SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
An Autonomous Institute
(Approved by AICTE, New Delhi & Affiliated to JNTU Kakinada)
Accredited by **NBA (Mech, ECE & CSE) & NAAC with 'A' Grade**
Nandamuru, Pedana Mandal, Krishna Dist – 521369.
DEPARTMENT OF CIVIL ENGINEERING
COURSE STRUCTURE AND COURSE SYLLABUS

B.TECH. – I YEAR I SEMESTER (FOR GROUP-B BRANCHES)

S.No.	Category	Title	L/D	T	P	Credits
1	BS&H	Engineering Physics	3	0	0	3
2	BS&H	Linear Algebra & Calculus	3	0	0	3
3	Engineering Science	Basic Electrical & Electronics Engineering	3	0	0	3
4	Engineering Science	Engineering Graphics	1	0	4	3
5	Engineering Science	Introduction to Programming	3	0	0	3
6	Engineering Science	IT Workshop	0	0	2	1
7	BS&H	Engineering Physics Lab	0	0	2	1
8	Engineering Science	Electrical & Electronics Engineering Workshop	0	0	3	1.5
9	Engineering Science	Computer Programming Lab	0	0	3	1.5
10	BS&H	NSS/NCC/Scouts & Guides/Community Service	-	-	1	0.5
		Total	**13**	**00**	**15**	**20.5**

B.Tech. – I Year II Semester (for Group-B Branches)

S.No.	Category	Title	L	T	P	Credits
1	BS&H	Communicative English	2	0	0	2
2	BS & H	Engineering Chemistry / Chemistry / Fundamental Chemistry	3	0	0	3
3	Engineering Science	Differential Equations & Vector Calculus	3	0	0	3
4	Engineering Science	Basic Civil & Mechanical Engineering	3	0	0	3
5	Professional Core	Engineering Mechanics/Network Analysis/ Data structures (Branch specific)	3	0	0	3
6	BS&H	Communicative English Lab	0	0	2	1
7	BS&H	Engineering Chemistry / Chemistry / Fundamental Chemistry Lab	0	0	2	1
8	Engineering Science	Engineering Workshop	0	0	3	1.5
9	Professional Core	Engineering Mechanics & Building Practices Lab	0	0	3	1.5
10		Health and wellness, Yoga and Sports	-	-	1	0.5
Total			**14**	**00**	**11**	**19.5**

L	T	P	C
3	0	0	3

ENGINEERING PHYSICS
(for Civil Engineering)

Course Objectives:

To bridge the gap between the Physics in school at 10+2 level and UG level engineering courses by identifying the importance of the optical phenomenon like interference, diffraction etc, enlightening the periodic arrangement of atoms in crystalline solids and concepts of quantum mechanics, introduce novel concepts of dielectric and magnetic materials, physics of semiconductors.

Course Outcomes:

CO1: Analyze the intensity variation of light due to polarization, interference and diffraction.CO2: Familiarize with the basics of crystals and their structures.

CO3: Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.

CO4: Summarize various types of polarization of dielectrics and classify the magnetic materials.

CO5: Explain the basic concepts of Quantum Mechanics and the band theory of solids.CO6: Identify the type of semiconductor using Hall effect.

UNIT I   Wave Optics   12Hours
Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colours in thin films- Newton's Rings, Determination of wavelength and refractive index.

Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative). Polarization: Introduction -Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

UNIT II Crystallography and X-ray diffraction   11Hours

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (hkl) planes.

X- ray diffraction: Bragg's law - X-ray Diffractometer – crystal structure determination by Laue's and powder methods

UNIT III Dielectric and Magnetic Materials   13Hours
Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector – Relation between the electric vectors - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius- Mossotti equation - complex dielectric constant – Frequency dependence of polarization – dielectric loss

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials and

its Applications.

UNIT IV   Quantum Mechanics and Free electron Theory   10Hours
Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle –Significance and properties of wave function – Schrodinger's time independent and dependentwave equations– Particle in a one-dimensional infinite potential well.
Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) – Fermi-Dirac distribution - Density of states - Fermi energy-Quantum free electron theory – electrical conductivity based on quantum free electron theory.

UNIT V Semiconductors   9Hours
Semiconductors: Formation of energy bands – classification of crystalline solids - Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors: density of charge carriers – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation – Hall effectand its applications.

Textbooks:

1. A Text book of Engineering Physics, M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy, S. Chand Publications, 11th Edition 2019.
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018
3. Engineering Physics – P.K.Palani Samy

Reference Books:

1. Engineering Physics - B.K. Pandey and S. Chaturvedi, Cengage Learning 2021.
2. Engineering Physics" - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press.2010
3. Engineering Physics - M.R. Srinivasan, New Age international publishers (2009).

Web Resources: https://www.loc.gov/rr/scitech/selected-internet/physics.html

L	T	P	C
3	0	0	3

LINEAR ALGEBRA & CALCULUS
(for Civil Engineering)

Course Objectives:

- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real-world problems and their applications.

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

CO1: Develop and use of matrix algebra techniques that are needed by engineers for practical applications.

CO2: Utilize mean value theorems to real life problems.

CO3: Familiarize with functions of several variables which is useful in optimization.CO4:

Learn important tools of calculus in higher dimensions.

CO5: Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.

UNIT I   Matrices

Rank of a matrix by echelon form, normal form. Cauchy–Binet formulae (without proof). Inverse of Non- singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.

UNIT II   Eigenvalues, Eigenvectors and Orthogonal Transformation

Eigenvalues, Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonicalforms by Orthogonal Transformation.

UNIT III   Calculus

Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), Problems and applications on the above theorems.

UNIT IV   Partial differentiation and Applications (Multi variable calculus) Functions of
several variables: Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Directional derivative, Taylor's and Maclaurin's series expansion of
functions of two variables. Jacobians, Functional dependence, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT V   Multiple Integrals (Multi variable Calculus)

Double integrals, triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

Textbooks:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10thEdition.

Reference Books:
1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha ScienceInternational Ltd., 2021 5th Edition(9th reprint).
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4. Advanced Engineering Mathematics, Micheael Greenberg, , Pearson publishers, 9th edition
5. Higher Engineering Mathematics, H. K Das, Er. Rajnish Verma, S. Chand Publications,2014, Third Edition (Reprint 2021)

L	T	P	C
3	0	0	3

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

Course Objectives
To expose to the field of electrical & electronics engineering, laws and principles of electrical/electronic engineering and to acquire fundamental knowledge in the relevant field.

Course Outcomes: After the completion of the course students will be able to

CO1. Describe fundamental laws, operating principles of motors/generators, MC/MI instruments (L2)

CO2. Demonstrate the working of electrical machines, measuring instruments and powergeneration stations. (L2)

CO3. Apply mathematical tools and fundamental concepts to derive various equations relatedto electrical circuits and machines. (L3)

CO4. Calculate electrical load and electricity bill of residential and commercial buildings. (L4)

PART A: BASIC ELECTRICAL ENGINEERING

UNIT I DC & AC Circuits

DC Circuits: Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Super Position theorem, Simple numerical problems.

AC Circuits: A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits, Concept of Impedance, Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

UNIT II Machines and Measuring Instruments

Machines: Construction, principle and operation of (i) DC Motor, (ii) DC Generator, (iii) Single Phase Transformer, (iv) Three Phase Induction Motor and (v) Alternator, Applications of electrical machines.

Measuring Instruments: Construction and working principle of Permanent Magnet Moving Coil (PMMC), Moving Iron (MI) Instruments and Wheat Stone bridge.

UNIT III Energy Resources, Electricity Bill & Safety Measures

Energy Resources: Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel, Nuclear, Solar & Wind power generation.

Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops,Printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricitytariff, calculation of electricity bill for domestic consumers.

Equipment Safety Measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Personal safety measures: Electric Shock, Earthing and its types,Safety Precautions to avoid shock.

Textbooks:
1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti,Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, ThirdEdition

Reference Books:
1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019,Fourth Edition
2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020
3. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford UniversityPress, 2017
4. Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Person Publications,2018, Second Edition.

Web Resources:
1. https://nptel.ac.in/courses/108105053
2. https://nptel.ac.in/courses/108108076

PART B: BASIC ELECTRONICS ENGINEERING

Course Objectives:

- To teach the fundamentals of semiconductor devices and its applications, principles ofdigital electronics.

Course Outcomes: After the completion of the course students will be able to
- **CO1.** Student will be able to Understand Diode & Bipolar Junction Transistor (L1)
- **CO2.** Student will be able to Develop Power Supply. (L2)
- **CO3.** Student will be able to Understand electronic instructions (L1)
- **CO4.** Student will be able to Understand Combinational & Sequential Circuits. (L1)

UNIT I   SEMICONDUCTOR DEVICES
Introduction - Evolution of electronics – Vacuum tubes to nano electronics - Characteristics ofPN Junction Diode — Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics — Elementary Treatment of Small Signal CE Amplifier.

UNIT II   BASIC ELECTRONIC CIRCUITS AND INSTRUMENTTAION
Rectifiers and power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple zener voltage regulator. Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response. Electronic Instrumentation: Block diagram of an electronic instrumentation system.

UNIT III   DIGITAL ELECTRONICS
Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of BooleanAlgebra, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adders. Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only)

Textbooks:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, PearsonEducation, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009

Reference Books:

1. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010.
2. Santiram Kal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall,India, 2002.
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version,Pearson Education,2009.

End examination pattern:
i) Question paper shall be in two parts viz., Part A and Part B with equal weightage of 35marks each.
ii) In each part, question 1 shall contain 5 compulsory short answer questions for a total of5 marks such that each question carries 1 mark.
iii) In each part, questions from 2 to 4, there shall be either/or type questions of 10 markseach. Student shall answer any one of them.

The questions from 2 to 4 shall be set by covering one unit of the syllabus for eachquestion.

L	T	P	C
1	0	4	3

ENGINEERING GRAPHICS
(Common to All branches of Engineering)

Course Objectives:

- To enable the students with various concepts like dimensioning, conventions and standards related to Engineering Drawing
- To impart knowledge on the projection of points, lines and plane surfaces
- To improve the visualization skills for better understanding of projection of solids
- To develop the imaginative skills of the students required to understand Section of solids and Developments of surfaces.
- To make the students understand the viewing perception of a solid object in Isometric and Perspective projections.

Course Outcomes:

CO1: Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.
CO2: Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.
CO3: Understand and draw projection of solids in various positions in first quadrant.
CO4: Explain principles behind development of surfaces.
CO5: Prepare isometric and perspective sections of simple solids.

UNIT I

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.
Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves.
Scales: Plain scales, diagonal scales and vernier scales.

UNIT II

Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.
Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes
Projections of Planes: regular planes Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

UNIT III

Projections of Solids: Types of solids: Polyhedra and Solids of revolution. Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.

UNIT IV

Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shape of section, Sections of solids in simple position only.

Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid and cone.

UNIT V

Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Computer graphics: Creating 2D&3D drawings ofobjects including PCB and Transformations using Auto CAD (*Not for end examination*).

Textbook:

1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 2016.

Reference Books:

1. Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.
2. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc,2009.
3. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, TataMcGraw Hill, 2017.

L	T	P	C
3	0	0	3

INTRODUCTION TO PROGRAMMING
(Common to All branches of Engineering)

Course Objectives:
- To introduce students to the fundamentals of computer programming.
- To provide hands-on experience with coding and debugging.
- To foster logical thinking and problem-solving skills using programming.
- To familiarize students with programming concepts such as data types, control structures, functions, and arrays.
- To encourage collaborative learning and teamwork in coding projects.

Course Outcomes: A student after completion of the course will be able to
CO1: Understand basics of computers, the concept of algorithm and algorithmic thinking.
CO2: Analyse a problem and develop an algorithm to solve it.
CO3: Implement various algorithms using the C programming language.
CO4: Understand more advanced features of C language.
CO5: Develop problem-solving skills and the ability to debug and optimize the code.

UNIT I　　　Introduction to Programming and Problem Solving
History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Basics of a Computer Program-Algorithms, flowcharts (Using Dia Tool), pseudo code. Introduction to Compilation and Execution, Primitive Data Types, Variables, and Constants, Basic Input and Output, Operations, Type Conversion, and Casting.

Problem solving techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

UNIT II　　　Control Structures
Simple sequential programs Conditional Statements (if, if-else, switch), Loops (for, while, do-while) Break and Continue.

UNIT III　　　Arrays and Strings
Arrays indexing, memory model, programs with array of integers, two dimensional arrays, Introduction to Strings.

UNIT IV　　　Pointers & User Defined Data types
Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers, User-defined data types-Structures and Unions.

UNIT V　　　Functions & File Handling
Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments, modifying parameters inside functions using pointers, arrays as parameters. Scope and Lifetime of Variables, Basics of File Handling

Note: The syllabus is designed with C Language as the fundamental language of implementation**.**

Textbooks:
1. "The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall, 1988
2. Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill Education,1996

Reference Books:
1. Computing fundamentals and C Programming, Balagurusamy, E., McGraw-HillEducation, 2008.
2. Programming in C, Rema Theraja, Oxford, 2016, 2nd edition
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad,CENGAGE, 3rd edition

L	T	P	C
0	0	2	1

IT WORKSHOP

COURSE OBJECTIVES:

- To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables
- To demonstrate configuring the system as Dual boot both Windows and other Operating Systems Viz. Linux, BOSS
- To teach basic command line interface commands on Linux.
- To teach the usage of Internet for productivity and self-paced life-long learning
- To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spread sheets and Presentation tools.

COURSE OUTCOMES:

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

CO1: Demonstrate Hardware troubleshooting
CO2: Identify Hardware components and inter dependencies.
CO3: Describe usage of web browsers, email, news groups and discussion forums.
CO4: Design word documents and create presentations using different styles.
CO5: Prepare spreadsheets with calculations

SYLLABUS:

PC Hardware & Software Installation

Task 1: 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.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot (VMWare) with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Task 5: Every student should install BOSS on the computer. The system should be configured as dual boot (VMWare) with both Windows and BOSS. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web

Task1: 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, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: 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.

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1 – Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent(FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using La TeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both La TeX and Word.

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS)tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview oftoolbars, saving excel files, Using help and resources.
Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2: Calculating GPA -. Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,

LOOKUP/VLOOKUP

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

POWER POINT

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.
Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.
Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – ChatGPT

Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.
- Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a storyor a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas
- Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."

