

### Mandatory Courses (MC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501AC01	Environmental Science	FC	2			0	100	-	100	-
2501AC02	Constitution of India	FC	2			0	100	-	100	-
2501AC03	Research Methodology	FC	2			0	100	-	100	-
2501AC04	Intellectual Property Rights & Patents	FC	2			0	100	-	100	-
2501AC05	Indian Knowledge Systems	FC	2			0	100	-	100	-
<b>Total</b>			<b>10</b>			<b>0</b>				

## Environmental Science

(Common to CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS), PT & Min.E)

<b>Course Code: 2501AC01</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>

### Course Outcomes:

**At the end of the course, student will be able to:**

- CO1:** Outline the natural resources and their importance for the sustenance of the life
- CO2:** Explain about the biodiversity of India, threats and its conservation methods
- CO3:** Illustrate various attributes of the pollution, impacts and measures to control the pollution along with waste management practices
- CO4:** Describe social issues of both rural and urban environment to combat the challenges and the legislations of India in environmental protection
- CO5:** Explain the population growth and its implications

### Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
<b>CO1</b>	1	-	-	-	1	-	2	-	-	-	-
<b>CO2</b>	1	-	-	-	-	-	3	-	-	-	-
<b>CO3</b>	-	-	-	-	2	-	3	-	-	-	1
<b>CO4</b>	-	-	-	-	1	-	3	1	-	-	1
<b>CO5</b>	-	-	-	-	-	-	3	-	-	-	-

### UNIT-I

**Multidisciplinary Nature of Environmental Studies:** Definition, Scope and Importance, Need for Public Awareness.

**Natural Resources:** Renewable and non-renewable resources – Natural resources and associated problems.

### UNIT-II

#### **Ecosystem, Biodiversity and Its Conservation:**

**Ecosystems:** Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers, and decomposers. Food chains, food webs and ecological pyramids.

**Biodiversity And Its Conservation:** Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Values of biodiversity. Hot-spots of biodiversity – Threats to biodiversity. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

### UNIT-III

**Environmental Pollution and Solid Waste Management:** Environmental Pollution: Definition, Cause, effects, and control measures of:

- a. Air Pollution.
- b. Water Pollution
- c. Soil Pollution

d. Marine Pollution

e. Noise Pollution

Solid Waste Management:

Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution

#### **UNIT-IV**

**Social Issues and The Environment:** Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to Energy & Water. Resettlement and rehabilitation of people, Environmental ethics, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents, and holocaust. Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act-Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

#### **UNIT-V**

**Human Population and The Environment:** Population growth, variation among nations. Environment and human health, Human Rights, Value Education. Role of Information Technology in Environment and human health.

#### **Text Books:**

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press, ISBN: 9788173718625
2. Environmental Studies by Palaniswamy – Pearson education, ISBN: 978-9332528277

#### **Reference Books:**

1. Textbook of Environmental Science, Deeksha Dave and E.Sai Baba Reddy, Cengage Publications. ISBN: 978-8131517604
2. Textbook of Environmental Sciences and Technology by M.Anji Reddy, B.S Publication. ISBN: 9385433385
3. Comprehensive Environmental studies by J.P.Sharma, Laxmi publications ISBN: 978-8170087380

#### **Web Links:**

1. <https://archive.nptel.ac.in/courses/127/105/127105018/>
2. [https://onlinecourses.swayam2.ac.in/cec24\\_ge05/preview](https://onlinecourses.swayam2.ac.in/cec24_ge05/preview)

### Constitution of India

(Common to CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS), PT & Min.E)

<b>Course Code: 2501AC02</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>

#### Course Outcomes:

At the end of the course, student will be able to:

- CO1** Explain historical background of the constitution making and its importance for building a democratic India
- CO2** Compare the functioning of three wings of the government i.e., executive, legislative and judiciary
- CO3** Interpret the value of the fundamental rights and duties for becoming good citizen of India
- CO4** Compare the decentralization of power between central, state and local self-government
- CO5** Extend the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.

#### Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
<b>CO1</b>	-	-	-	-	3	-	-	1	2	-	-
<b>CO2</b>	-	-	-	-	2	-	-	1	3	-	-
<b>CO3</b>	-	-	-	-	3	-	-	2	3	-	-
<b>CO4</b>	-	-	-	-	3	-	-	2	1	-	-
<b>CO5</b>	-	-	-	-	2	-	-	1	3	-	-

#### UNIT-I

**Introduction to Indian Constitution:** Constitution' meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

#### UNIT-II

**Union Government and its Administration Structure of the Indian Union:** Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions

#### UNIT-III

**State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organization, Structure and Functions**

#### UNIT-IV

**Local Administration:** District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation  
**Panchayati Raj:** Functions PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy

## UNIT – V

**Election Commission:** Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission:, Functions of Commissions for the welfare of SC/ST/OBC and women

### Text Books:

1. Introduction to the Constitution of India, Durga Das Basu, Prentice – Hall of India Pvt. Ltd. New Delhi. ISBN: 978-9388548861
2. Indian Constitution, Subash Kashyap, National Book Trust. ISBN: 9788123707341

### Reference Books:

1. Dynamics of Indian Government & Politics, J.A. Siwach ISBN: 9788120709768
2. Indian Government and Politics, D.C. Gupta ISBN: 9780706987782
3. Constitutional Law of India , H.M.Sreevai, 4<sup>th</sup> edition in 3 volumes (Universal Law Publication). ISBN: 9788194776529

### Web Links:

1. [nptel.ac.in/courses/109104045/](https://nptel.ac.in/courses/109104045/)
2. [nptel.ac.in/courses/101104065/](https://nptel.ac.in/courses/101104065/)

## Research Methodology

(Common to CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS), PT & Min.E)

<b>Course Code: 2501AC03</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>

### Course Outcomes:

**At the end of the course, student will be able to:**

- CO1:** Explain the characteristics and process of research.
- CO2:** Select the research problem by applying problem identification techniques.
- CO3:** Formulate and execute research design process.
- CO4:** Report the results of research process adhering to professional ethics.
- CO5:** Analyze the results of research using statistical measures of central tendency

### Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
<b>CO1</b>	1	-	-	2	-	-	-	-	-	2	1
<b>CO2</b>	1	-	-	2	-	-	-	-	-	2	1
<b>CO3</b>	1	-	-	2	-	-	-	-	-	2	1
<b>CO4</b>	1	-	-	2	-	-	-	3	-	2	1
<b>CO5</b>	1	-	-	2	2	-	-	-	-	2	1

### Unit – I

**Meaning of Research:** Function of Research - Characteristics of Research – Steps involved in Research – Research in Pure and Applied Sciences - Inter Disciplinary Research. Factors which hinder Research – Significance of Research - Research and scientific methods – Research Process– Criteria of good Research – Problems encountered by Researchers – Literature review.

### UNIT-II

**Identification of Research Problem:** Selecting the Research problem – Necessity of defining the problem – Goals and Criteria for identifying problems for research. Perception of Research problem – Techniques involved in defining the problem

### UNIT-III

**Research Design:** Formulation of Research design – Need for Research design – Features of a good design – Important concepts related to Research design.

### UNIT-IV

**Interpretation and Report Writing:** Meaning and Technique of interpretation – Precautions in interpretation – Significance of report writing – Different steps in writing a report – Layout of a Research report.

### Unit – V

**Statistical Techniques and Tools:** Introduction of statistics – Functions – Limitations – Measures of central tendency - Arithmetic mean – Median – Mode – Standard deviation – Co-efficient of variation (Discrete series and continuous series) – Correlation - Regression

**Text Books:**

1. Research Methodology Methods & Techniques, C.R. Kothari – New Age international Publishers, Reprint. ISBN: 9788122415223
2. A Hand Book of Methodology of Research, Rajammall, P. Devadoss and K. Kulandaivel, RMM Vidyalaya press. ISBN: 9780367135720

**Reference Books:**

1. Thesis and Assignment Writing, J. Anderson, Wiley Eastern Ltd. ISBN: 978-8126530755
2. Research Methodology, Mukul Gupta, Deepa Gupta – PHI Learning Private Ltd., New Delhi. ISBN: 9788120349469
3. Fundamentals of Mathematical statistics, S.C. Gupta and V.K. Kapoor, Sultan Chand & Sons, New Delhi. ISBN: 978-8180545283

