SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
Computer Science & Engineering
First Year B.Tech (SEMESTER – I) W.E.F. A.Y. 2023-24 (R20)

Course Code	Category	Course Title	Scheme of Instruction (Hours per week)				Scheme of Examination (Maximum marks)			No. of Credits
			L	T	P	Total	CIE	SEE	Total	
20CS101/ MA01	BS	Linear Algebra and Ordinary Differential Equations	2	1	0	3	30	70	100	3
20CS102/ CY01	BS	Engineering Chemistry	3	0	0	3	30	70	100	3
20CS103/ EL01	HS	Communicative English	3	0	0	3	30	70	100	3
20CS104/ CS02	ES	Introduction to Problem Solving	1	0	4	5	30	70	100	3
20CSL101/ CSL03	ES	Computer Fundamentals Lab	0	0	3	3	30	70	100	1.5
20CSL102/ CYL01	BS	Chemistry Lab	0	0	3	3	30	70	100	1.5
20CSL103/ ELL01	HS	English Communication skills Lab	0	0	3	3	30	70	100	1.5
20CS105/ MC01	MC	Environmental Studies	2	0	0	2	30	0	30	0
TOTAL			**11**	**1**	**13**	**25**	**240**	**490**	**730**	**16.5**
INDUCTION PROGRAM	First Three Weeks (Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Familiarization to Dept./Branch & Innovations)									

L: Lecture T: Tutorial P: Practical
CIE: Continuous Internal Evaluation SEE: Semester End Examination

Linear Algebra and Ordinary Differential Equations

I B.Tech – I Semester (Code: 20CS101/MA01)

Lectures	:	2 Hours/Week, 1 Hour Tutorial	Continuous Assessment	:	30
Final Exam	:	3 Hours	Final Exam Marks	:	70

Pre-Requisite: None.

Course Objectives: Students will be able to

- Learn about solving a system of linear homogeneous and non-homogeneous equations, finding the inverse of a given square matrix and also its Eigen values and Eigen vectors.
- Identify the type of a given differential equation and select and apply the appropriate Analytical technique for finding the solution of first order and higher order ordinary differential equations.
- Create and analyze mathematical models using first and second order differential equations to solve application problems that arises in engineering.
- To learn about solving linear Differential equations with constant coefficients with the given initial conditions using Laplace transform technique.

Course Outcomes: Students will be able to

CO-1	Find the eigen values and eigen vectors of a given matrix and its inverse.
CO-2	Apply the appropriate analytical technique to find the solution of a first order ordiniary differential equation.
CO-3	Solve higher order linear differential equations with constant coefficients arise in engineering applications.
CO-4	Apply Laplace transform to solve differential equations arising in engineering

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO-1	3	3	2	-	2	-	-	-	-	-	-	2	-	-	-
CO-2	3	3	3	-	2	-	-	-	-	-	-	2	-	-	-
CO-3	3	3	3	-	-	-	-	-	-	-	-	2	-	-	-
CO-4	3	3	3	-	1	-	-	-	-	-	-	2	-	-	-

UNIT-1 12 Hours

Linear Algebra: Rank of a Matrix; Elementary transformations of a matrix; Gauss-Jordan method of finding the inverse;

Consistency of linear System of equations: Rouches theorem, System of linear Non-homogeneous equations, System of linear homogeneous equations; vectors; Eigen values; properties of Eigen values (without proofs); Cayley-Hamilton theorem (without proof).

[Sections: 2.7.1; 2.7.2; 2.7.6; 2.10.1; 2.10.2; 2.10.3; 2.12.1; 2.13.1; 2.14; 2.15.]

UNIT-2 12 Hours

Differential Equations of first order: Definitions; Formation of a Differential equation; Solution of a Differential equation; Equations of the first order and first degree; variables separable; Linear Equations; Bernoulli's equation; Exact Differential equations.

Equations reducible to Exact equations: I.F found by inspection, I.F of a Homogeneous equation, In the equation M dx+ N dy=0.