Task 3: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language.Compare the output tosee how accurate and fluent the translations are.
- Ex:Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

REFERENCE BOOKS:

1. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dream tech, 2003
2. The Complete Computer upgrade and repair book, Cheryl A Schmidt, WILEYDream tech, 2013, 3rd edition
3. Introduction to Information Technology, ITL Education Solutions limited,PearsonEducation, 2012, 2nd edition
4. PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft)
5. LaTeX Companion, Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide, David Anfins onand KenQuamme. – CISCO Press, Pearson Education, 3rd edition
7. IT Essentials PC Hardware and Software Labs and Study Guide, PatrickRegan– CISCOPress, Pearson Education, 3rd edition

L	T	P	C
0	0	2	1

ENGINEERING PHYSICS LAB
(for Civil Engineering)

Course Objectives:

To study the concepts of optical phenomenon like interference, diffraction etc., recognize the importance of energy gap in the study of conductivity and Hall effect in semiconductors and study the parameters and applications of dielectric and magnetic materials by conducting experiments.

Course Outcomes: The students will be able to

CO1: Operate optical instruments like travelling microscope and spectrometer.CO2: Estimate the wavelengths of different colours using diffraction grating.
CO3: Plot the intensity of the magnetic field of circular coil carrying current with distance. CO4: Evaluate dielectric constant and magnetic susceptibility for dielectric and magneticmaterials respectively.
CO5: Calculate the band gap of a given semiconductor. CO6: Identify the type of semiconductor using Hall effect.

List of Experiments:
1. Determination of radius of curvature of a given Plano-convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Verification of Brewster's law
4. Determination of dielectric constant using charging and discharging method.
5. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
6. Determination of wavelength of Laser light using diffraction grating.
7. Estimation of Planck's constant using photoelectric effect.
8. Determination of the resistivity of semiconductors by four probe methods.
9. Determination of energy gap of a semiconductor using p-n junction diode.

10. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
11. Determination of Hall voltage and Hall coefficient of a given semiconductorusing Hall effect.
12. Determination of temperature coefficients of a thermistor.
13. Determination of acceleration due to gravity and radius of Gyration by usinga compound pendulum.
14. Determination of magnetic susceptibility by Kundt's tube method.
15. Determination of rigidity modulus of the material of the given wire using Torsionalpendulum.
16. Sonometer: Verification of laws of stretched string.
17. Determination of young's modulus for the given material of wooden scaleby non-uniform bending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork byMelde's experiment.

Note: Any TEN of the listed experiments are to be conducted. Out of whichany TWO experiments may be conducted in virtual mode.

References:

- A Textbook of Practical Physics - S. Balasubramanian, M.N. Srinivasan, S. ChandPublishers, 2017.

Web Resources

- www.vlab.co.in
- https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype

L	T	P	C
0	0	3	1.5

ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP

Course Objectives:

To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.

Course Outcomes:

After competition of this course, the student will be able to

CO1. Measure voltage, current and power in an electrical circuit. (L3)
CO2. Measure of Resistance using Wheat stone bridge (L4)
CO3. Discover critical field resistance and critical speed of DC shunt generators. (L4)
CO4. Investigate the effect of reactive power and power factor in electrical loads. (L5)

Activities:

1. Familiarization of commonly used Electrical & Electronic Workshop Tools: Bread board, Solder, cables, relays, switches, connectors, fuses, Cutter, plier, screwdriver set, wire stripper, flux, knife/blade, soldering iron, de-soldering pump etc.
   - Provide some exercises so that hardware tools and instruments are learned to be used by the students.

2. Familiarization of Measuring Instruments like Voltmeters, Ammeters, multimeter, LCR-Q meter, Power Supplies, CRO, DSO, Function Generator, Frequency counter.
   - Provide some exercises so that measuring instruments are learned to be used by the students.

3. Components:
   - Familiarization/Identification of components (Resistors, Capacitors, Inductors, Diodes, transistors, IC's etc.) – Functionality, type, size, colour coding package, symbol, cost etc.

   - Testing of components like Resistor, Capacitor, Diode, Transistor, ICs etc. - Compare values of components like resistors, inductors, capacitors etc with the measured values by using instruments

PART A: ELECTRICAL ENGINEERING LAB

List of experiments:

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Measurement of Resistance using Wheat stone bridge
4. Magnetization Characteristics of DC shunt Generator
5. Measurement of Power and Power factor using Single-phase wattmeter
6. Measurement of Earth Resistance using Megger
7. Calculation of Electrical Energy for Domestic Premises

Reference Books:
1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, FirstEdition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti,Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, ThirdEdition

Note: Minimum Six Experiments to be peformed.

PART B: ELECTRONICS ENGINEERING LAB

Course Objectives:
- To impart knowledge on the principles of digital electronics and fundamentals ofelectron devices & its applications.

Course Outcomes: At the end of the course, the student will be able toCO1: Identify & testing of various electronic components.
CO2: Understand the usage of electronic measuring instruments. CO3: Plot and discuss the characteristics of various electron devices.CO4: Explain the operation of a digital circuit.

List of Experiments:

1. Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Plot V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Plot Input & Output characteristics of BJT in CE and CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gatesusing ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters,AC Voltmeters, CROs, all the required active devices.

References:
1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, PearsonEducation, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version,Pearson Education,2009.

Note: Minimum Six Experiments to be performed. All the experiments shall be implemented using both Hardware and Software.

L	T	P	C
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<p style="text-align:center; color:red;">COMPUTER PROGRAMMING LAB</p>

COURSE OBJECTIVES:

The course aims to give students hands – on experience and train them on theconcepts of the C- programming language.

COURSE OUTCOMES:

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

CO1: Read, understand, and trace the execution of programs written in C language.
CO2: Select the right control structure for solving the problem.
CO3: Develop C programs which utilize memory efficiently using programming constructslike pointers.
CO4: Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.

SYLLABUS:

UNIT-I

WEEK 1

Objective: Getting familiar with the programming environment on the computer and writing the first program.

Suggested Experiments/Activities:
Tutorial 1: Problem-solving using Computers.
Lab1: Familiarization with programming environment
    i)   Basic Linux environment and its editors like Vi, Vim & Emacs etc.
    ii) Exposure to Turbo C, gcc
    iii) Writing simple programs using printf(), scanf()

WEEK 2

Objective: Getting familiar with how to formally describe a solution to a problem in a series of finite steps both using textual notation and graphic notation.

Suggested Experiments /Activities:
Tutorial 2: Problem-solving using Algorithms and Flow charts.
Lab 1: Converting algorithms/flow charts into C Source code.
Developing the algorithms/flowcharts for the following sample programs
    i)   Sum and average of 3 numbers
    ii) Conversion of Fahrenheit to Celsius and vice versa
    iii) Simple interest calculation

WEEK 3

Objective: Learn how to define variables with the desired data-type, initialize them with appropriate values and how arithmetic operators can be usedwith variables and constants.

Suggested Experiments/Activities:
Tutorial 3: Variable types and type conversions:
Lab 3: Simple computational problems using arithmetic expressions.
   i) Finding the square root of a given number
   ii) Finding compound interest
   iii) Area of a triangle using heron's formulae
   iv) Distance travelled by an object

UNIT-II

WEEK 4
Objective: Explore the full scope of expressions, type-compatibility of variables& constants and operators used in the expression and how operator precedence works.

Suggested Experiments/Activities:
Tutorial4: Operators and the precedence and as associativity:
Lab4: Simple computational problems using the operator' precedence and associativity
   i) Evaluate the following expressions.
      a. A+B*C+(D*E) + F*G
      b. A/B*C-B+A*D/3
      c. A+++B---A
      d. J= (i++) + (++i)
   ii) Find the maximum of three numbers using conditional operator
   iii) Take marks of 5 subjects in integers, and find the total, average in float

WEEK 5
Objective: Explore the ful scope of different variants of "if construct" namely if- else, null-else, if-else if*-else, switch and nested-if including in what scenario each one of them can be used and how to use them. Explore all relational and logical operators while writing conditionals for "if construct".

Suggested Experiments/Activities:
Tutorial 5: Branching and logical expressions:
Lab 5: Problems involving if-then-else structures.
   i) Write a C program to find the max and min of four numbers using if-else.
   ii) Write a C program to generate electricity bill.
   iii) Find the roots of the quadratic equation.
   iv) Write a C program to simulate a calculator using switch case.
   v) Write a C program to find the given year is a leap year or not.

WEEK 6
Objective: Explore the full scope of iterative constructs namely while loop, do-while loop and for loop in addition to structured jump constructs like break and continue including when each of these statements is more appropriate to use.

Suggested Experiments/Activities:
Tutorial 6: Loops, while and for loops
Lab 6: Iterative problems e.g., the sum of series
   i) Find the factorial of given number using any loop.
   ii) Find the given number is a prime or not.
   iii) Compute sine and cos series
   iv) Checking a number palindrome
   v) Construct a pyramid of numbers.

UNIT-III

WEEK 7:

Objective: Explore the full scope of Arrays construct namely defining and initializing 1-D and 2-D and more generically n-D arrays and referencing individual array elements from the defined array. Using integer 1-D arrays, explore search solution linear search.

Suggested Experiments/Activities:

Tutorial 7: 1 D Arrays: searching.

Lab 7: 1D Array manipulation, linear search
   i)   Find the min and max of a 1-D integer array.
   ii)   Perform linear search on1D array.
   iii)   The reverse of a 1D integer array
   iv)   Find 2's complement of the given binary number.
   v)   Eliminate duplicate elements in an array.

WEEK 8:

Objective: Explore the difference between other arrays and character arrays that can be used as Strings by using null character and get comfortable with string by doing experiments that will reverse a string and concatenate two strings. Explore sorting solution bubble sort using integer arrays.

Suggested Experiments/Activities:

Tutorial 8: 2 D arrays, sorting and Strings.

Lab 8: Matrix problems String operations, Bubble sort,
   i)   Addition of two matrices
   ii)   Multiplication two matrices
   iii)   Sort array elements using bubble sort
   iv)   Concatenate two strings without built-in functions
   v)   Reverse a string using built-in and without built-in string functions

UNIT-IV

WEEK 9:

Objective: Explore pointers to manage a dynamic array of integers, including memory allocation & value initialization, resizing changing and reordering the contents of an array and memory de-allocation using malloc (), calloc (), realloc () and free () functions. Gain experience processing command-line arguments received by C

Suggested Experiments/Activities:

Tutorial 9: Pointers, structures and dynamic memory allocation

Lab 9: Pointers and structures, memory dereference.
   i)   Write a C program to find the sum of a 1D array using malloc()
   ii)   Write a C program to find the total, average of n students using structures
   iii)   Enter n students data using calloc() and display failed students list
   iv)   Read student name and marks from the command line and display the student details along with the total.
   v)   Write a C program to implement realloc()

WEEK 10:

Objective: Experiment with C Structures, Unions, bit fields and self-referential structures (Singly linked lists) and nested structures

Suggested Experiments/Activities:

Tutorial 10: Bitfields, Self-Referential Structures, Linked lists

Lab10 : Bitfields, linked lists

Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit- fields

i) Create and display a singly linked list using self-referential structure.
ii) Demonstrate the differences between structures and unions using a C program.
iii) Write a C program to shift/rotate using bitfields.
iv) Write a C program to copy one structure variable to another structure of the same type.

UNIT-V

WEEK 11:

Objective: Explore the Functions, sub-routines, scope and extent of variables, doing some experiments by parameter passing using call by value. Basic methods of numerical integration

Suggested Experiments/Activities:

Tutorial 11: Functions, call by value, scope and extent,
Lab 11: Simple functions using call by value, solving differential equations using Eulers theorem.

i) Write a C function to calculate NCR value.
ii) Write a C function to find the length of a string.
iii) Write a C function to transpose of a matrix.
iv) Write a C function to demonstrate numerical integration of differential equations using Euler's method

WEEK 12:

Objective: Explore how recursive solutions can be programmed by writing recursive functions that can be invoked from the main by programming at-least five distinct problems that have naturally recursive solutions.

Suggested Experiments/Activities:

Tutorial 12: Recursion, the structure of recursive calls
Lab 12: Recursive functions

i) Write a recursive function to generate Fibonacci series.
ii) Write a recursive function to find the lcm of two numbers.
iii) Write a recursive function to find the factorial of a number.
iv) Write a C Program to implement Ackermann function using recursion.
v) Write a recursive function to find the sum of series.

WEEK 13:

Objective: Explore the basic difference between normal and pointer variables, Arithmetic operations using pointers and passing variables to functions using pointers

Suggested Experiments/Activities:

Tutorial 13: Call by reference, dangling pointers
Lab 13: Simple functions using Call by reference, Dangling pointers.

i) Write a C program to swap two numbers using call by reference.
ii) Demonstrate Dangling pointer problem using a C program.
iii) Write a C program to copy one string into another using pointer.
iv) Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.

WEEK14:

Objective: To understand data files and file handling with various file I/O functions. Explore the differences between text and binary files.

Suggested Experiments/Activities:

Tutorial 14: File handling

Lab 14: File operations

i) Write a C program to write and read text into a file.
ii) Write a C program to write and read text into a binary file using fread() andfwrite()
iii) Copy the contents of one file to another file.
iv) Write a C program to merge two files into the third file using command-line arguments.
v) Find no. of lines, words and characters in a file
vi) Write a C program to print last n characters of a given file.

TEXTBOOKS:

1. Ajay Mittal, Programming in C: A practical approach, Pearson.
2. Byron Gottfried, Schaum' s Outline of Programming with C, McGraw Hill

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice- Hall of India
2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE

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NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE
</div>

Course Objectives:

The objective of introducing this course is to impart discipline, character, fraternity, teamwork,social consciousness among the students and engaging them in selfless service.

Course Outcomes: After completion of the course the students will be able to
    CO1: Understand the importance of discipline, character and service motto.
    CO2: Solve some societal issues by applying acquired knowledge, facts, and techniques.
    CO3: Explore human relationships by analyzing social problems.
    CO4: Determine to extend their help for the fellow beings and downtrodden people.
    CO5: Develop leadership skills and civic responsibilities.

UNIT I   Orientation
General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, careerguidance.

Activities:
    i)   Conducting –ice breaking sessions-expectations from the course-knowing personaltalents and skills
    ii) Conducting orientations programs for the students –future plans-activities-releasingroad map etc.
    iii) Displaying success stories-motivational biopics- award winning movies on societal issues etc.
    iv) Conducting talent show in singing patriotic songs-paintings- any other contribution.

UNIT II   Nature &Care
Activities:
    i)   Best out of waste competition.
    ii) Poster and signs making competition to spread environmental awareness.
    iii) Recycling and environmental pollution article writing competition.
    iv) Organising Zero-waste day.
    v) Digital Environmental awareness activity via various social media platforms.
    vi) Virtual demonstration of different eco-friendly approaches for sustainable living.
    vii) Write a summary on any book related to environmental issues.