**Web Links:**

1. <https://nptel.ac.in/courses/127106227>
2. <https://archive.nptel.ac.in/courses/121/106/121106007/>

**Intellectual Property Rights & Patents**  
(Common to CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS), PT & Min.E)

<b>Course Code: 2501AC04</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Course Outcomes:**

**At the end of the course, student will be able to:**

- CO1:** Compare various types of Intellectual Property rights.
- CO2:** Discuss Intellectual Property and infer rights on such Intellectual Property owners
- CO3:** Explain the process of patenting
- CO4:** Apply for Trade marks and Copyrights.
- CO5:** Explain the methods to protect Trade secrets

**Mapping of Course Outcomes with Program Outcomes:**

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
<b>CO1</b>	1	-	-	-	-	1	-	3	-	-	2
<b>CO2</b>	1	-	-	-	-	1	-	3	-	-	2
<b>CO3</b>	1	-	-	-	-	1	-	3	-	-	2
<b>CO4</b>	1	-	-	-	-	1	-	3	-	-	2
<b>CO5</b>	1	-	-	-	-	1	-	3	-	-	2

**UNIT-I**

**Introduction to Intellectual Property Rights (IPR):** Concept of Property - Introduction to IPR – International Instruments and IPR - WIPO - TRIPS – WTO –Laws Relating to IPR - IPR Tool Kit - Protection and Regulation - Copyrights and Neighboring Rights – Industrial Property – Patents - Agencies for IPR Registration – Traditional Knowledge –Emerging Areas of IPR – Layout Designs and Integrated Circuits – Use and Misuse of Intellectual Property Rights.

**UNIT-II**

**Copyrights and Neighboring Rights:** Introduction to Copyrights – Principles of Copyright Protection – Law Relating to Copyrights - Subject Matters of Copyright – Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works –Rights of Distribution – Rights of Performers – Copyright Registration – Limitations – Infringement of Copyright – Relief and Remedy – Case Law - Semiconductor Chip Protection Act.

**UNIT-III**

**Patents:** Introduction to Patents - Laws Relating to Patents in India – Patent Requirements – Product Patent and Process Patent - Patent Search - Patent Registration and Granting of Patent - Exclusive Rights – Limitations - Ownership and Transfer — Revocation of Patent – Patent Appellate Board - Infringement of Patent – Double Patenting — Patent Cooperation Treaty – New developments in Patents – Software Protection and Computer related

Innovations.

## **UNIT-IV**

**Trademarks and Trade secrets:** Introduction to Trademarks – Laws Relating to Trademarks – Functions of Trademark – Distinction between Trademark and Property Mark – Marks Covered under Trademark Law - Trade Mark Registration – Trade Mark Maintenance – Transfer of rights - Deceptive Similarities - Likelihood of Confusion - Dilution of Ownership – Trademarks Claims and Infringement – Remedies – Passing off Action - Introduction to Trade Secrets – General Principles - Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreements.

## **Unit – V**

**Cyber Law and Cyber Crime:** Introduction to Cyber Law – Information Technology Act 2000 - Protection of Online and Computer Transactions - E-commerce - Data Security – Authentication and Confidentiality - Privacy - Digital Signatures – Certifying Authorities - Cyber Crimes - Prevention and Punishment – Liability of Network Providers. Relevant Cases Shall be dealt where ever necessary.

### **Text Books:**

- 1 Fundamentals of IPR for Engineers- Kompal Bansal & Parishit Bansal, B. S. Publications (Press). ISBN: 9788178002774
- 2 Intellectual Property -Deborah E.Bouchoux, Third Edition, Cengage Learning, New Delhi. ISBN: 0 340 67786 4

### **Reference Books:**

- 1 Intellectual property rights- Prabuddha Ganuli, Tata Mcgraw hill. ISBN: 978-0070077171
- 2 Intellectual property rights M.Ashok kumar and Mohd.Iqbal Ali:, Serials Publications ISBN: 9788183871648
- 3 Intellectual Property Rights (Patents & Cyber Law), Dr. A. Srinivas. Oxford University Press, New Delhi. ISBN: 979-8886848229
- 4 Intellectual Property- Richard Stim, Cengage Learning, New Delhi. ISBN: 978-0766826656