Applications of a first order Differential equations: Newton's law of cooling; Rate of decay of Radio-active materials. [Sections: 11.1; 11.3; 11.4; 11.5; 11.6; 11.9; 11.10; 11.11; 11.12.1; 11.12.2; 11.12.4; 12.6; 12.8]	
UNIT-3	12 Hours
Linear Differential Equations: Definitions; Theorem; Operator D; Rules for finding the complementary function; Inverse operator; Rules for finding the Particular Integral; Working procedure to solve the equation; Method of Variation of Parameters; **Applications of Linear Differential Equations:** Oscillatory Electrical Circuits. [Sections: 13.1; 13.2.1; 13.3; 13.4; 13.5; 13.6; 13.7;13.8.1;14.1;14.5]	
UNIT-4	12 Hours
Laplace Transforms: Definition; conditions for the existence; Transforms of elementary functions; properties of Laplace Transforms; Transforms of derivatives; Transforms of integrals; Multiplication by t^n; Division by t; Inverse transforms- Method of partial fractions; Other methods of finding inverse transforms; Convolution theorem(without proof); **Application to differential equations**: Solution of ODE with constant coefficients using Laplace transforms. [Sections:21.2.1; 21.2.2; 21.3; 21.4; 21.7; 21.8; 21.9; 21.10; 21.12; 21.13; 21.14; 21.15.1]	
Text Books :	B.S.Grewal, "Higher Engineering Mathematics", 44thedition, Khanna publishers, 2017.
References :	1. ErwinKreyszig, "Advanced Engineering Mathematics", 9th edition, John Wiley & Sons. 2. N.P.Bali and M.Goyal, "A Text book of Engineering Mathematics" Laxmi Publications, 2010.

Engineering Chemistry

I B. Tech. – II Semester (Code: 20CS102/CY01)

Lectures	:	3 Hours/Week	Continuous Assessment	:	30
Final Exam	:	3 Hours	Final Exam Marks	:	70

Pre-Requisite: None.

Course Objectives: Students will be able to

- With the principles of water characterization and treatment of water for industrial purposes and methods of producing water for potable purposes.
- To understand the thermodynamic concepts, energy changes, concept of corrosion & its control.
- With the conventional energy sources, solid, liquid and gaseous Fuels & knowledge of knocking and anti-knocking characteristics
- With aim to gain good knowledge of organic reactions, plastics, conducting polymers & biodegradable polymers.

Course Outcomes: Students will be able to

CO-1	Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost
CO-2	Apply their knowledge in converting various energies of different systems and protection of different metals from corrosion
CO-3	Have the capacity of applying energy sources efficiently and economically for various needs.
CO-4	With aim to gain good knowledge of organic reactions, plastics, conducting polymers & biodegradable polymers

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO-1	2	3	2	3	-	2	3	-	-	-	-	3	-	2	-
CO-2	2	3	2	3	-	2	3	-	-	-	-	3	2	-	-
CO-3	2	3	2	3	-	2	3	-	-	-	-	3	-	-	3
CO-4	2	3	3	3	-	2	3	-	-	-	-	3	2	-	-

UNIT-1 12 Hours

Introduction: water quality parameters
Characteristics: Alkalinity, Hardness **-** Estimation & simple numerical problems,
Boiler Troubles - Sludges, Scales, Caustic embrittlement, boiler corrosion, Priming and foaming;
Internal conditioning- phosphate, calgon and carbonate methods.
External conditioning - Ion exchange process & Zeolite process WHO Guidelines, Potable water, Sedimentation, Coagulation, Filtration.
Disinfection methods: Chlorination, ozonization and UV treatment.
Salinity – Treatment of Brackish water by Reverse Osmosis and Electrodialysis.

UNIT-2 12 Hours

Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications.
Corrosion: Types of corrosion - Chemical or dry corrosion, Electrochemical or wet corrosion; Galvanic, stress, pitting and differential aeration corrosion; Factors effecting corrosion, **Corrosion control** – Cathodic protection, and electro plating (Au) & electrodes Ni plating.