UNIT III   Community
ServiceActivities:

    i)   Conducting One Day Special Camp in a village contacting village-area leaders- Survey in the village, identification of problems- helping them to solve via media- authorities-experts-etc.

    ii) Conducting awareness programs on Health-related issues such as General Health,Mental health, Spiritual Health, HIV/AIDS,
    iii) Conducting consumer Awareness. Explaining various legal provisions etc.
    iv) Women Empowerment Programmes- Sexual Abuse, Adolescent Health and PopulationEducation.

Any other programmes in collaboration with local charities, NGOs etc.

Reference Books:

1. Nirmalya Kumar Sinha & Surajit Majumder, *A Text Book of National Service Scheme* Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81-952368-8-6)
2. *Red Book - National Cadet Corps* – Standing Instructions Vol I & II, DirectorateGeneral of NCC, Ministry of Defence, New Delhi
3. Davis M. L. and Cornwell D. A., "Introduction to Environmental Engineering", McGraw Hill, New York 4/e 2008
4. Masters G. M., Joseph K. and Nagendran R. "Introduction to Environmental Engineering and Science", Pearson Education, New Delhi. 2/e 2007
5. Ram Ahuja. *Social Problems in India*, Rawat Publications, New Delhi.

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities.
2. Institutes are required to provide instructor to mentor the students.

Evaluation Guidelines:

- Evaluated for a total of 100 marks.
- A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting vivavoce on the subject

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COMMUNICATIVE   ENGLISH
(for Civil Engineering)

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Course Objectives:
The main objective of introducing this course, *Communicative English,* is to facilitate effective listening, Reading, Speaking and Writing skills among the students. It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary. This course helps the students to make them effective in speaking and writing skills and to make them industry ready.

Course Outcomes:
CO1: Understand the context, topic, and pieces of specific information from social or Transactional dialogues.
CO2: Apply grammatical structures to formulate sentences and correct word forms.
CO3: Analyze discourse markers to speak clearly on a specific topic in informal discussions.
CO4: Evaluate reading / listening texts and to write summaries based on global comprehension of these texts.
CO5: Create a coherent paragraph, essay, and resume.

UNIT I
Lesson: HUMAN VALUES: Gift of Magi **(Short Story)**
Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.
Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.
Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.
Writing: Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.
Grammar: Parts of Speech, Basic Sentence Structures-forming questions
Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNIT II
Lesson: NATURE: The Brook by Alfred Tennyson (Poem)

Listening: Answering a series of questions about main ideas and supporting ideas after listening to audio texts.
Speaking: Discussion in pairs/small groups on specific topics followed by short structure talks.
Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.
Writing: Structure of a paragraph - Paragraph writing (specific topics) **Grammar:** Cohesive devices - linkers, use of articles and zero article; prepositions.
Vocabulary: Homonyms, Homophones, Homographs.

UNIT III
Lesson: BIOGRAPHY: Elon Musk
Listening: Listening for global comprehension and summarizing what is listened to.
Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed

Reading: Readinga text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.
Writing: Summarizing, Note-making, paraphrasing
Grammar: Verbs - tenses; subject-verb agreement; Compound words, Collocations
Vocabulary: Compound words, Collocations

UNIT IV
Lesson: INSPIRATION: The Toys of Peace by Saki

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.
Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.
Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.
Writing: Letter Writing: Official Letters, Resumes
Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice
Vocabulary: Words often confused, Jargons

UNIT V
Lesson: MOTIVATION: The Power of Intrapersonal Communication (An Essay)

Listening: Identifying key terms,   understanding concepts and answering a series of relevant questions that test comprehension.
Speaking: Formal oral presentations on topics from academic contexts
Reading: Reading comprehension.
Writing: Writing structured essays on specific topics.
Grammar: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)
Vocabulary: Technical Jargons

Textbooks:

1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, OrientBlack Swan, 2023 (Units 1,2 & 3)
2.
3. Empowering with Language by Cengage Publications, 2023 (Units 4 & 5)

Reference Books:

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020

2. Bailey, Stephen. Academic writing: A Handbook for International Students. Routledge, 2014.

3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.

4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary. Anchor, 2014.

Web Resources:
GRAMMAR:

1. www.bbc.co.uk/learningenglish
2. https://dictionary.cambridge.org/grammar/british-grammar/
3. www.eslpod.com/index.html
4. https://www.learngrammar.net/
5. https://english4today.com/english-grammar-online-with-quizzes/
6. https://www.talkenglish.com/grammar/grammar.aspx

VOCABULARY

1. https://www.youtube.com/c/DailyVideoVocabulary/videos
2. https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA

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ENGINEERING CHEMISTRY
(for Civil Engineering)

Course Objectives:
- To familiarize engineering chemistry and its applications
- To impart the concept of soft and hard waters, softening methods of hard water
- To train the students on the principles and applications of ectrochemistry, polymers, surface chemistry, and cement

.

Course Outcomes: At the end of the course, the students will be able to

CO1: Demonstrate the corrosion prevention methods and factors affecting corrosion.

CO2: Explain the preparation, properties, and applications of thermoplastics & thermosetting, elastomers & conducting polymers.

CO3: Explain calorific values, octane number, refining of petroleum and cracking of oils.

CO4: Explain the setting and hardening of cement.

CO5: Summarize the concepts of colloids, micelle and nanomaterials.

UNIT I   Water Technology

Soft and hardwater, Estimation of hardness of water by EDTA Method, Estimation of dissolved Oxygen - Boiler troubles –Priming, foaming**,** scale and sludge, Caustic embrittlement, Industrial water treatment – Specifications for drinking water, Bureau of Indian Standards(BIS) and World health organization(WHO) standards, Ion-exchange processes - desalination of brackish water, reverse osmosis (RO) and electrodialysis.

UNIT II   Electrochemistry and Applications

Electrodes –electrochemical cell, Nernst equation, cell potential calculations.

Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium (NiCad),and lithium ion batteries- working principle of the batteries including cell reactions; Fuel cells-Basic Concepts,the principle and working of hydrogen-oxygen Fuel cell.

Corrosion: Introduction to corrosion, electrochemical theory of corrosion, differential aerationcell corrosion, galvanic corrosion, metal oxide formation by dry electrochemical corrosion, Pilling Bedworth ratios and uses, Factors affecting the corrosion**,** cathodic and anodic protection, electroplating and electro less plating (Nickel and Copper).

UNIT III   Polymers and Fuel Chemistry

Introduction to polymers, functionality of monomers, Mechanism of chain growth, step growth polymerization.

Thermoplastics and Thermo-setting plastics-: Preparation, properties and applications of poly styrene. PVC Nylon 6,6 and Bakelite.

Elastomers – Preparation, properties and applications of Buna S, Buna N, Thiokol rubbers.

Fuels **–** Types of fuels, calorific value of fuels, numerical problems based on calorific value; Analysis of coal (Proximate and Ultimate analysis), Liquid Fuels, refining of petroleum, Octaneand Cetane number- alternative fuels- propane, methanol, ethanol and bio fuel-bio diesel.

UNIT IV   Modern Engineering Materials

Composites- Definition, Constituents, Classification- Particle, Fibre and Structural reinforced

composites, properties and Engineering applications

Refractories- Classification, Properties, Factors affecting the refractory materials and Applications.

Lubricants- Classification, Functions of lubricants, Mechanism, Properties of lubricating oils – Viscosity, Viscosity Index, Flash point, Fire point, Cloud point, saponification and Applications.

Building materials- Portland Cement, constituents, Setting and Hardening of cement.

UNIT V　　Surface Chemistry and Nanomaterials

Introduction to surface chemistry, colloids, nanometals and nanometal oxides, micelle formation, synthesis of colloids (Braggs Method), chemical and biological methods of preparation of nanometals and metal oxides, stabilization of colloids and nanomaterials by stabilizing agents, adsorption isotherm (Freundlich and Longmuir), BET equation (no derivation) applications of colloids and nanomaterials – catalysis, medicine, sensors, etc.

Textbooks:
1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:
1. H.F.W. Taylor, Cement Chemistry, 2/e, Thomas Telford Publications, 1997.
2. D.J. Shaw, Introduction to Colloids and Surface Chemistry, Butterworth-Heineman, 1992.
   Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition

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DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS
(for Civil Engineering)

Course Objectives:

- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real-world applications.

Course Outcomes: At the end of the course, the student will be able to CO1:
Solve the differential equations related to various engineering fields.
CO2: Identify solution methods for partial differential equations that model physical processes.
CO3: Interpret the physical meaning of different operators such as gradient, curl and divergence.
CO4: Estimate the work done against a field, circulation and flux using vector calculus.

UNIT I　　　　　　　Differential equations of first order and first degree

Linear differential equations – Bernoulli's equations- Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling – Law of natural growth and decay- Electrical circuits.

UNIT II　　　　　Linear differential equations of higher order (Constant Coefficients)

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Simple Harmonic motion.

UNIT III　　　　　　Partial Differential Equations
Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method. Homogeneous Linear Partial differential equations with constant coefficients.

UNIT IV　　　　　　Vector differentiation
Scalar and vector point functions, vector operator Del, Del applies to scalar point functions-Gradient, Directional derivative, del applied to vector point functions-Divergence and Curl, vector identities.
UNIT V　　　　　Vector integration

Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and related problems.

Textbooks:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

Reference Books:

1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, Dennis G. Zill and Warren S. Wright, Jones and Bartlett, 2018.
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018,5th Edition.
4. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
5. Higher Engineering Mathematics, B. V. Ramana, , McGraw Hill Education, 2017

L	T	P	C
3	0	0	3

BASIC CIVIL AND MECHANICAL ENGINEERING
(Common to All branches of Engineering)

Course Objectives:
- Get familiarized with the scope and importance of Civil Engineering sub-divisions.
- Introduce the preliminary concepts of surveying.
- Acquire preliminary knowledge on Transportation and its importance in nation's economy.
- Get familiarized with the importance of quality, conveyance and storage of water.
- Introduction to basic civil engineering materials and construction techniques.

Course Outcomes: On completion of the course, the student should be able to:

CO1: Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.

CO2: Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.

CO3: Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.

CO4: Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.

CO5: Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.

UNIT I
Basics of Civil Engineering: Role of Civil Engineers in Society- Various Disciplines of Civil Engineering- Structural Engineering- Geo-technical Engineering- Transportation Engineering - Hydraulics and Water Resources Engineering - Environmental Engineering-Scope of each discipline - Building Construction and Planning- Construction Materials-Cement - Aggregate - Bricks- Cement concrete- Steel. Introduction to Prefabricated construction Techniques.

UNIT II
Surveying: Objectives of Surveying- Horizontal Measurements- Angular Measurements-Introduction to Bearings Levelling instruments used for levelling -Simple problems on levelling and bearings-Contour mapping.

UNIT III
Transportation Engineering Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements - Simple Differences. Basics of Harbour, Tunnel, Airport, and Railway Engineering.

Water Resources and Environmental Engineering: Introduction, Sources of water- Quality of water- Specifications- Introduction to Hydrology–Rainwater Harvesting-Water Storage and Conveyance Structures (Simple introduction to Dams and Reservoirs).

Textbooks:
1. Basic Civil Engineering, M.S.Palanisamy, , Tata Mcgraw Hill publications (India) Pvt. Ltd. Fourth Edition.
2. Introduction to Civil Engineering, S.S. Bhavikatti, New Age International Publishers. 2022. First Edition.
3. Basic Civil Engineering, Satheesh Gopi, Pearson Publications, 2009, First Edition.

Reference Books:
1. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers 2019. Fifth Edition.
2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi. 2016
3. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi 2023. 38th Edition.
4. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand andBrothers Publications 2019. 10th Edition.
5. Indian Standard DRINKING WATER — SPECIFICATION IS 10500-2012.

PART B: BASIC MECHANICAL ENGINEERING

Course Objectives: The students after completing the course are expected to
- Get familiarized with the scope and importance of Mechanical Engineering in different sectors and industries.
- Explain different engineering materials and different manufacturing processes.
- Provide an overview of different thermal and mechanical transmission systems and introduce basics of robotics and its applications.

Course Outcomes: On completion of the course, the student should be able to
CO1: Understand the different manufacturing processes.
CO2: Explain the basics of thermal engineering and its applications.
CO3: Describe the working of different mechanical power transmission systems and power plants.
CO4: Describe the basics of robotics and its applications.

UNIT I

Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society- Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.
Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials.

UNIT II

Manufacturing Processes: Principles of Casting**,** Forming, joining processes, Machining, Introduction to CNC machines, 3D printing, and Smart manufacturing.

Thermal Engineering – Working principle of Boilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.

UNIT III

Power plants – Working principle of Steam, Diesel, Hydro, Nuclear power plants.
Mechanical Power Transmission - Belt Drives, Chain, Rope drives, Gear Drives and their applications.
Introduction to Robotics - Joints & links, configurations, and applications of robotics.

(Note: The subject covers only the basic principles of Civil and Mechanical Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject.)

Textbooks:

1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India) Pvt. Ltd.
2. A text book of Theory of Machines by S.S. Rattan, Tata McGraw Hill Publications, (India) Pvt. Ltd.
3. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, Cengage learning India Pvt. Ltd.

Reference Books:

1. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, Tata McGraw Hill publications (India) Pvt. Ltd.
2. Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India) Pvt. Ltd.
3. 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak M Pandey, Springer publications
4. Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I

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ENGINEERING MECHANICS
(Common to Civil, Mechanical Engineering & Allied branches)

</div>

Course Objectives:
- To get familiarized with different types of force systems.
- To draw accurate free body diagrams representing forces and moments acting on a body to analyze the equilibrium of system of forces.
- To teach the basic principles of center of gravity, centroid and moment of inertia and determine them for different simple and composite bodies.
- To apply the Work-Energy method to particle motion.
- To understand the kinematics and kinetics of translational and rotational motion of rigid bodies.

Course Outcomes: On Completion of the course, the student should be able to
CO1: Understand the fundamental concepts in mechanics and determine the frictional forces for bodies in contact.
CO2: Analyze different force systems such as concurrent, coplanar and spatial systems and calculate their resultant forces and moments.
CO3: Calculate the centroids, center of gravity and moment of inertia of different geometrical shapes.
CO4: Apply the principles of work-energy and impulse-momentum to solve the problems of rectilinear and curvilinear motion of a particle.
CO5: Solve the problems involving the translational and rotational motion of rigid bodies.

UNIT I
Introduction to Engineering Mechanics– Basic Concepts. Scope and Applications
Systems of Forces: Coplanar Concurrent Forces– Components in Space–Resultant–Moment of Force and its Application –Couples and Resultant of Force Systems.
Friction: Introduction**,** limiting friction and impending motion, Coulomb'slaws of dryfriction, coefficient of friction, Cone of Static friction.

