen by the students in the constituent colleges/centres/departments of the University of Delhi. However, the students will be choosing the 3<sup>rd</sup> semester DSEs at CIC only. The list of the DSEs is the following:

### DISCIPLINE SPECIFIC ELECTIVE (DSE-01A): Socially Engaging with the Human World

#### Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
Socially Engaging with the Human World (DSE-01A)	4	0	0	4	Class XII Pass	Nil

#### Learning Objectives

- To make students understand the complexity and contours of a social problem.
- To make students learn to identify a social problem.
- To design strategies and solutions using a multi-pronged trans-disciplinary approach towards social interventions.

#### Learning Outcomes

- Students will learn the complexity of a social problem.
- Students will learn to identify a social problem.
- Students will be able to design strategies to address the identified social problem using innovative means.

#### OUTLINE OF DSE-01A

It has become imperative for us as a society to engage with issues arising out of social formations and their interaction with social institutions. This approach is useful from an individual's as well as society's perspective, specially keeping in view its implications for public policy, governance and larger social wellbeing. This paper will be offered entirely in the practical mode. This is an intervention-based module and therefore the students will be guided to identify a problem arising out of any social, cultural,



economic, political issue which has larger implications for human society in general and Indian demography in particular. After identifying the problem, the students will be mentored to design a feasible strategy to address the identified problem by suggesting and practicing innovative means and tools such as organising: seminars and workshops, awareness campaigns, dialogue with communities, publishing research and newspaper articles, producing mass media programmes such as blogs, vlogs, documentaries/filmmaking, theatre interventions and interventions through translations, creative writing and other creative mediums. The students will be encouraged to involve various stakeholders, the concerting agencies and other communities pursuing similar goals.

**Suggestive Themes:**

- Understanding social formations
- Politics of identity
- Social institutions issues and challenges
- Public policy and the social groups
- Social and economic policies

**Practical component (if any) - 100 %**

**Note:** Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

**DISCIPLINE SPECIFIC ELECTIVE (DSE-01B): Gender Issues and Challenges in India**

**Credit distribution, Eligibility and Pre-requisites of the Course**

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
Gender Issues and Challenges in India (DSE-01B)	4	0	0	4	Class XII Pass	Nil

**Learning Objectives**

- To introduce students to the concept and issues of Gender and Gender Studies.
- To make students learn the issues around Gender and Gender Normativity.
- To make students learn to identify a social problem arising out of Gender issues.
- To train students to design strategies and solutions using a trans-disciplinary approach towards gender issues.

### Learning Outcomes

- Students will learn the concepts and issues around Gender and Gender Studies.
- The student will critically analyze Gender Normativity.
- Students will be able to design strategies and solutions towards gender issues.

### OUTLINE OF DSE-01B

As society it has become imperative for us to study the issues arising out of complexity of gender. To understand the complexity of gender the students not only need to engage with the recent debates related to gender but they are also required to practically examine the normative practices associated with the gender role. So, this paper will be offered entirely in the practical mode. It is an intervention-based module and therefore the students will be guided to identify a problem arising out of the complexity of gender and its larger implications for the individual and society. After identifying the problem, the students will be mentored to design a feasible strategy to address the identified problem by suggesting and practicing innovative means and tools such as challenging stereotypes, organising seminars and workshops, sensitisation campaigns, dialogue with communities, publishing research and newspaper articles, producing mass media programmes such as blogs, vlogs, documentaries/filmmaking, theatre interventions and interventions through translations, creative writing and other creative mediums. The students will be encouraged to involve various stakeholders, the concerting agencies and other communities pursuing similar goals.