UNIT-3	12 Hours
Fuels: Classification of fuels; Calorific value of fuels (lower, higher) **Solid fuels**: Determination of calorific value (Bomb Calorimeter) & related problems, Coal ranking. **Liquid Fuels:** Petroleum refining and fractions, composition and uses. Knocking and anti- knocking Agents, Octane number and Cetane number; Bio fuels- Biodiesel, general methods of preparation and advantages **Gaseous fuels:** CNG and LPG, **Flue gas analysis –** Orsat apparatus.	
UNIT-4	12 Hours
Organic reactions and synthesis of a drug molecule Introduction to reactions involving substitution (SN^1, SN^2), addition (Markownikoff's and anti-Markwnikoff's rules) , elimination (E_1& E_2), Synthesis of a commonly used drug molecule.(Aspirin and Paracetamol) **Polymers:** Conducting polymers: Classification, Intrinsic and Extrinsic conducting polymers and their applications**.** Plastics: Thermoplasts and thermosetting plastics, Bskelite and PVC. Bio degradable polymers: types, examples-Polyhydroxybuterate (PHB), Polyhydroxybuterate-co-β-hydroxyvalerate (PHBV), applications.	
Text Books :	1. P.C. Jain and Monica Jain, "Engineering Chemistry" DhanpatRai Pub, Co., New Delhi 17th edition (2017). 2. SeshiChawla, "Engineering Chemistry" DhanpatRai Pub, Co LTD, New Delhi 13 th edition, 2013.
References :	1. Essential of Physical Chemistry by ArunBahl, B.S. Bahl, G.D.Tuli, by ArunBahl, B.S. Bahl, G.D.Tuli, Published by S Chand Publishers, 12th Edition, 2012. 2. Engineering Chemistry by C.P. Murthy, C.V. Agarwal, A. Naidu B.S. Publications, Hyderabad (2006). 3. Engineering Chemistry by K. Maheswaramma, Pearson publishers 2015.

Communicative English

I B. Tech. – I Semester (Code: 20CS103/EL01)

Lectures	:	3 Hours/Week	Continuous Assessment	:	30
Final Exam	:	3 Hours	Final Exam Marks	:	70

Pre-Requisite: None.

Course Objectives: Students will be able to

- To comprehend the importance, barriers and strategies of listening skills in English.
- To illustrate and impart practice Phonemic symbols, stress and intonation.
- To practice oral skills and receive feedback on learners' performance.
- To practice language in various contexts through pair work, role plays, group work and dialogue conversations

Course Outcomes: Students will be able to

CO-1	Understand how to build academic vocabulary to enrich their writing skills
CO-2	Produce accurate grammatical sentences
CO-3	Analyse the content of the text in writing
CO-4	Produce coherent and unified paragraphs with adequate support and detail

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO-1	-	-	-	-	-	-	-	2	2	3	2	2	-	2	-
CO-2	-	-	-	-	-	-	-	2	2	3	2	2	-	2	-
CO-3	-	-	-	-	-	-	-	2	2	3	2	2	-	2	-
CO-4	-	-	-	-	-	-	-	2	2	3	2	2	-	2	-

UNIT-1 12 Hours

1.1 **Vocabulary Development:** Word formation-Formation of Nouns, Verbs & Adjectives from Root words-Suffixes and Prefixes
1.2 **Essential Grammar:** Prepositions, Conjunctions, Articles
1.3 **Basic Writing Skills:** Punctuation in writing
1.4 **Writing Practices:** Mind Mapping, Paragraph writing (structure-Descriptive, Narrative, Expository & Persuasive)

UNIT-2 12 Hours

2.1 **Vocabulary Development:** Synonyms and Antonyms
2.2 **Essential Grammar:** Concord, Modal Verbs, Common Errors
2.3 **Basic Writing Skills**: Using Phrases and clauses
2.4 **Writing Practices**: Hint Development, Essay Writing

UNIT-3 12 Hours

3.1 **Vocabulary Development:** One word Substitutes
3.2 **Essential Grammar:**Tenses, Voices
3.3 **Basic Writing Skills:** Sentence structures (Simple, Complex, Compound)
3.4 **Writing Practices:** Note Making

UNIT-4	12 Hours
4.1 **Vocabulary Development**: Words often confused 4.2 **Essential Grammar**: Reported speech, Common Errors 4.3 **Basic Writing Skills**: Coherence in Writing: Jumbled Sentences **Writing Practices**: Paraphrasing &Summarizing	
Text Books :	1. Communication Skills, Sanjay Kumar &PushpaLatha. Oxford University Press:2011. 2. Practical English Usage, Michael Swan. Oxford University Press:1995. 3. Remedial English Grammar, F.T.Wood. Macmillan:2007. 4. Study Writing, Liz Hamplyons & Ben Heasley. Cambridge University Press:2006

Introduction to Problem Solving I B.Tech – I Semester (Code: 20CS104/CS02)					
Lectures	:	2T + 2P / Week	Continuous Assessment	:	30
Final Exam	:	3 Hours	Final Exam Marks	:	70

Pre-Requisite: None

UNIT-1	(15 Hours)

Introduction to components of a computer system: Memory, processor, I/O Devices, storage.