UNIT II
Equilibrium of Systems of Forces: Free Body Diagrams, Lami's Theorem, Equations of Equilibrium of Coplanar Systems, Graphical method for the equilibrium, Triangle law of forces, converse of the law of polygon of forces condition of equilibrium, Equations of Equilibrium for Spatial System of forces, Numerical examples on spatial system of forces using vector approach, Analysis of plane trusses.
Principle of virtual work with simple examples

UNIT III
Centroid: Centroids of simple figures (from basic principles)–Centroids of Composite Figures.
Centre of Gravity: Centre of gravity of simple body (from basic principles), Centre of gravity of composite bodies, Pappus theorems.

Area Moments of Inertia: Definition– Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.
Mass Moment of Inertia: Moment of Inertia of Masses, Transfer Formula for Mass Momentsof Inertia, Mass Moment of Inertia of composite bodies.

UNIT IV
Rectilinear and Curvilinear motion of a particle: Kinematics and Kinetics –D'Alembert's Principle - Work Energy method and applications to particle motion-Impulse Momentum method.
UNIT V
Rigid body Motion: Kinematics and Kinetics of translation, Rotation about fixed axis and plane motion, Work Energy method and Impulse Momentum method.

Textbooks:
1. Engineering Mechanics, S. Timoshenko, D. H. Young, J.V. Rao, S. Pati.,, McGraw Hill Education 2017. 5th Edition.
2. Engineering Mechanics, P.C.Dumir- S.Sengupta and Srinivas V veeravalli , Universitypress. 2020. First Edition.
3. A Textbook of Engineering Mechanics, S.S Bhavikatti. New age international publications 2018. 4th Edition.

Reference Books:
1. Engineering Mechanics, Statics and Dynamics, Rogers and M A. Nelson., McGraw HillEducation. 2017. First Edition.
2. Engineering Mechanics, Statics and Dynamics, I.H. Shames., PHI, 2002. 4th Edition.
3. Engineering Mechanics, Volume-I: Statics, Volume-II: Dynamics, J. L. Meriam and L. G. Kraige., John Wiley, 2008. 6th Edition.
4. Introduction to Statics and Dynamics, Basudev Battachatia, Oxford University Press,2014. Second Edition
5. Engineering Mechanics: Statics and Dynamics, Hibbeler R.C., Pearson Education, Inc.,New Delhi, 2022, 14th Edition

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COMMUNICATIVE ENGLISH LAB
(for Civil Engineering)

Course Objectives:

The main objective of introducing this course, Communicative English Laboratory, is to expose the students to a variety of self-instructional, learner friendly modes of language learning. The students will get trained in basic communication skills and also make them ready to face job interviews.

Course Outcomes:

CO1: Understand the different aspects of the English language proficiency with emphasis on LSRW skills.

CO2: Apply communication skills through various language learning activities.

CO3: Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.

CO4: Evaluate and exhibit professionalism in participating in debates and group discussions.

CO5: Create effective Course Objectives:

List of Topics:

1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play or Conversational Practice
5. E-mail Writing
6. Resume Writing, Cover letter, SOP
7. Group Discussions-methods & practice
8. Debates - Methods & Practice
9. PPT Presentations/ Poster Presentation
10. Interviews Skills

Suggested Software:

- Walden Infotech
- Softx Communicative English lab software
- Young India Films

Reference Books:

1. Raman Meenakshi, Sangeeta-Sharma. *Technical Communication*. Oxford Press.2018.
2. Taylor Grant: *English Conversation Practice*, Tata McGraw-Hill Education India, 2016
3. Hewing's, Martin. Cambridge *Academic English* (B2). CUP, 2012.
4. J. Sethi & P.V. Dhamija. *A Course in Phonetics and Spoken English*, (2nd Ed), Kindle, 2013

Web Resources:

Spoken English:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. https://www.britishcouncil.in/english/online
5. http://www.letstalkpodcast.com/
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. https://www.youtube.com/c/ArnelsEverydayEnglish/featured
8. https://www.youtube.com/c/engvidAdam/featured
9. https://www.youtube.com/c/EnglishClass101/featured
10. https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

2. https://www.youtube.com/user/letstalkaccent/videos
3. https://www.youtube.com/c/EngLanguageClub/featured
4. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
   https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_

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ENGINEERING CHEMISTRY LAB
(for Civil Engineering)

Course Objectives:
- To verify the fundamental concepts with experiments

Course Outcomes: At the end of the course, the students will be able to
CO1: Determine the cell constant and conductance of solutions.
CO2: Prepare advanced polymer materials.
CO3: Determine the physical properties like surface tension, adsorption and viscosity.
CO4: Estimate the Iron and Calcium in cement.
CO5: Calculate the hardness of water.

List of Experiments:
1. Determination of Hardness of a groundwater sample.
2. Estimation of Dissolved Oxygen by Winkler's method
3. Determination of Strength of an acid in Pb-Acid battery
4. Preparation of a polymer (Bakelite)
5. Determination of percentage of Iron in Cement sample by colorimetry
6. Estimation of Calcium in port land Cement
7. Preparation of nanomaterials by precipitation method.
8. Adsorption of acetic acid by charcoal
9. Determination of percentage Moisture content in a coal sample
10. Determination of Viscosity of lubricating oil by Redwood Viscometer 1
11. Determination of Viscosity of lubricating oil by Redwood Viscometer 2
12. Determination of Calorific value of gases by Junker's gas Calorimeter

Reference:
"Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson
Publicationsby J. Mendham, R.C. Denney, J.D. Barnes and B. Sivasankar

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ENGINEERING WORKSHOP
(Common to All branches of Engineering)

Course Objectives:

To familiarize students with wood working, sheet metal operations, fitting, electrical house wiring skills, and basic repairs of two-wheeler vehicle.

Course Outcomes:

CO1: Identify workshop tools and their operational capabilities.
CO2: Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding.
CO3: Apply fitting operations in various applications.
CO4: Apply basic electrical engineering knowledge for House Wiring Practice

SYLLABUS

1. **Demonstration**: Safety practices and precautions to be observed in workshop.
2. **Wood Working:** Familiarity with different types of woods and tools used in wood working and make following joints.
   a) Half – Lap joint   b) Mortise and Tenon joint   c) Corner Dovetail joint or Bridle joint
3. **Sheet Metal Working**: Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.
   a) Tapered tray   b) Conical funnel   c) Elbow pipe   d) Brazing
4. **Fitting:** Familiarity with different types of tools used in fitting and do the following fitting exercises.
   a) V-fit   b) Dovetail fit   c) Semi-circular fit   d) Bicycle tire puncture and change of two-wheeler tyre
5. **Electrical Wiring**: Familiarity with different types of basic electrical circuits and make the following connections.
   a) Parallel and series   b) Two-way switch   c) Godown lighting
   d) Tube light   e) Three phase motor   f) Soldering of wires
6. **Foundry Trade:** Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Patterns.
7. **Welding Shop**: Demonstration and practice on Arc Welding and Gas welding. Preparation of Lap joint and Butt joint.
8. **Plumbing:** Demonstration and practice of Plumbing tools, Preparation of Pipe joints with coupling for same diameter and with reducer for different diameters.
9. **Basic repairs of Two-wheeler vehicle** – Demonstration of working of two-wheeler vehicle and its repairs.

Textbooks:

1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published,2019. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge publishers, 5th Edn. 2015.
2. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.

Reference Books:

1. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007, 14th edition
2. Workshop Practice by H. S. Bawa, Tata-McGraw Hill, 2004.
3. Wiring Estimating, Costing and Contracting; Soni P.M. & Upadhyay P.A.; Atul Prakasan,2021-22

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0	0	3	1.5

ENGINEERING MECHANICS & BUILDING PRACTICES LAB
(Civil Engineering & allied branches)

Course Objectives: The students completing the course are expected to
- Verify the Law of Parallelogram of Forces and Lami's theorem.
- Determine the coefficients of friction of Static and Rolling friction and Centre of gravity of different plane Lamina.
- Understand the layout of a building, concepts of Non-Destructive Testing and different Alternative Materials.

Course Outcomes: On completion of the course, the student should be able to:

CO1: Evaluate the coefficient of friction between two different surfaces and between the inclined plane and the roller.

CO2: Verify Law of Parallelogram of forces and Law of Moment using force polygon and bellcrank lever.

CO3: Determine the Centre of gravity different configurations and

CO4: Understand the Quality Testing and Assessment Procedures and principles of Non-Destructive Testing.

CO5: Exposure to safety practices in the construction industry.

The following experiments need to be performed using both Hardware and simulation Software.

Students have to perform any 10 of the following Experiments:
1. To study various types of tools used in construction.
2. Forces in Pin Jointed Trusses
3. Experimental Proof of Lami's Theorem
4. Verification of Law of Parallelogram of Forces.
5. Determination of Centroid of different shaped Plane Lamina.
6. Determination of coefficient of Static and Rolling Friction.
7. Verification of Law of Moment using Rotation Disc Apparatus and Bell Crank Lever
8. Study of Alternative Materials like M-sand, Fly ash, Sea Sand etc.
9. Field-Visit to understand the Quality Testing - report.
10. Safety Practices in Construction industry
11. Demonstration of Non-Destructive Testing - using Rebound Hammer & UPV
12. Study of Plumbing in buildings.

References:

1. S. Timoshenko, D. H. Young, J.V. Rao, S. Pati., Engineering Mechanics, 5th Edition, McGrawHill Education.
2. Hibbeler R.C., Engineering Mechanics: Statics and Dynamics, 14th Edition, Pearson Education,Inc., New Delhi, 2022
3. Non-Destructive Testing for concrete-Method of test- IS 13311(Part- 2) : 1992

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HEALTH AND WELLNESS, YOGA AND SPORTS FOR II SEMESTER
Course Objectives:

The main objective of introducing this course is to make the students maintain their mental and physical wellness by balancing emotions in their life. It mainly enhances the essential traits required for the development of the personality.

Course Outcomes: After completion of the course the student will be able to

CO1: Understand the importance of yoga and sports for Physical fitness and sound health.
CO2: Demonstrate an understanding of health-related fitness components. **CO3:** Compare and contrast various activities that help enhance their health. **CO4:** Assess current personal fitness levels.
CO5: Develop Positive Personality

UNIT I

Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index(BMI) of all age groups.
Activities:

i)   Organizing health awareness programmes in community
ii) Preparation of health profile
iii) Preparation of chart for balance diet for all age groups

UNIT II

Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas- Pranayama and meditation, stress management and yoga, Mental health and yoga practice.
Activities:
Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar

UNIT III

Concept of Sports and fitness, importance, fitness components, history of sports,Ancient and Modern Olympics, Asian games and Commonwealth games.
Activities:

i)   Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc.
     Practicing general and specific warm up, aerobics
ii) Practicing cardio respiratory fitness, treadmill, run test, 9 min walk, skipping and running.

Reference Books:

1. Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones & Bartlett Learning,2022
2. T.K.V.Desikachar. The Heart of Yoga: Developing a Personal Practice
3. Archie J.Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993
4. Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to SurvivingAnywhere Third Edition, William Morrow Paperbacks, 2014
5. The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rd ed. HumanKinetics, Inc.2014

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities of Health/Sports/Yoga.
2. Institutes must provide field/facility and offer the minimum of five choices of as manyas Games/Sports.
3. Institutes are required to provide sports instructor / yoga teacher to mentor the students.

Evaluation Guidelines:

- Evaluated for a total of 100 marks.
- A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totalling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting vivavoce on the subject.

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DEPARTMENT OF CIVIL ENGINEERING
(R23-IInd YEAR COURSE STRUCTURE)

B.Tech II Year I Semester

S.NO.	CATEGORY	SUBJECT CODE	TITLE	L	T	P	CREDITS
1	BS	B23SH33	Numerical Techniques And Statistical Methods	3	0	0	3
2	HSMC	B23SH31	Universal human values – understanding harmony and Ethical human conduct	2	1	0	3
3	Engineering Science	B23CE31	Surveying	3	0	0	3
4	Professional Core	B23CE32	Strength of Materials	3	0	0	3
5	Professional Core	B23CE33	Fluid Mechanics	3	0	0	3
6	Professional Core	B23CE37	Surveying Lab	0	0	3	1.5
7	Professional Core	B23CE38	Strength of Materials Lab	0	0	3	1.5
8	Skill Enhancement Course	B23CE39	Building Planning and Drawing	0	1	2	2
			Total	**14**	**2**	**8**	**20**

B.Tech II Year II Semester

S.NO.	CATEGORY	SUBJECT CODE	TITLE	L	T	P	CREDITS
1	Management Course-I	B23SH41	Managerial Economics and Financial Analysis	2	0	0	2
2	Engineering Science / Basic Science	B23CE41	Engineering Geology	3	0	0	3
3	Professional Core	B23CE42	Concrete Technology	3	0	0	3
4	Professional Core	B23CE43	Structural Analysis	3	0	0	3
5	Professional Core	B23CE44	Hydraulics & Hydraulic Machinery	3	0	0	3
6	Professional Core	B23CE47	Concrete Technology Lab	0	0	3	1.5
7	Professional Core	B23CE48	Engineering Geology lab	0	0	3	1.5
8	Skill Enhancement course	B23CE49	Remote Sensing & Geographical Information Systems	0	1	2	2
9	Engineering Science	B23CC41	Design Thinking & Innovation	1	0	2	2
			Total	**15**	**1**	**10**	**21**
10	Mandatory course	B23CE45	Building materials and Construction	3	0	0	-
11	Audit Course	B23CC43	Environmental Science	2	0	0	-
		Mandatory Community Service Project Internship of 08 weeks duration during summer vacation					

DEPARTMENT OF CIVIL ENGINEERING

II YEAR - I SEMESTER

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L	T	P	C
3	0	0	3

II Year I Semester

NUMERICAL TECHNIQUES AND STATISTICAL METHODS

Course Objectives:

- To elucidate the different numerical methods to solve non linear algebraic equations

- To disseminate the use of different numerical techniques for carrying out numericalintegration.

- To familiarize the students with the foundations of probability and statistical methods.

- To equip the students to solve application problems in their disciplines.