### **Web Links:**

- 1 <http://www.wipo.int/portal/en/index.html>
- 2 <https://indiankanoon.org/>
- 3 <http://www.ipindia.nic.in/patents.htm>
- 4 <http://www.ipindia.nic.in/trade-marks.htm>
- 5 <http://copyright.gov.in>

## Indian Knowledge Systems

(Common to CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS), PT & Min.E)

<b>Course Code: 2501AC05</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>

### Course Outcomes:

**At the end of the course, student will be able to:**

- CO1:** Apply biological engineering principles, procedures needed to solve real-world problems.
- CO2:** Demonstrate the fundamentals of living things, their classification, cell structure and biochemical constituents.
- CO3:** Apply the concept of plant, animal and microbial systems and growth in real life Situations.
- CO4:** Explain genetics and the immune system to know the cause, symptoms, diagnosis and treatment of common diseases.
- CO5:** Demonstrate basic knowledge of the applications of biological systems in relevant industries and knowledge of transgenic plants and animals for the benefit of society.

### Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
CO1	-	-	-	-	-	2	1	2	-	-	3
CO2	-	-	-	-	-	1	3	1	-	-	2
CO3	-	-	-	-	-	2	1	2	-	-	3
CO4	-	-	-	-	-	1	3	1	-	-	3
CO5	-	-	-	-	-	1	3	1	-	-	2

### UNIT – I

**Introduction to life:** Characteristics of living organisms-Basic classification-cell theory-structure of prokaryotic and eukaryotic cell Introduction to biomolecules: definition-general classification and important functions of carbohydrates-lipids proteins-nucleic acids vitamins and enzymes-genes and chromosome.

### UNIT – II

**Biodiversity Plant System:** basic concepts of plant growth-nutrition-photosynthesis and nitrogen fixation Animal System: elementary study of digestive-respiratory-circulatory-excretory systems and their functions

**Microbial System:** history-types of microbes-economic importance and control of microbes.

### UNIT – III

Genetics and immune system: Evolution: theories of evolution-Mendel's cell division-mitosis and meiosis-evidence of e laws of inheritance-variation and speciation- nucleic acids as a genetic material-central dogma

Immunity antigens-antibody-immune response

## UNIT – IV

**Human diseases:** Definition- causes, symptoms, diagnosis, treatment and prevention of diabetes, cancer, hypertension, influenza, AIDS and Hepatitis.

## UNIT – V

**Biology and its industrial applications:** Transgenic plants and animal , stem cell and tissue engineering, bioreactors, bio-pharming, recombinant vaccines, cloning-drug discovery, biological neural networks, bioremediation, bio-fertilizer, bio-control, bio-filters, bio-sensors, bio-polymers, bio-energy, bio-materials, biochips, basic biomedical instrumentation

### Text Books:

- 1 A Text book of Biotechnology, R.C.Dubey, S. Chand Higher Academic Publications. ISBN: 9789355010537.
- 2 Diseases of the Human Body, Carol D. Tamparo and Marcia A. Lewis, F.A. Davis Company. ISBN-13. 978-0803605640
- 3 Biomedical instrumentation, Technology and applications, R. Khandpur, McGraw Hill Professional. ISBN-13 978-0071447843

### Reference Books:

- 1 Biology for Engineers, Arthur T. Johnson, CRC Press, Taylor and Francis. ISBN : 9781351165648
- 2 Cell Biology and Genetics (Biology: The unity and diversity of life Volume I), Cecie Starr, Ralph Taggart, Christine Evers and Lisa Starr, Cengage Learning. ISBN-13: 978-1305251243
- 3 Biotechnology Expanding horizon, B.D. Singh, Kalyani Publishers. ISBN: 9327222989, 9789327222982.

### Web Links:

- 1 <https://www.biology-online.org/>
- 2 <http://www.biologyreference.com/>
- 3 <http://www.allexperts.com/browse.cgi?catLvl=2&catID=229>
- 4 <https://www.library.qmul.ac.uk/subject-guides/biological-sciences>