Software: system software, application software, computer classifications, generation of computer.

Procedure: steps involved in problem solving, Algorithm, Steps involved in algorithm development. Flow Chart, Advantages of Flowcharts, Symbols used in Flow Charts, Simple problems using flow chart, pseudo code method.

UNIT-2	(15 Hours)

Fundamental algorithms: exchange the values of two variables, counting, summation of a set of numbers, factorial computation, sine function computation, generation of the Fibonacci sequence, reverse the digits of an integer, base conversion, charter to number conversion.

UNIT-3	(15 Hours)

Factoring methods: finding the square root of a number, the smallest divisor of an integer, the greatest common divisor of two integers, generate prime numbers, computing the prime factors of an integer, generation of pseudo-random numbers, raising a number to a large power.

UNIT-4	(15 Hours)

Array Techniques: array order reversals, remove of duplicates from an order array, finding the Kth smallest element, finding the kth largest element and higher dimensional arrays.

Efficiency of algorithm: redundant computation, referencing array elements, inefficiency duo to late termination, early detection of desired output conditions, trading storage for efficiency gain.

Analysis of algorithms: computational complexity, order notation, best, worst and average case behavior.

Text Books :	How to Solve it by Computer, R.G. Dromey, First Edition, 2006, Pearson.

Fundamentals of Computer Lab I B.Tech – I Semester (Code: 20CSL101/CSL02)					
Practicals	:	3 Hours/Week	Continuous Assessment	:	30
Final Exam	:	3 Hours	Final Exam Marks	:	70

Pre-Requisite: None.

LIST OF EXPERIMENTS

Experiment 1: Computer Hardware Basics: PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition, hardware and software level troubleshooting process, tips and tricks would be covered.
Every student should identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor. Every student should disassemble and assemble the PC back to working condition.

Experiment 2: Installation of Software: Every student should individually install operating system like Linux or MS windows on the personal computer. The system should be configured as dual boot with both windows and Linux.

Experiment 3: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition.

Experiment 4: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Experiment 5: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate how to access the websites and email.

Experiment 6: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured. Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. Usage of search engines like Google, Yahoo, ask.com and others should be demonstrated by student.

Experiment 7: Cyber Hygiene: Students should learn about viruses on the internet and install antivirus software. Student should learn to customize the browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Experiment 8: Drawing flowcharts (Raptor Tool): Students should draw flowcharts for the problems validating an email id entered by user, printing first fifty numbers and preparing electricity bill.

Experiment 9: Productivity tool: Microsoft (MS) office: Importance of MS office, Details of the three tasks and features that should be covered in each, MS word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter. Formatting Styles, Inserting table,

Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Experiment 10: Practice with MS Word to create project certificate: Features to be covered: - Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colours, Inserting Header and Footer, Using Date and Time option in Word.

Experiment 11: Orientation on Spread sheet: Accessing, overview of toolbars, saving spreadsheet files, Using help and resources. Creating a Scheduler: - Gridlines, Format Cells, Summation, auto fill, Formatting Text

Experiment 12: Creating Power Point: Student should work on basic power point utilities and tools in Ms Office which help them create basic power point presentation. PPT Orientation, Slide Layouts, Inserting Text, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting Images, Tables and Charts.

Text Books :	1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education. 2. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech. 3. Computer Fundamentals, l e, Anita Goel, Person Education.
References :	1. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.

Chemistry Lab

I B.Tech – II Semester (Code: 20CSL102/CYL01)

Practicals	:	3 Hours/Week	Continuous Assessment	:	30
Final Exam	:	3 Hours	Final Exam Marks	:	70

Pre-Requisite: None.

Course Objectives: Students will be able to

- With the principles of water characterization and treatment of water for industrial purposes and methods of producing water for potable purposes.
- To understand the thermodynamic concepts, energy changes, concept of corrosion & its control.
- With the conventional energy sources, solid, liquid and gaseous Fuels & knowledge of knocking and anti-knocking characteristics
- With aim to gain good knowledge of organic reactions, plastics, conducting polymers & biodegradable polymers.