Course Outcomes:

1. Evaluate the approximate roots of polynomial and transcendental equations by different algorithms. Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)

2. Apply numerical integral techniques to different Engineering problems. Apply different algorithms for approximating the solutions of ordinary differential equations with initialconditions to its analytical computations(L3)

3. Apply discrete and continuous probability distributions(L3)

4. Design the components of a classical hypothesis test(L6)

5. Inferthestatisticalinferentialmethodsbasedonsmallandlargesamplingtests(L4)

UNIT–I

Iterative Methods:

Introduction– Solutions of algebraic and transcendental equations: Bisection method–Secantmethod–Method of false position–Iteration method–Newton-Raphson method (One variable and simultaneous Equations)

Interpolation: Newton's forward and backward formulae for interpolation–Interpolation withunequal intervals – Lagrange's interpolation formula

UNIT–II

Numerical integration, Solution of ordinary differential equations with initial conditions:
Trapezoidal rule– Simpson's $1/3^{rd}$and $3/8^{th}$rule– Solution of initial value problems by Taylor's series–Picard's method of successive approximations–Euler's method– Runge- Kutta method (second and fourth order) – Milne's Predictor and Corrector Method.

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UNIT–III

Probability and Distributions:

Baye's theorem – Random variables – Discrete and Continuous random variables – Distribution functions– Probability mass function ,Probability density function and Cumulative distribution functions – Mathematical Expectation and Variance – Binomial, Poisson, Uniform and Normal distributions.

UNIT–IV

Sampling Theory

Introduction – Population and Samples – Sampling distribution of Means and Variance (definition only) –Point and Interval estimations – Maximum error of estimate – Central limit theorem (without proof)– Estimation using t,z^2 and F-distributions.

UNIT–V
Tests of Hypothesis
Introduction – Hypothesis – Null and Alternative Hypothesis – Type I and Type II errors – Level of significance– One tail and two-tail tests – Test of significance for large samples and Small Samples: Single and difference means – Single and two proportions –Student's t-test,F- test, z^2-test.

Textbooks:

1. **B.S.Grewal,**Higher Engineering Mathematics,44[th]Edition,KhannaPublishers.

2. **MillerandFreund's**,Probability and Statistics for Engineers,7/e,Pearson,2008.

Reference Books:

1. **Steven C. Chapra,** Applied Numerical Methods with MATLAB for Engineering andScience,Tata Mc. Graw Hill Education.

2. **M.K.Jain,S.R.K.Iyengar and R.K.Jain,**Numerical Methods for Scientific andEngineering Computation, New Age International Publications.

3. **Lawrence Turyn,** Advanced Engineering Mathematics, CRC Press.

4. **S.C.GuptaandV.K.Kapoor**,FundamentalsofMathematicalStatistics,11/e, Sultan Chand& Sons Publications, 2012.

5. **ShronL.Myers,KeyingYe, Ronald EWalpole,**ProbabilityandStatisticsEngineers andthe Scientists,8th Edition, Pearson 2007.

6. **Jay l. Devore,** Probability and Statistics for Engineering and the Sciences, 8th Edition,Cengage.

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II Year I Semester

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UNIVERSAL HUMAN VALUES –
UNDERSTANDING HARMONY AND ETHICAL HUMAN CONDUCT

Course Objectives:
- To help the students appreciate the essential complementary between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.

Course Outcomes:
- Define the terms like Natural Acceptance, Happiness and Prosperity (L1, L2)
- Identify one's self, and one's surroundings (family, society nature) (L1, L2)
- Apply what they have learnt to their own self in different day-to-day settings in real life (L3)
- Relate human values with human relationship and human society. (L4)
- Justify the need for universal human values and harmonious existence (L5)
- Develop as socially and ecologically responsible engineers (L3, L6)

Course Topics

The course has 28 lectures and 14 tutorials in 5 modules. The lectures and tutorials are of 1- hour duration. Tutorial sessions are to be used to explore and practice what has been proposed during the lecture sessions.

The Teacher's Manual provides the outline for lectures as well as practice sessions. The teacher is expected to present the issues to be discussed as propositions and encourage the students to have a dialogue.

UNIT I
Introduction to Value Education (6 lectures and 3 tutorials for practice session)
Lecture 1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education)
Lecture 2: Understanding Value Education
Tutorial 1: Practice Session PS1 Sharing about Oneself Lecture 3: self-exploration as the Process for Value Education
Lecture 4: Continuous Happiness and Prosperity –   the Basic Human   Aspirations
Tutorial 2: Practice Session PS2 Exploring Human Consciousness
Lecture 5: Happiness and Prosperity – Current Scenario Lecture 6: Method to Fulfill the Basic Human Aspirations Tutorial 3: Practice Session PS3 Exploring Natural Acceptance

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UNIT II

Harmony in the Human Being (6 lectures and 3 tutorials for practice session) Lecture 7: Understanding Human being as the Co-existence of the self and the body. Lecture 8: Distinguishing between the Needs of the self and the body

Tutorial 4: Practice Session PS4 Exploring the difference of Needs of self and body. Lecture 9: The body as an Instrument of the self

Lecture 10: Understanding Harmony in the self

Tutorial 5: Practice Session PS5 Exploring Sources of Imagination in the self Lecture 11: Harmony of the self with the body

Lecture 12: Programme to ensure self-regulation and Health

Tutorial 6: Practice Session PS6 Exploring Harmony of self with the body

UNIT III

Harmony in the Family and Society (6 lectures and 3 tutorials for practice session) Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction

Lecture 14: 'Trust' – the Foundational Value in Relationship Tutorial 7: Practice Session PS7 Exploring the Feeling of Trust Lecture 15: 'Respect' – as the Right Evaluation

Tutorial 8: Practice Session PS8 Exploring the Feeling of Respect Lecture 16: Other Feelings, Justice in Human-to-Human Relationship Lecture 17: Understanding Harmony in the Society

Lecture 18: Vision for the Universal Human Order

Tutorial 9: Practice Session PS9 Exploring Systems to fulfill Human Goal

UNIT IV

Harmony in the Nature/Existence (4 lectures and 2 tutorials for practice session) Lecture 19: Understanding Harmony in the Nature

Lecture 20: Interconnectedness, self-regulation and Mutual Fulfillment among the Four Orders of Nature

Tutorial 10: Practice Session PS10 Exploring the Four Orders of Nature Lecture 21: Realizing Existence as Co-existence at All Levels

Lecture 22: The Holistic Perception of Harmony in Existence

Tutorial 11: Practice Session PS11 Exploring Co-existence in Existence.

UNIT V

Implications of the Holistic Understanding – a Look at Professional Ethics (6 lectures and 3 tutorials for practice session)

Lecture 23: Natural Acceptance of Human Values Lecture 24: Definitiveness of (Ethical) Human Conduct

Tutorial 12: Practice Session PS12 Exploring Ethical Human Conduct

Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order

Lecture 26: Competence in Professional Ethics

Tutorial 13: Practice Session PS13 Exploring Humanistic Models in Education

Lecture 27: Holistic Technologies, Production Systems and Management Models-Typical Case Studies

Lecture 28: Strategies for Transition towards Value-based Life and Profession

Tutorial 14: Practice Session PS14 Exploring Steps of Transition towards Universal Human Order

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Practice Sessions for UNIT I – Introduction to Value Education PS1Sharing about Oneself
PS2 Exploring Human Consciousness PS3Exploring Natural Acceptance

Practice Sessions for UNIT II – Harmony in the Human Being PS4Exploring the difference of Needs of self and body
PS5 Exploring Sources of Imagination in the self PS6Exploring Harmony of self with the body

Practice Sessions for UNIT III – Harmony in the Family and Society PS7Exploring the Feeling of Trust
PS8 Exploring the Feeling of Respect
PS9 Exploring Systems to fulfill Human Goal

Practice Sessions for UNIT IV – Harmony in the Nature (Existence) PS10Exploring the Four Orders of Nature
PS11 Exploring Co-existence in Existence

Practice Sessions for UNIT V – Implications of the Holistic Understanding – a Look atProfessional Ethics
PS12 Exploring Ethical Human Conduct
PS13 Exploring Humanistic Models in Education
PS14 Exploring Steps of Transition towards Universal Human Order

READINGS:
Textbook and Teachers Manual
a. The Textbook
R R Gaur, R Asthana, G P Bagaria, *A Foundation Course in Human Values and Professional Ethics*, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
b. The Teacher's Manual
R R Gaur, R Asthana, G P Bagaria,*Teachers' Manual for A Foundation Course in Human Values and Professional Ethics,* 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books
1. *JeevanVidya: EkParichaya,* A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
2. *Human Values*, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. *The Story of Stuff* (Book).
4. *The Story of My Experiments with Truth* - by Mohandas Karamchand Gandhi
5. *Small is Beautiful* - E. F Schumacher.
6. *Slow is Beautifu*l - Cecile Andrews
7. *Economy of Permanence* - J C Kumarappa
8. *Bharat Mein Angreji Raj* – PanditSunderlal

9. *Rediscovering India* - by Dharampal
10. *Hind Swaraj or Indian Home Rule* - by Mohandas K. Gandhi
11. *India Wins Freedom* - Maulana Abdul Kalam Azad
12. *Vivekananda* - Romain Rolland (English)
13. *Gandhi* - Romain Rolland (English)

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Mode of Conduct:

Lecture hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them.

Tutorial hours are to be used for practice sessions.

While analyzing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements.

In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own self and do self-observation, self-reflection and self-exploration.

Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than" extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values. It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses. This course is to be taught by faculty from every teaching department, not exclusively by any one department. Teacher preparation with a minimum exposure to at least one 8-day Faculty Development Program on Universal Human Values is deemed essential.

Online Resources:

1. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%201-Introduction%20to%20Value%20Education.pdf
2. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%202-Harmony%20in%20the%20Human%20Being.pdf
3. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf
4. https://fdp-si.aicte-india.org/UHV%201%20Teaching%20Material/D3-S2%20Respect%20July%202023.pdf
5. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf
6. https://fdp-si.aicte-india.org/download/FDPTeachingMaterial/3-days%20FDP-SI%20UHV%20Teaching%20Material/Day%203%20Handouts/UHV%203D%20D3-S2A%20Und%20Nature-Existence.pdf
7. https://fdp-si.aicte-india.org/UHV%20II%20Teaching%20Material/UHV%20II%20Lecture%2023-25%20Ethics%20v1.pdf
8. https://www.studocu.com/in/document/kiet-group-of-institutions/universal-human-values/chapter-5-holistic-understanding-of-harmony-on-professional-ethics/62490385
9. https://onlinecourses.swayam2.ac.in/aic22_ge23/preview

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II Year – I Semester

L	T	P	C
3	0	0	3

SURVEYING

Course Objectives:

The objectives of this course are to:

1. Know the principle and methods of surveying and measuring of horizontal and vertical- distances and angles
2. Identification of source of errors and rectification methods
3. Know surveying principles to determine areas and volumes
4. Setting out curves and use modern surveying equipments for accurate results
5. Know the basics of Photogrammetric Surveying

Course Outcomes:

Course will enable the student to:

CO	STATEMENT	Blooms level
CO 1	Apply the principle and methods of surveying and measuring of horizontal and vertical- distances and angles	L2
CO 2	Identify the source of errors and rectification methods	L3
CO 3	Apply surveying principles to determine areas and volumes	L2
CO 4	Setting out curves and using modern surveying equipments	L3
CO 5	Apply the basics of Photogrammetry Surveying in field	L4

Course Articulation Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	2	1	3	-	3	3	3	-	1	1	1
CO2	3	2	-	2	2	2	-	2	2	2	-	2	2	1
CO3	3	1	-	1	1	1	-	1	2	2	-	2	3	1
CO4	3	3	-	3	3	1	-	1	1	1	-	2	1	2
CO5	3	1	-	3	3	1	-	1	1	1	-	2	3	2

Syllabus:

UNIT - I

Introduction and Basic Concepts: Introduction, Objectives, classification and principles of surveying, Surveying accessories.Introduction to Compass, leveling and Plane table surveying.

Linear distances- Approximate methods, Direct Methods- Chains- Tapes, ranging, Tape corrections.

Prismatic Compass- Bearings, included angles, Local Attraction, Magnetic Declination, and dip –systems and W.C.B and Q.B systems of locating bearings.

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UNIT - II

Leveling- Types of levels, methods of leveling, and Determination of levels, Effect of Curvature of Earth and Refraction.

Contouring- Characteristics and uses of Contours, methods of contour surveying.

Areas - Determination of areas consisting of irregular boundary and regular boundary.

Volumes -Determination of volume of earth work in cutting and embankments for level section, capacity of reservoirs.

UNIT - III

Theodolite Surveying: Types of Theodolites, temporary adjustments, measurement of horizontal angle by repetition method and reiteration method, measurement of vertical Angle, Trigonometrical leveling when base is accessible and inaccessible.

Traversing: Methods of traversing, traverse computations and adjustments, Introduction to Omitted measurements.

UNIT - IV

Curves: Types of curves and their necessity, elements of simple, compound, reverse curves. Introduction to Tacheometric Surveying.

Modern Surveying Methods: Principle and types of E.D.M. Instruments, Total station-advantages and Applications. Introduction to Global Positioning System. Introduction to Drone survey and LiDARSurvey(Light Detection And Ranging).

UNIT - V

Photogrammetry Surveying:

Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping- aerial triangulation, radial triangulation, methods; photographic mapping- mapping using paper prints, mapping using stereo-plotting instruments, mosaics, map substitutes.

Text Books:

1. Duggal S K, Surveying (Vol – 1 & 2) , Tata McGraw Hill Publishing Co. Ltd. New Delhi, 5th edition, 2019.
2. C Venkatramaiah , Textbook of Surveying ,Universities Press 1st Edition, 2011.

Reference Books:

1. B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Surveying (Vol – 1), Laxmi Publications (P) ltd., New Delhi, 18th edition 2024.
2. B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Surveying (Vol – 2), Laxmi Publications (P) ltd., New Delhi 17th 2022.
3. B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Surveying (Vol – 3), Laxmi Publications (P) ltd., New Delhi 16th 2023.

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4. Chandra A M, Plane Surveying and Higher Surveying, New age Internation1al

    Pvt. Ltd.,Publishers, New Delhi, 3rd Edition, 2015.