### Suggestive Themes:

- Normative gender roles
- Challenges of transgender communities
- Gender rights movements
- Gender as a discourse
- Sexual abuse and sexual harassment
- Gender and economics
- Gender Identity

**Practical component (if any) - 100 %**

**Note:** Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

**DISCIPLINE SPECIFIC ELECTIVE (DSE-01C): Engaging with Emerging Human Rights Challenges**

**Credit distribution, Eligibility and Pre-requisites of the Course**

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
Engaging with Emerging Human Rights Challenges (DSE-01C)	4	0	0	4	Class XII Pass	Nil

**Learning Objectives**

- To make students learn the concepts and paradigms of Human Rights and Rights-based movements.
- To mentor students in identifying causes and concerns of Rights-based movements.
- To mentor students towards ideating and proposing solutions by involving key stakeholders in the process concerning the issue at hand.

**Learning Outcomes**

- The students will learn the concepts and paradigms of Human Rights and Rights-based movements.
- Students will learn identifying causes and concerns of Rights-based movements.
- Students will be equipped to ideate and propose solutions by involving key stakeholders in the process concerning the issue at hand.

**OUTLINE OF DSE-01C**

‘Engaging with Emerging Human Rights Challenges’ is an intervention-based paper. In this paper the students will be guided to identify a problem arising out of Human Rights issues such as social conflicts, human-nature conflicts, politics of rights-based movements, and movements of identity. After identifying the problem, the students will be mentored to design a feasible strategy to address the identified problem by suggesting and practicing innovative means and tools like challenging stereotypes, organising seminars and workshops, sensitisation campaigns, dialogue with communities, publishing research and newspaper articles, producing mass media programmes such as blogs, vlogs, documentaries/filmmaking, theatre interventions and interventions through translations, creative writing and other creative mediums. This paper will be offered entirely in the practical mode. The students will be encouraged to involve various stakeholders, the concerting agencies and other communities pursuing similar goals.

**Suggestive Themes:**

- Paradigms of human rights based movements
- Public policy and human rights
- The stateless people and the human rights issues

**Practical component (if any) - 100 %**

**Note:** Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

**DISCIPLINE SPECIFIC ELECTIVE (DSE-01D): Social Challenges and Sensitizations  
Concerning Marginalised Communities**

### Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical / Practice		
<b>Social Challenges and Sensitizations Concerning Marginalised Communities (DSE-01D)</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>Class XII Pass</b>	<b>Nil</b>

#### Learning Objectives

- To learn from the marginalized communities.
- To sensitize students about issues related to marginalized groups.
- To enable students to conceive and devise strategies and solutions using a trans-disciplinary approach towards issues of the marginalized.

#### Learning Outcomes

- The students will learn through the traditions and socio-cultural practices of the marginalized communities.
- The students will be sensitized about issues of marginalized groups. 3. The students will ideate and devise strategies and interventions using innovative approaches.

#### OUTLINE OF DSE-01D

To achieve the goal of social inclusion it is imperative for us to study the experiences of discrimination as well as the unequal power relationships of the society. This paper will introduce the students to not only the issues related to marginalised communities but they will also develop empathetic attitude towards such communities. It is an intervention-based module and therefore the students will be guided to identify a problem concerning marginalised communities such as the Scheduled Castes, Scheduled Tribes, Women, Persons with Disabilities, Gender-minorities, and the other subaltern groups. After identifying the problem, the students will be sensitised to understand the communication and other cultural barriers in order to establish a meaningful dialogue with the marginalised communities aimed at achieving a socially inclusive society. This paper will be offered entirely in the practical mode and the students will be encouraged to involve various stakeholders, the concerting agencies and other communities pursuing similar goals.

**Suggestive Themes:**

- Issues and challenges of scheduled castes and scheduled tribes
- Issues and challenges of persons with disabilities
- Issues and challenges of religious minorities and the other subaltern groups
- Public policy and the marginalised groups

**Practical component (if any) - 100 %**

**Note:** Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

**DISCIPLINE SPECIFIC ELECTIVE (DSE-01E): Preservation and Promotion of Linguistic Plurality and Cultural Diversity in India**

**Credit distribution, Eligibility and Pre-requisites of the Course**

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical / Practice		
Preservation and Promotion of Linguistic Plurality and Cultural Diversity in India (DSE-01E)	4	0	0	4	Class XII Pass	Nil

**Learning Objectives**

- To engage students with various cultural and linguistic traditions of India.