Course Outcomes: Students will be able to

CO-1	Familiar with fundamental basics of Chemistry lab.
CO-2	Ability to estimate purity of washing soda, bleaching powder and quantity of Iron and other salts.
CO-3	Gain the knowledge regarding the quality parameters of water like salinity, hardness, alkalinity etc.
CO-4	Able to analyse the given oil for saponification and iodine value.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO-1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO-2	2	2	2	2	-	2	-	-	-	-	-	2	-	-	-
CO-3	2	2	2	2	-	2	-	-	-	-	-	2	-	-	-
CO-4	2	2	2	2	-	-	-	-	-	-	-	2	-	-	-

LIST OF EXPERIMENTS

1. Introduction to Chemistry Lab (the teachers are expected to teach fundamentals like Calibration of Volumetric Apparatus, Primary, Secondary Solutions, Normality, Molarity, Molality etc. and error, accuracy, precision, theory of indicators, use of volumetric titrations).

2. **Volumetric Analysis:**
   a. Estimation of Washing Soda.
   b. Estimation of Active Chlorine Content in Bleaching Powder
   c. Estimation of Mohr's salt by permanganometry.
   b. Estimation of given salt by using Ion-exchange resin using Dowex-50.

3. **Analysis of Water**:
   a. Determination of Alkalinity of Tap water.
   b. Determination of Total Hardness of ground water sample by EDTA method
   c. Determination of Salinity of water sample.

4. **Estimation of properties of oil:**
   a. Estimation of Acid Value

b. Estimation of Saponification value. 5. **Preparations:** a. Preparation of Soap b. Preparation of Urea-formaldehyde resin c. Preparation of Phenyl benzoate.	
Text Books :	1. Practical Engineering Chemistry by K.Mukkanti, Etal, B.S. Publicaitons, Hyderabad, 2009. 2. Inorganic quantitative analysis, Vogel, 5th edition, Longman group Ltd. London, 1979.
References :	1. Text Book of engineering chemistry by R.n. Goyal and HarrmendraGoel. 2. A text book on experiments and calculations- Engineering Chemistry. S.S. Dara. 3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

English Communication Skills Lab

I B. Tech. – I Semester (Code: 20CSL103/ELL01)

Practicals	:	3 Hours/Week	Continuous Assessment	:	30
Final Exam	:	3 Hours	Final Exam Marks	:	70

Pre-Requisite: None.

Course Objectives: Students will be able to

- To comprehend the importance, barriers and strategies of listening skills in English.
- To illustrate and impart practice Phonemic symbols, stress and intonation.
- To practice oral skills and receive feedback on learners' performance.
- To practice language in various contexts through pair work, role plays, group work and dialogue conversations

Course Outcomes: Students will be able to

CO-1	Better understand the nuances of English language through audio- visual experience and group activities
CO-2	Develop neutralization of accent for intelligibility
CO-3	Build confidence to enhance their speaking skills
CO-4	Use effective vocabulary both in formal and informal situations

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO-1	-	-	-	-	-	-	-	-	3	3	2	2	-	2	1
CO-2	-	-	-	-	-	-	-	-	2	3	2	2	-	2	1
CO-3	-	-	-	-	-	-	-	-	3	3	2	2	-	2	1
CO-4	-	-	-	-	-	-	-	-	3	3	2	2	-	2	1

1.1 Listening Skills; Importance – Purpose- Process- Types
1.2 Barriers to Listening
1.3 Strategies for Effective Listening

2.1 Phonetics; Introduction to Consonant, Vowel and Diphthong sounds
2.2 Stress
2.3 Rhythm
2.4 Intonation

3.1Formal and Informal Situations
3.2 Expressions used in different situations
3.3 Introducing Yourself & Others-Greeting & Parting-Congratulating-Giving Suggestions & Advices-Expressing Opinions-Inviting People-Requesting-Seeking Permission-Giving Information- Giving Directions- Sympathizing- Convincing People- Complaining & Apologizing-Thanking Others- Shopping- Travelling- Conversational Gambits

4.1 JAM Session
4.2 Debates
4.3 Extempore

Text Books :	1. Communication Skills, Sanjay Kumar and Pushpa Lata. Oxford University Press. 2011 2. Better English Pronunciation, J.D. O' Connor. Cambridge University Press:1984 3. New Interchange (4rth Edition), Jack C Richards. Cambridge University Press:2015 4. English Conversation Practice, Grant Taylor. McGraw Hill:2001
Software:	1. Buzzers for conversations, New Interchange series 2. English in Mind series, Telephoning in English 3. Speech Solutions, A Course in Listening and Speaking

Environmental Studies

I B. Tech. – I Semester (Code: 20CS105/MC01)

Lectures	:	2 Hours/Week	Continuous Assessment	:	30
Final Exam	:	---	Final Exam Marks	:	---

Pre-Requisite: None.