5. N.Basak ,Surveying and Levelling, Tata McGraw Hill Publishing Co. Ltd. New Delhi, 4th edition, 2014.

6. Arora K R, Surveying (Vol 1, 2 & 3),Standard Book House, Delhi. Edition: 12th, 2015.

Web Resources:

https://koha.srmap.edu.in/cgi-bin/koha/opac-detail.pl?biblionumber=11522&shelfbrowse_itemnumber=23066

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II Year – I Semester

L	T	P	C
3	0	0	3

STRENGTH OF MATERIALS

Course Learning Objectives:

1. To impart Fundamental concepts of Strength of Material and Principles of Elasticity and Plasticity Stress
2. To impart concepts of shear force and bending moment on various types of beams and loading conditions
3. To impart concepts of stresses developed in the cross section and bending equations calculation of section modulus of sections with different cross sections.
4. To the concepts above will be utilized in measuring deflections in beams under various loading and support conditions.
5. To classify cylinders and columns based on their thickness and to derive equations for measurement of stresses across the cross section when subjected to external pressure

Course Outcomes:

At the end of completion of the course, the student will be able

CO	STATEMENT	Blooms level
CO 1	To understand the basic materials behavior under the influence of different External loading conditions and the support conditions.	L2
CO 2	To draw the diagrams indicating the variation of the key performance features like axial forces, bending moment and shear forces in structural members.	L3
CO 3	To acquire knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams	L2
CO 4	To analyze the deflections due to various loading conditions.	L3
CO 5	To assess stresses across section of the thin, thick cylinders and columns to arrive at optimum sections to withstand the internal pressure using Lame's Equation	L4

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	2	-	-	-	-	-	2	1	3	3	1
CO2	2	1	-	1	-	-	-	-	-	1	1	2	3	1
CO3	2	2	-	1	-	-	-	-	-	2	1	2	3	2
CO4	1	2	-	1	-	-	-	-	-	2	1	1	3	2
CO5	2	1	-	2	-	-	-	-	-	1	1	2	3	2

UNIT — I:

Simple Stresses and Strains: Elasticity and plasticity — Types of stresses and strains — Hooke's law — Factor of safety, Poisson's ratio - Relationship between Elastic constants — Bars of varying section — stresses in composite bars.

UNIT — II:

Shear Force and Bending Moment: Definition of beam — Types of beams — Concept of shear force and bending moment — Point of contra flexure — Relation between S.F., B.M and rate of loading at a section of a beam; S.F and B.M diagrams for cantilever,

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simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads, partial uniformly distributed loads, couple and combination of these loads.

UNIT — III:

Flexural Stresses: Theory of simple bending — Assumptions — Derivation of bending equation, Neutral axis — Determination of bending stresses — section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections — Design of simple beams

Shear Stresses: Derivation of formula — Shear stress distribution across various beam sections like rectangular, circular, I, T Angle sections.

Torsion – circular shafts only.

UNIT — IV:

Deflection of Beams: Double integration and Macaulay's methods — Determination of slope and deflection for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads, partial uniformly distributed loads, couple and combination of these loads. Mohr's theorems — Moment area method — application to simple cases of cantilever.

UNIT — V:

Columns & Struts: Introduction – Classification of columns – Axially loaded compression members – Euler's crippling load theory – Derivation of Euler's critical load formulae for various end conditions – Equivalent length – Slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine's – Gordon formula – Eccentric loading and Secant formula – Prof. Perry's formula.

Thin and Thick cylindrical shells — Derivation of formula for longitudinal and circumferential stresses — hoop, longitudinal and volumetric strains — changes in diameter, and volume of thin cylinders. Lame's theory for thick cylinders, Derivation of Lame's formulae, distribution of hoop and radial stresses across the thickness, compound cylinders- distribution of stresses

TEXTBOOKS:

1. R. K. Rajput, 7e (Mechanics of Solids) SI Units S. Chand & Co, A Textbook of Strength of Materials, NewDelhi 7th edition 2022.
2. E P Popov, Mechanics of Solids, Prentice Hall, 2nd Edition, 2015.
3. B. S. Basavarajaiah and P. Mahadevappa, Strength of Materials ,Universities Press 3rd Edition, 2010
4. J.K. Gupta and S.K. Gupta, Strength of Materials ,Cengage publications 2nd edition, 2024

REFERENCES:

1. R. K. Bansal, Strength of Materials ,Lakshmi Publications, 16th Edition, 2022
2. L.S Srinath, Advanced Mechanics of Solids, McGraw Hill Education, 2017, 3rd Edition
3. T.D.Gunneswara Rao and MudimbyAndal, Strength of Materials - Fundamentals andApplications, Cambridge University Press, 2018, 1st Edition
4. Beer and Johnston,Mechanics of Materials, McGraw Hill India Pvt. Ltd., 2020, 8th Edition (SI Units).
5. E P Popov, Mechanics of Solids, Prentice Hall, 2nd Edition, 2015.
6. S.S.Ratan, Strength of Materials, Tata McGrill Publications 3rd Edition , 2016.

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II Year – I Semester

L	T	P	C
3	0	0	3

FLUID MECHANICS

Course Objectives:

1. To explain basics of statics, kinematics and dynamics of fluids and various measuring techniques of hydrostatic forces on objects.
2. To impart ability to solve engineering problems in fluid mechanics
3. To enable the students measure quantities of fluid flowing in pipes, tanks and channels
4. To teach integral forms of fundamental laws of fluid mechanics to predict relevant pressures, velocities and forces.
5. To strengthen the students with fundamentals useful in application-intensive courses dealing with hydraulics, hydraulic machinery and hydrology in future courses.

Course Outcomes:

At the end of completion of the course, the student will be able

CO	STATEMENT	Blooms level
CO1	Understand the principles of fluid statics, kinematics and dynamics	L2
CO2	Apply the laws of fluid statics and concepts of buoyancy	L3
CO3	Understand the fundamentals of fluid kinematics and differentiate types of fluid flows	L2
CO4	Apply the Principle of conservation of energy for flow measurement.	L3
CO5	Analyse the losses in pipes and discharge through pipe network.	L4

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	-	-	-	2	-	-	1	-	1	1	3	1
CO2	3	3	-	-	-	2	-	-	3	-	3	3	3	1
CO3	3	1	-	-	-	3	-	-	1	-	1	1	3	2
CO4	3	2	-	-	-	1	-	-	2	-	2	2	3	2
CO5	3	3	-	-	-	2	-	-	3	-	3	3	3	2

UNIT - I

Basic Concepts and Definitions: Distinction between a fluid and a solid; Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity; Variation of viscosity with temperature, Newton's law of viscosity; Vapor pressure, Boiling point, Surface tension, Capillarity, Bulk modulus of elasticity, Compressibility

UNIT – II

Fluid Statics: Fluid Pressure: Pressure at a point, Pascal's law, pressure variation with temperature, density and altitude.Piezometer,U-Tube Manometer, Single Column Manometer, U Tube Differential Manometer. Pressure gauges, Hydrostatic pressure and force: horizontal, vertical and inclined surfaces. Buoyancy and stability of floating bodies

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UNIT - III

Fluid Kinematics: Classification of fluid flow : steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one, two and three dimensional flows; Stream line, path line, streak line and stream tube; stream function, velocity potential function. One, two and three - Dimensional continuity equations in Cartesian coordinates.

UNIT - IV

Fluid Dynamics: Surface and body forces; Equations of motion - Euler's equation; Bernoulli's equation – Derivation; Energy Principle; Practical applications of Bernoulli's equation : Venturimeter, orifice meter and Pitot tube; Momentum principle; Forces exerted by fluid flow on pipe bend; Vortex Flow – Free and Forced; Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number;

UNIT - V

Analysis Of Pipe Flow: Energy losses in pipelines; Darcy – Weisbach equation; Minor losses in pipelines; Hydraulic Grade Line and Total Energy Line; Concept of equivalent length – Pipes in Parallel and Series.

Textbooks:
1. Hydraulics and Fluid Mechanics, P. M. Modi and S. M. Seth, Standard Book House 22nd edition 2019.
2. R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) Ltd., New Delhi 11th edition, 2024.
3. Theory and Applications of Fluid Mechanics, K. Subrahmanya, Tata McGraw Hill, 2nd edition 2018 edition.

Reference Books:
1. N. Narayana Pillai, Principles of Fluid Mechanics and Fluid Machines, Universities Press Pvt Ltd, Hyderabad. 3rd Edition 2009.
2. Frank M. White, Henry Xue, Fluid Mechanics, Tata McGraw Hill, 9th edition , 2022.
3. C. S. P. Ojha, R. Berndtsson and P. N. Chadramouli, Fluid Mechanics and Machinery, Oxford University Press, 2010.
4. S K Som, Gautam Biswas, S Chakraborty ,Introduction to Fluid Mechanics & Fluid Machines, Tata McGraw Hill, 3rd edition 2011

Online Learning Resources:
https://archive.nptel.ac.in/courses/112/105/112105269/
https://nptel.ac.in/courses/112104118
https://nptel.ac.in/courses/105103192

II Year I Semester

L	T	P	C
0	0	3	1.5

SURVEYING LAB

Course Objectives:

By the end of this course student will be able to

1. Know about various linear and angular measuring instruments
2. Take Measurements in the linear and angular view
3. Determine the area and volume by interpreting the data obtained from surveying activities
4. Know modern equipment such as total station
5. Draft field notes from survey data

Course Outcomes:

Upon the successful

Completion of this course, the students will able to:

1. Handle various linear and angular measuring instruments
2. Measure the linear and angular measurements
3. Calculate the area and volume by interpreting the data obtained from surveying activities
4. Handle modern equipment such as total station
5. Prepare field notes from survey data

Course Articulation Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	2	2	-	2	1	-	-	-	3	2	2	2	2	-
CO 2	2	2	-	2	1	-	-	-	3	3	3	2	2	-
CO 3	2	2	-	2	1	-	-	-	3	2	2	2	2	-
CO 4	1	2	-	-	3	-	-	-	3	2	2	1	1	-
CO 5	2	1	-	-	-	-	-	-	3	2	2	1	1	-

List of Field Works:

1. Chain survey of road profile with offsets in case of road widening.
2. Determination of distance between two inaccessible points by using compass.
3. Plane table survey ;finding the area of a given boundary by the method of Radiation
4. Fly levelling : Height of the instrument method (differential leveling)
5. Fly levelling: rise and fall method.
6. Theodolite survey: determining the horizontal and vertical angles by the method of repetition method
7. Theodolite survey: finding the distance between two in accessible points.
8. Theodolite survey: finding the height of far object.
9. Determination of area perimeter using total station.
10. Determination of distance between two inaccessible point by using total station.
11. Setting out a curve
12. Determining the levels of contours

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L	T	P	C
0	0	3	1.5

II Year I Semester

STRENGTH OF MATERIALS LAB

Course objectives: By the end of this course student will be able to
1. To determine the tensile strength and yield parameters of mild steel
2. To find out flexural strengths of Steel/Wood specimens and measure deflections
3. To determine the torsion parameters of mild steel bar
4. To determine the hardness numbers, impact and shear strengths of metals
6. To determine the load-deflection parameters for springs

Course Outcomes:
1. Conduct tensile strength test and draw stress-strain diagrams for ductile metals
2. Perform bending test and determine load-deflection curve of steel/wood
3. Able to conduct torsion test and determine torsion parameters
4. Perform hardness, impact and shear strength tests and calculate hardness numbers, impact and shear strengths
5. Able to conduct tests on closely coiled and open coiled springs and calculate deflections

Course Articulation Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	2	-	3	-	-	-	-	-	-	-	-
CO2	3	-	-	2	-	3	-	-	-	-	-	-	-	-
CO3	3	-	-	2	-	3	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	3	-	-	-	-	-	-	-	-
CO5	3	-	2	-	-	2	-	-	-	-	-	-	-	-

LIST OF EXPERIMENTS:
1. Tension test on mild steel bar
2. Bending test on (Steel/Wood) Cantilever beam.
3. Bending test on simply supported beam.
4. Torsion test on mild steel bar.
6. Hardness test- Rockwell, Brinell methods.
7. Compression test on Open coiled springs
8. Tension test on Closely coiled springs
9. Compression test on Wood/Brick
10. Izod / Charpy Impact test on metals
11. Shear test on metals
12. Continuous beam – deflection test.

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II Year I Semester

L	T	P	C
0	1	2	2

BUILDING PLANNING AND DRAWING

Course Objectives:
1. Initiating the student to different building bye-laws and regulations.
2. Imparting the planning aspects of residential buildings and public buildings.
3. Giving training exercises on various signs and bonds.
4. Giving training exercises on different building units.
5. Imparting the skills and methods of planning of various buildings.

Course Outcomes:
Upon successful completion of this course the students will be able to:
1. Plan various buildings as per the building by-laws.
2. Distinguish the relation between the plan, elevation and cross section and identify the form and functions among the buildings.
3. Draw signs and bonds
4. Draw different building units
5. Learn the skills of drawing building elements and plan the buildings as per requirements.

Course Articulation Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	2	-	-	3	3	2	-	2	2	2	3	-	2
CO2	1	1	2	-	-	3	2	-	-	2	1	1	-	-	-
CO3	1	1	2	-	-	3	3	2	-	2	2	2	3	1	1
CO4	1	1	2	-	-	3	3	2	-	2	2	2	3	1	1
CO5	1	1	2	-	-	3	3	2	-	2	2	2	3	1	1

Syllabus:
1. Detailing & Drawing of Sign Conventions.
2. Detailing & Drawing of English Bond.
3. Detailing & Drawing of Flemish Bond.
4. Detailing & Drawing of Doors.
5. Detailing & Drawing of Windows.
6. Detailing & Drawing of Ventilators &Roofs.
7. Drawing of Line Diagram of Residential Buildings by using Building Bye- Laws.
8. Drawing of Plan, Elevation & Section from line diagram for a single Storey Building.
9. Drawing of Plan, Elevation & Section for Hospital Building.
10. Drawing of Plan, Elevation & Section for Industrial Building.

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Text Books:

1. Gurcharan Singh and Jagdish Singh, Planning, designing and Scheduling.
2. M. Chakraborti, Building planning and drawing.
3. M G Shah, C M Kale and S Y Patki, Building drawing,Tata McGraw Hill, New Delhi.

Reference Books:

1. National Building Code 2016 (Volume- I & II).
2. M G Shah and C M Kale, Principles of Building Drawing,Trinity Publications, New Delhi.
3. B. P. Verma, Civil Engineering drawing and House planning, Khanna publishers, NewDelhi.
4. Suraj Singh, Civil Engineering Building practice, CBS Publications, New Delhi, and Chennai
5. G. C Saha and Joy Gopal Jana, Building Materials and Construction, McGrawHill Education (P) India Ltd. New Delhi.

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DEPARTMENT OF CIVIL ENGINEERING

II YEAR - II SEMESTER
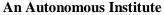
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L	T	P	C
2	0	0	2

II Year II Semester

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Objectives:
- Toinculcatethebasicknowledgeofmicroeconomicsandfinancialaccounting
- To make the students learn how demand is estimated for different products, input-output relationship for optimizing production and cost
- ToKnowtheVarioustypesofmarketstructureandpricingmethodsandstrategy
- To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
- To provide fundamental skills on accounting and to explain the process of preparing financial statements.