- To make students learn to appreciate the cultural and linguistic diversity of our country.
- To make students conceptualize strategies to preserve the lesser-known cultural, linguistic and traditional practices of India.

### Learning Outcomes

- The students will engage with various cultural and linguistic traditions of India.
- The students will learn to appreciate the cultural and linguistic diversity of our country.
- The students will learn to conceptualize strategies to preserve the lesser-known cultural, linguistic and traditional practices of India.

### OUTLINE OF DSE-01E

India is a country of diverse traditions with myriad of languages. The aim of this paper is to make students able to appreciate this rich cultural heritage and linguistic heterogeneity of India. Through this paper students will also learn about the various tools, techniques and practices to preserve the lesser-known cultures, languages and traditions of our country. This paper will be offered entirely in the practical mode. This is an intervention-based module and therefore the students will be guided to find solutions to preserve various cultural and linguistic traditions of India in order to achieve a culturally heterogeneous and linguistically plural society. The students will be mentored to design a feasible strategy to engage with the identified tradition by suggesting and practicing innovative means and tools such as organising workshops, seminars and talks, awareness campaigns, dialogue with communities, publishing research and newspaper articles, producing mass media programmes such as blogs, vlogs, documentaries/filmmaking, theatre interventions and interventions through translations, creative writing and other creative mediums. The students will be encouraged to involve various stakeholders, the concerting agencies and other communities pursuing similar goals.

### Suggestive Themes:

- Exploration and promotion of cultural festivals of India
- Preservation and practice of linguistic diversity of India
- Promotion of arts and crafts

### Practical component (if any) - 100

**Note:** Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

**DISCIPLINE SPECIFIC ELECTIVE (DSE-01F): Exploration and Promotion of Heritage of India**

**Credit distribution, Eligibility and Pre-requisites of the Course**

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course	Department offering the Course
		Lecture	Tutorial	Practical/ Practice			
Exploration and Promotion of Heritage of India (DSE-01F)	4	0	0	4	Class XII Pass	Nil	CIC

**Learning Objectives**

- To enable students explore the tangible and in-tangible Heritage of the Nation.
- To make students appreciate the rich heritage of India and its potential for our national growth.
- To mentor students-led intervention to restore, preserve and promote Heritage of India.

**Learning Outcomes**

- Students will explore the tangible and in-tangible Heritage of India.
- Students will be able to gauge the possible role of our National Heritage in contributing towards our development and economy.
- The students will lead interventions to restore, preserve and promote Heritage of India.

**OUTLINE OF DSE-01F**

Through this paper the students will be able to appreciate the vast contours of our geographical, spiritual, religious, architectural, aesthetical, musical, culinary, handicraft, and folk traditions. This is an intervention-based module and therefore the students will be guided to explore the tangible and in-tangible heritage of India. They will work towards promotion of our rich heritage by designing and conducting events like Heritage Walks, Nature Walks, Curating Exhibitions, organising: workshops, seminars and talks, awareness campaigns, dialogue with communities, publishing research and newspaper articles, producing mass media programmes such as blogs, vlogs, documentaries/filmmaking, theatre interventions and interventions through translations, creative writing and other creative mediums. This paper will be offered entirely in the practical mode. The students will be encouraged to involve various stakeholders, the concerting agencies and other communities pursuing similar goals.

**Suggestive Themes:**

- Promotion and preservation of lesser-known monuments
- Appreciating and promoting culinary traditions of India
- Exploration and awareness of folk arts and traditions
- Exploration and promotion of music and dance traditions of India
- Exploring biodiversity of India

**Practical component (if any) - 100 %**

**Note:** Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.