Course Objectives: Students will be able to

- To develop an awareness, knowledge, and appreciation for the natural environment.
- To understand different types of ecosystems exist in nature.
- To know our biodiversity.
- To understand different types of pollutants present in Environment.
- Create awareness among the youth on environmental concerns important in the long-term interest of the society

Course Outcomes: Students will be able to

CO-1	Develop an appreciation for the local and natural history of the area.
CO-2	Hope for the better future of environment in India which is based on many positive factors like Biodiversity, successive use of renewable energy resources and other resources, increasing number of people's movements focusing on environment.
CO-3	Know how to manage the harmful pollutants. Gain the knowledge of Environment.
CO-4	Create awareness among the youth on environmental concerns important in the long-term interest of the society

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO-1	-	-	-	-	-	3	3	-	-	-	-	2	-	-	-
CO-2	-	-	-	-	-	3	3	-	-	-	-	2	-	-	-
CO-3	-	-	-	-	-	3	3	-	-	-	-	2	-	-	-
CO-4	-	-	-	-	-	3	3	-	-	-	-	2	-	-	-

UNIT-1 8 Hours

Introduction: Definition, Scope and Importance, Need for public awareness. Ecosystems: Definition, Structure and Functions of Ecosystems, types - Forest, Grassland, Desert, Aquatic (Marine, pond and estuaries).

Biodiversity: Definition and levels of Biodiversity; Values of Biodiversity - Consumptive, Productive, Social, Aesthetic, Ethical and Optional; Threats and Conservation of Biodiversity; Hot Spots of Biodiversity, Bio-geographical Classification of India, India as a mega diversity nation. Chipko movement case study

UNIT-2 8 Hours

Natural resources: Land: Land as a resource, Causes and effects of land degradation - Soil erosion, Desertification. **Forest**: Use of forests, Causes and effects of deforestation, Afforestation, Mining - benefits and problems. **Water**: Uses, floods and drought, Dams - benefits and problems.
Energy: Importance of energy, Environmental Impacts of Renewable and Non-renewable energy resources. Silent Valley Project and Narmada BachaoAndolan case studies
Sustainability: Definition, Concept and Equitable use of resources for sustainable development; Rain water harvesting and Watershed management. Fieldwork on Rain water harvesting and Watershed management.

UNIT-3	8 Hours

Pollution: Definition; Causes, effects and control of air, water and nuclear pollution; Chernobyl Nuclear Disaster case study; Solid Waste: urban, Industrial and hazardous wastes; Integrated waste management - 3R approach, composting and vermicomposting.
Environmental acts: Water and air (Prevention and Control of pollution) acts, Environmental protection act, Forest Conservation act.

UNIT-4	8 Hours

Environmental issues: Green House effect & Global warming, Ozone layer depletion, Acid rains, Green Revolution, Population Growth and environmental quality, Environmental Impact Assessment. Environmental Standards (ISO 14000, etc.)
Case Studies: Bhopal Tragedy, Mathura Refinery and TajMahal, and Ralegan Siddhi (Anna Hazare).

Field work: Visit to a local area to document environmental assets – Pond/Forest/Grassland. Visit to a local polluted site- Urban and industry/ Rural and Agriculture.

Text Books :	1. "Environmental Studies" by Benny Joseph, Tata McGraw-Hill Publishing Company Limited, New Delhi. 2. "Comprehensive environmental studies"- JP Sharma, Laxmi Publications. 3. Text Book of environmental Studies – ErachBharucha
References :	1. "Environmental studies", R.Rajagopalan, Oxford University Press. 2. "Introduction to Environmental Science", Anjaneyulu Y, B S Publications 3. "Environmental Science", 11th Edition – Thomson Series – By Jr. G. Tyler Miller.