Course Outcomes:
- Define the concepts related to Managerial Economics, financial accounting and management.
- Understand the fundament also Economics viz., Demand, Production, cost, revenue and markets
- Apply the Concept of Production cost and revenues for effective Business decision
- Analyze how to invest their capital and maximize returns
- Evaluate the capital budgeting techniques
- Develop the accounting statements and evaluate the financial performance of business entity.

UNIT-I
Managerial Economics: Introduction – Nature, meaning, significance, functions, and advantages. Demand - Concept, Function, Law of Demand - Demand Elasticity- Types – Measurement. Demand Forecasting- Factors governing Forecasting, Methods. Managerial Economics and Financial Accounting and Management.

UNIT-II
Production and Cost Analysis: Introduction – Nature, meaning, significance, functions and advantages.ProductionFunction–Least-costcombination–Shortrunandlongrun Production Function- ISO-quants and ISO-costs, MRTS -Cobb-Douglas Production Function – Laws of Returns - Internal and External Economies of scale. Cost & Break-Even Analysis -Cost concepts and Cost behaviour- Break-Even Analysis (BEA) -Determination of Break- Even Point (Simple Problems)-Managerial significance and limitations of Break- Even Analysis.

UNIT-III
Business Organizations and Markets: Introduction –Nature, meaning, significance, functions and advantages. Forms of Business Organizations- Sole Proprietary -Partnership-Joint Stock Companies-Public Sector Enterprises .Types of Markets -Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition–Oligopoly-Price-Output Determination-Pricing Methods and Strategies

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UNIT-IV

Capital Budgeting: Introduction – Nature, meaning, significance, functions and advantages. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements. Capital Budgeting–Features, Proposals, Methods and Evaluation. Projects– Pay Back Method , Accounting Rate of Return(ARR) Net Present Value(NPV)Internal Rate Return(IRR) Method (sample problems)

UNIT-V

Financial Accounting and Analysis: Introduction – Nature, meaning, significance, functions and advantages. Concepts and Conventions-Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).Financial Analysis-Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

Textbooks:
1. Varshney & Maheswari: Managerial Economics,SultanChand,2013.

Reference Books:
1. Managerial Economics: Principles And Worldwide Applications, 9E (Adaptation) by Dominick Salvatore and Siddhartha Rastogi
2. Managerial Economics: Principles and Worldwide Applications by Dominick Salvatore

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L	T	P	C
3	0	0	3

II Year II Semester

ENGINEERING GEOLOGY

Course Learning Objectives:
The objective of this course is:
1. To know the importance of Engineering Geology to the Civil Engineering.
2. To enable the students understand what minerals and rocks are and their formation and identification.
3. To highlight significance/ importance/ role of Engineering Geology in construction of Civil Engineering structures.
4. To enable the student realize its importance and applications of Engineering Geology in Civil Engineering constructions.
5. Concepts of Groundwater and its geophysical methods.

Course Outcomes:
Upon the successful completion of this course, the students will be able to:
1. Understand the significance of geological agents on Earth surface and its significance in Civil Engineering.
2. Identify and understand the properties of Minerals and Rocks.
3. Understand the concepts of Groundwater and its geophysical methods.
4. Classify and measure the Earthquake prone areas, Landslides and subsidence to practice the hazard Zonation.
5. Investigate the project site for mega/mini civil engineering projects and site selection for mega engineering projects like Dams, Reservoirs and Tunnels.

Course Articulation Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	1	2	-
CO2	2	1	-	-	-	-	-	-	-	-	-	-	1	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-	1	-
CO4	3	3	3	2	3	-	2	-	-	-	2	2	2	2
CO5	3	3	2	2	3	-	2	-	-	-	2	2	2	2

SYLLABUS:
UNIT-I:
Introduction: Branches of Geology, Importance of Geology in Civil Engineering with case studies, weathering of rocks, Geological agents, weathering process of Rock, Rivers and geological work of rivers.

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UNIT-II

Mineralogy And Petrology: Definitions of mineral and rock-Different methods of study of mineral and rock. Physical properties of minerals and rocks for megascopic study for the following minerals and rocks. Common rock forming minerals: Feldspar, Quartz Group, Olivine, Augite, Hornblende, Mica Group, Asbestos, Talc, Chlorite, Kyanite, Garnet, Calcite and ore forming minerals are Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Chromite, Magnetite and Bauxite. Classification, structures, textures and forms of Igneous rocks, Sedimentary rocks, Metamorphic rocks, and their megascopic study of granite varieties, (pink, gray, green). Pegmatite, Dolerite, Basalt etc., Shale, Sand Stone, Lime Stone, Laterite, Quartzite, Gneiss, Schist, Marble, Khondalite and Slate.

UNIT-III

Structural Geology: Strike , Dip and Outcrop study of common geological structures associating with the rocks such as Folds, Faults, Joints and Unconformities- parts, types, mechanism and their importance in Civil Engineering.

UNIT-IV

Ground Water: Water table, Cone of depression, Geological controls of Ground Water Movement, Ground Water Exploration Techniques.
Earthquakes and Land Slides: Terminology, Classification, causes and effects, Shield areas and Seismic bells, Richter scale intensity, Precautions of building constructions in seismic areas. Classification of Landslides, Causes and Effects, measures to be taken prevent their occurrence at Landslides.
Geophysics: Importance of Geophysical methods, Classification, Principles of Geophysical study by Gravity method, Magnetic method, Electrical methods, Seismic methods, Radiometric method and Electrical resistivity, Seismic refraction methods and Engineering properties of rocks.

UNIT-V

Geology of Dams, Reservoirs and Tunnels: Types and purpose of Dams, Geological considerations in the selection of a Dam site. Geology consideration for successful constructions of reservoirs, Life of Reservoirs. Purpose of Tunnelling, effects, Lining of Tunnels. Influence of Geology for successful Tunnelling.

TEXT BOOKS:
1. N. ChennaKesavulu, Engineering Geology Laxmi Publications . 2nd Edn 2014.
2. Parbin Singh, Engineering & General Geology, Katson educational series 8th 2023

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REFERENCES:

1. Subinoy Gangopadhay ,Engineering Geology,Oxford University press 1st edition, 2012.
2. D. Venkat Reddy, Engineering Geology , Vikas Publishing, 2nd Edn , 2017,

3. Alan E, Geology for Engineers and Environmental Society, Kehew, 3rd edn., 2013) Pearson publications.
4. K.S.Valdiya, Environmental Geology (2013) 2nd ed., McGraw Hill Publications.

Web Materials:
1. http://nptel.iitm.ac.in/video.php?subjectId=105105106
2. http://nptel.iitm.ac.in/video.php?courseId=1055&p=1
4. http://nptel.iitm.ac.in/video.php?courseId=1055&p=3
5. http://nptel.iitm.ac.in/video.php?courseId=1055&p=4

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II Year II Semester

L	T	P	C
3	0	0	3

CONCRETE TECHNOLOGY

Course Learning Objectives

Upon successful completion of this course, the student will be able to

1. Learn materials and their properties used in the production of concrete
2. Learn the behavior of concrete at fresh stage
3. Learn the behavior of concrete at hardened stage
4. Learn the influence of elasticity, creep and shrinkage on concrete
5. Learn the mix design methodology and special concretes

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

CO1   Familiarise the basic ingredients of concrete and their role in the production of concrete and its behavior in the field.

CO2   Test the fresh concrete properties and the hardened concrete properties. Understand the basic concepts of concrete. Design the concrete mix by BIS method.

CO3   Evaluate the ingredients of concrete through lab test results. Realize the importance of quality of concrete

CO4   Understand the behavior of concrete in various environments.

CO5   Familiarize the basic concepts of special concrete and their production and applications.

CO	STATEMENT	Blooms level
CO1	Familiarise the basic ingredients of concrete and their role in the production of concrete and its behavior in the field	L2
CO2	Test the fresh concrete properties and the hardened concrete properties. Understand the basic concepts of concrete. Design the concrete mix by BIS method.	L5
CO3	Evaluate the ingredients of concrete through lab test results. Realize the importance of quality of concrete	L5
CO4	Understand the behavior of concrete in various environments	L2
CO5	Familiarize the basic concepts of special concrete and their production and applications.	L2

Course Articulation Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	2	2	-	-	-	-	-	2	-	-
CO2	3	2	-	-	-	2	2	-	-	-	-	-	2	-	-
CO3	2	3	-	3	-	2	2	-	-	-	-	-	2	-	-
CO4	3	2	-	-	-	2	2	-	-	-	-	-	2	-	-
CO5	2	-	3	-	-	2	2	-	-	-	-	-	2	-	-

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Detailed Syllabus:
UNIT- I

Cements: Portland cement – Chemical composition – Hydration, Setting of cement, Fineness of cement, Structure of hydrate cement – Test for physical properties – Different grades of cements – Admixtures – Mineral and chemical admixtures – accelerators, retarders, air entrainers, plasticizers, super plasticizers, fly ash and silica fume

Aggregates: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregates – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand –Deleterious substances – Soundness – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Maximum aggregate size- Quality of mixing water

UNIT- II

Fresh Concrete: Steps in Manufacture of Concrete–proportion, mixing, placing, compaction, finishing, curing – including various types in each stage. Properties of fresh concrete-Workability – Factors affecting workability – Measurement of workability by different tests, Setting times of concrete, Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete, Ready mixed concrete, Shotcrete

UNIT- III

Hardened Concrete: Water / Cement ratio – Abram's Law – Gel/space ratio – Nature of strength of concrete –Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength – Curing, Testing of Hardened Concrete:Compression test – Tension test – Factors affecting strength – Flexure test –Splitting test – Non-destructive testing methods – Codal provisions for NDT.

UNIT- IV

Elasticity, Creep & Shrinkage – Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage –types of shrinkage.

UNIT- V

Mix Design And Special Concretes: Ready mixed concrete, Fibre reinforced concrete – Different types of fibres – Factors affecting properties of FRC, High performance concrete – Self consolidating concrete, Self healing concrete.

Factors in the choice of mix proportions –Quality control of concrete- Statistical methods-Acceptance Criteria-Concepts Proportioning of concrete mixes by ACI method and IS Code method

TEXT BOOKS
1. A.M. Neville ,Properties of Concrete , PEARSON – 4th edition
2. M.L. Gambhir ,Concrete Technology , Tata Mc.Graw Hill Publishers, New Delhi 5th edition 2013.
3. Job Thomas,Concrete Technology ,Cengagae Publications, 1st edition, 2015

References
1. P.K. Mehta and Moterio ,Concrete Microstructure, Properties of Materials, McGraw Hill 4th edition 2014
2. J.J. Brooks and A. M. Neville, Concrete Technology, Pearson, 2019, 2nd Edition.
3. M. S. Shetty, Concrete Technology ,S. Chand & Co.; 2004
4. A.R. Santha Kumar, Concrete Technology ,Oxford University Press, New Delhi

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II Year – II Semester

L	T	P	C
3	0	0	3

STRUCTURAL ANALYSIS

Course Learning Objectives

Upon successful completion of this course, the student will be able to

1. Learn energy theorems
2. Learn the analysis of indeterminate structures
3. Analysis of fixed and continuous beams
4. Learn about slope-deflection method
5. Learn about Moment – distribution method

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

1. Apply energy theorems to analyze trusses
2. analyze indeterminate structures by using Castigliano's–II theorem
3. Analysis of fixed and continuous beams
4. Analyze continuous beams and portal frames by using slope-deflection method
5. Analyze continuous beams and portal frames by using Moment – distribution method

Course will enable the student to:

CO	STATEMENT	Blooms Level
CO 1	Apply energy theorems to analyze trusses	L3
CO 2	analyze indeterminate structures by using Castigliano's–II theorem	L4
CO 3	Analysis of fixed and continuous beams	L4
CO 4	Analyze continuous beams and portal frames by using slope-deflection method.	L4
CO 5	Analyze continuous beams and portal frames by using Moment – distribution method	L4

Course Articulation Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	2	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	2	1	-	-	-	-	-	-	-	-	-
CO3	3	3	2	2	1	-	-	-	-	-	-	-	-	-
CO4	3	3	2	3	1	-	-	-	-	-	-	-	-	-
CO5	3	3	2	2	1	-	-	-	-	-	-	-	-	-

UNIT – I

Energy Theorems: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces – Castigliano's first theorem Deflections of simple beams and pin jointed trusses.

UNIT - II

Analysis Of Indeterminate Structures: Indeterminate Structural Analysis – Determination of static and kinematic indeterminacies – Solution of trusses with up to two degrees of internal and external indeterminacies – Castigliano's –II theorem.

UNIT - III

Fixed Beams : Introduction to statically indeterminate beams with uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads – Shear force and Bending moment diagrams – Deflection of **SVIET B.Tech Civil. R 23 Regulations** fixed beams effect of sinking of support, effect of rotation of a support.

Continuous Beams: Introduction, Application to continuous beams.

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UNIT - IV

Slope-Deflection Method: Introduction-derivation of slope deflection equations-application to continuous beams with and without settlement of supports - Analysis of single storey -portal frames without sway.

UNIT - V

Moment Distribution Method: Introduction to moment distribution method- Application to continuous beams with and without settlement of supports-Analysis of single storey portal frames without sway, with sway.

Textbooks:

1. V.N.Vazirani & M.M.Ratwani, Analysis of Structures –Vol-I&II , Khanna Publications, New Delhi.
2. C.S.Reddy, Basic Structural Analysis, Tata McGraw Hill Publishers. 3rd edition 2017.

Reference Books:

1. Aslam Kassimali, Structural analysis, Cengage publications 6th edition 2020.
2. Dr.R.Vaidyanathan and Dr.PPerumal, Structural analysis Vol.I and II, Laxmi publications. 3rd 2016
3. B.D.Nautiyal, Introduction to structural analysis,New Age international publishers, New Delhi.
4. D.S.Prakasarao, Structural Analysis,Univeristy press.
5. B.C.Punmia, Strength of Materials and Mechanics of Structures, Khanna Publications,New Delhi.

II Year II Semester

L	T	P	C
3	0	0	3

HYDRAULICS AND HYRAULIC MACHINERY

Pre-requisite: Fluid Mechanics

Course Objectives:

1. To Introduce concepts of laminar and turbulent flows
2. To teach principles of uniform flows through open channel.
3. To teach principles of non-uniform flows through open channel.
4. To impart knowledge on design of turbines.
5. To impart knowledge on design of pumps

Course Outcomes:

On Completion of the course, the students will be able to:

COs	STATEMENTS	Blooms level
CO1	Understand the characteristics of laminar and turbulent flows.	L2
CO2	Apply the knowledge of fluid mechanics to address the uniform flow problems in open channels.	L3
CO3	Solve non-uniform flow problems and hydraulic jump phenomenon in open channel flows.	L3
CO4	Evaluate the performance of impact of jets on plates and design Pelton wheel, Francis and Kaplan turbine	L5
CO5	Understand the principles, losses and its efficiencies of centrifugal pumps	L2

Course Articulation Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	2	-	-	-	-	2	-	3	1
CO2	3	3	-	-	-	3	-	-	-	-	3	-	3	1
CO3	3	3	-	-	-	3	-	-	-	-	3	-	3	1
CO4	3	3	-	-	-	3	-	-	-	-	3	-	3	2
CO5	3	2	-	-	-	2	-	-	-	-	2	-	3	2

UNIT – I

Laminar & Turbulent Flow In Pipes: Laminar Flow- Laminar flow through: circular pipes, annulus and parallel plates. Stoke's law, Measurement of viscosity. Reynolds experiment, Transition from laminar to turbulent flow. Resistance to flow of fluid in smooth and rough pipes-Moody's diagram – Introduction to boundary layer theory.

UNIT - II

Uniform Flow In Open Channels: Open Channel Flow - Comparison between open channel flow and pipe flow, geometrical parameters of a channel, classification of open channels, classification of open channel flow, Velocity Distribution of channel section. Hydraulically efficient channel sections: Rectangular, trapezoidal and triangular channels, Energy and Momentum correction factors

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UNIT - III

Non-Uniform Flow In Open Channels: Specific energy, critical flow, discharge curve, Specific force, Specific depth, and Critical depth. Measurement of Discharge and Velocity – Gradually Varied Flow- Dynamic Equation of Gradually Varied Flow. Hydraulic Jump and classification - Elements and characteristics- Energy dissipation.

UNIT - IV

Impact of Jets: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes - Velocity triangles at inlet and outlet - Work done and efficiency Hydraulic Turbines: Classification of turbines; pelton wheel and its design. Francis turbine and its design - efficiency - Draft tube: theory - characteristic curves of hydraulic turbines. Cavitation: causes and effects.

UNIT – V

Pumps: Working principles of a centrifugal pump, work done by impeller; heads, losses and efficiencies; minimum starting speed; Priming; specific speed; limitation of suction lift, net positive suction head (NPSH); Performance and characteristic curves; Cavitation effects; Multistage centrifugal pumps; troubles and remedies

TEXT BOOKS: -

1. P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House 22^{nd,} 2019.

2. K. Subrahmanya, Theory and Applications of Fluid Mechanics, Tata McGraw Hill, 2nd edition 2018

Reference Books:

1. R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) Ltd., New Delhi 11th edition, 2024.
2. Frank M. White, Henry Xue, Fluid Mechanics, Tata McGraw Hill, 9th edition , 2022.
3. C. S. P. Ojha, R. Berndtsson and P. N. Chadramouli, Fluid Mechanics and Machinery, Oxford University Press, 2010.
4. S K Som, Gautam Biswas, S Chakraborty ,Introduction to Fluid Mechanics & Fluid Machines , 3rd edition 2011

Online Learning Resources:
https://nptel.ac.in/courses/105105203
https://archive.nptel.ac.in/courses/112/106/112106300/
https://archive.nptel.ac.in/courses/112/103/112103249/

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	L	T	P	C
II Year II Semester	0	0	3	1.5

CONCRETE TECHNOLOGY LABORATORY

Course Learning Objectives

Upon successful completion of this course, the student will be able to

To test basic properties of ingredients of concrete fresh and hardened concrete properties

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

- **CO1** Outline importance of testing cement and its properties
- **CO2** Assess different properties of Aggregates
- **CO3** Assess fresh concrete properties and their relevance to hardened concrete
- **CO4** Assess hardened concrete properties

Course Articulation Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	2	-	3	-	-	-	-	-	-	-	-
CO2	3	-	-	2	-	3	-	-	-	-	-	-	-	-
CO3	3	-	-	2	-	3	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	3	-	-	-	-	-	-	-	-
CO5	3	-	2	-	-	2	-	-	-	-	-	-	-	-

Detailed Syllabus:

1. Tests on Cement

   a) Normal Consistency and Fineness of cement.

   b) Initial setting time and Final setting time of cement.

   c) Specific gravity and soundness of cement.

   d) Compressive strength of cement.

2. Tests on Fine Aggregates

   a) Grading and fineness modulus of Fine aggregate by sieve analysis.

   b) Specific gravity of fine aggregate

   c) Water absorption and Bulking of sand.

3. Tests on Coarse Aggregates

   a) Grading of Coarse aggregate by sieve analysis.

   b) Specific gravity of coarse aggregate

   c) Water absorption of Coarse aggregates

4. Tests on fresh Concrete

   a) Workability of concrete by compaction factor method

   b) Workability of concrete by slump test

   c) Workability of concrete by Vee-bee test.

5. Tests on Hardened Concrete

   a) Compressive strength of cement concrete

   b) Modulus of rupture, Modulus of elasticity and Poisson's Ratio

   c) Split tensile strength of concrete.

   d) Demonstration of Non-Destructive testing on concrete (Rebound Hammer)

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L	T	P	C
0	0	3	1.5

II Year II Semester

ENGINEERING GEOLOGY LABORATORY

Course Learning Objectives:

The objective of this course is:

- To identify the Megascopic types of Ore minerals & Rock forming minerals.
- To identify the Megascopic types of Igneous, Sedimentary, Metamorphic rocks.
- To identify the topography of the site & material selection

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Identify Megascopic minerals & their properties.
2. Identify Megascopic rocks & their properties.
3. Identify the site parameters such as contour, slope & aspect for topography.
4. Know the occurrence of materials using the strike & dip problems.

Course Articulation Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	1	1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	1	1	-	-	-	-	-	-	-	-	-	-	-	-
CO3	1	1	1	-	-	-	-	-	-	1	1	-	1	1
CO4	1	-	-	-	-	-	-	-	-	-	-	-	-	-

LIST OF EXPERIMENTS

1. Physical properties of minerals: Mega-scopic identification of
   a. Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group & Talc, Chlorite, Olivine, Kyanite, Asbestos, Tourmelene, Calcite, Gypsum, etc…
   b. Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite, etc…

2. Megascopic description and identification of rocks.
   a. Igneous rocks – Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite, Granite Poryphery, Basalt, etc.
   b. Sedimentary rocks – Sand stone, Ferrugineous sand stone, Lime stone, Shale, Laterite, Conglamorate, etc.
   c. Metamorphic rocks – Biotite – Granite Gneiss, Slate, Muscovite &Biotiteschist, Marble, Khondalite, etc.

3. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc.

4. Simple Structural Geology problems.

5. Bore hole data.

6. Strength of the rock using laboratory tests.

7. Field work – To identify Minerals, Rocks, Geomorphology& Structural Geology.

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LAB EXAMINATION PATTERN:

1. Description and identification of FOUR minerals
2. Description and identification of FOUR (including Igneous, Sedimentary And Metamorphic Rocks)
3. ONE Question on Interpretation of a Geological map along with a geological section.
4. TWO Questions on Simple strike and Dip problems.
5. Bore hole problems.
6. Project report on geology.

REFERENCES:

1. M T Mauthesha Reddy,Applied Engineering Geology Practicals,New Age International Publishers, 2nd Edition.
2. Tony Waltham,Foundations of Engineering Geology,, Spon Press, 3rd edition, 2009.

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II Year II Semester

L	T	P	C
0	1	2	2

REMOTE SENSING AND GIS

Course Learning Objectives:

The course is designed to

- Introduce the basic principles of Remote Sensing and GIS techniques and its application to Civil Engineering.
- Learn various types of sensors and platforms and understand the principles of spatial analysis techniques in GIS.
- Introduce GIS software to understand the process of digitization, creation of thematic map from toposheets and maps.

Course outcomes

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

1. Acquire knowledge about concepts of remote sensing, sensors and their characteristics.
2. Familiarize with data models and data structures to introduce various Raster and Vector Analysis capabilities in GIS.
3. Digitize and create thematic map and extract important features to calculate geometry.
4. Perform surface analysis over Contour to develop digital elevation model.
5. Use GIS software to perform simple analysis in water resources and transportation engineering.

Course Articulation Matrix:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	-	1	1	-	-	2	-	-	-	-	2	1	-	1
CO2	2	-	1	1	-	-	2	-	-	-	-	2	1	-	1
CO3	1	2	2	1	2	2	3	-	2	2	1	3	1	-	2
CO4	1	2	2	1	2	2	3	-	2	2	1	3	2	-	2
CO5	1	2	2	1	2	2	3	-	2	2	1	3	2	-	2

1- Slightly; 2- Moderately; 3- Substantially

SYLLABUS:

UNIT – I

Introduction to Remote sensing: History of Remote Sensing, Electromagnetic Radiation, Electromagnetic Spectrum, Energy Interaction with Atmosphere, Energy Interaction with the Earth Surfaces - Characteristics of Remote Sensing Systems, Sensor Resolutions, Advantages & Limitations - Platforms: Types of Sensors, Airborne Remote Sensing, Spaceborne Remote Sensing - IRS, LANDSAT, SPOT & Recent satellite.

UNIT – II

Digital Image analysis: Digital Image Characteristics, Digital Image Data Formats, Band Interleaved by Pixel (BIP), Band Interleaved by Line (BIL), Band Sequential (BSQ) - Visual Interpretation Elements, Preprocessing, Enhancement, Classification, Supervised classification, Unsupervised classification.

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UNIT – III

Introduction to Geographic Information System: Principles, Components and Applications of GIS - Map projections, Spatial Data Structures, Raster and Vector Data Formats, Data Inputs, Data Manipulation, Data Retrieval, Data Analysis - Spatial data analysis: Overlay Function-Vector Overlay Operations, Raster Overlay Operations, Arithmetic Operators, Comparison and Logical Operators, Conditional Expressions - Network Analysis: Components of network, Transportation network - Optimum path analysis.

TEXT BOOKS:

1. BasudebBhatta (2021). 'Remote sensing and GIS', 3rdedn., Oxford University Press.
2. S. Kumar, (2016) 'Basics of Remote sensing & GIS', Laxmi Publications.
3. Lillesand, T.M, R.W. Kiefer and J.W. Chipman (2022) 'Remote Sensing and Image Interpretation', 7thedn., Wiley India Pvt. Ltd.
4. Demers, M.N, (2013) 'Fundamentals of Geographic Information Systems', 4thedn., Wiley India Pvt. Ltd.

List of Experiments:

Expt. 1 :Geo-referencing a Toposheet or Map

Expt. 2 : Digitization and Attribute table

creation. Expt. 3 : Creation of Thematic Map

Expt. 4 : Calculation of Feature geometry – Length, Area &

Perimeter. Expt. 5 : Contour map – developing TIN & DEM from

Contour.

Expt. 6 : Stream network – Stream ordering map.

Expt. 7 : Watershed - calculate Hydro-geo-morphological

parameters. Expt. 8 : Transportation Network Map – Route analysis.

GIS SOFTWARE: QGIS / ArcGIS

Textbook for Practical

1. QGIS User Guide
2. ArcGIS User Manual by ESRI

REFERENCES:

1. Schowengerdt, R. A (2006) 'Remote Sensing', Elsevier publishers.
2. Burrough P A and R.A. McDonnell, (1998) 'Principals of Geographical Information Systems', Oxford University Press.
3. George Joseph (2013) 'Fundamentals of Remote Sensing', Universities Press.

Web references:

1. https://nptel.ac.in/courses/10510319

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II Year II Semester

L	T	P	C
1	0	2	2

DESIGN THINKING & INNOVATION

Course Objectives: The objectives of the course are to
- Bring awareness on innovative design and new product development.
- Explain the basics of design thinking.
- Familiarize the role of reverse engineering in product development.
- Train how to identify the needs of society and convert into demand.
- Introduce product planning and product development process.

Course Outcomes:

CO	STATEMENT	Blooms level
CO1	Define the concepts related to design thinking.	L1
CO2	Explain the fundamentals of Design Thinking and innovation.	L2
CO3	Apply the design thinking techniques for solving problems in various sectors.	L3
CO4	Analyse to work in a multidisciplinary environment.	L4
CO5	Evaluate the value of creativity.	L5

UNIT – I
Introduction to Design Thinking: Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry**.**

UNIT – II
Design Thinking Process: Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of

design thinking - person, costumer, journey map, brainstorming, product development
Activity: Every student presents their idea in three minutes, Every student can present design

process in the form of flow diagram or flow chart etc. Every student should explain about product development.

UNIT – III
Innovation: Art of innovation, Difference between innovation and creativity, role of creativity

and innovation in organizations. Creativity to Innovation. Teams for innovation, Measuring the

impact and value of creativity**.**
Activity: Debate on innovation and creativity, Flow and planning from idea to innovation, Debate

on value-based innovation.

UNIT – IV
Product Design: Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications. Innovation towards product design Case studies.
Activity: Importance of modeling, how to set specifications, Explaining their own product design.

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UNIT – V
Design Thinking in Business Processes: Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs. Design thinking for Startups. Defining and testing Business Models and Business Cases. Developing & testing prototypes.
Activity: How to market our own product, about maintenance, Reliability and plan for startup.

Textbooks:
1. Tim Brown, Change by design, 1/e, Harper Bollins, 2009.
2. Idris Mootee, Design Thinking for Strategic Innovation, 1/e, Adams Media, 2014.

Reference Books:
1. David Lee, Design Thinking in the Classroom, Ulysses press, 2018.
2. Shrrutin N Shetty, Design the Future, 1/e, Norton Press, 2018.
3. William lidwell, Kritinaholden, &Jill butter, Universal principles of design, 2/e, Rockport Publishers, 2010.
4. Chesbrough.H, The era of open innovation, 2003.

Online Learning Resources:
- https://nptel.ac.in/courses/110/106/110106124/
- https://nptel.ac.in/courses/109/104/109104109/
- https://swayam.gov.in/nd1_noc19_mg60/preview
- https://onlinecourses.nptel.ac.in/noc22_de16/preview

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II Year II Semester

L	T	P	C
3	0	0	-

BUILDING MATERIALS AND CONSTRUCTION

Objectives of the course:
- Initiating the student with the knowledge of basic building materials and their properties.
- Imparting the knowledge of course pattern in masonry construction and flat roofs and techniques of forming foundation, columns, beams, walls, sloped and flat roofs.
- The student is to be exposed to the various patterns of floors, walls, different types of paints and varnishes.
- Imparting the students with the techniques of formwork and scaffolding.
- The students should be exposed to classification of aggregates, moisture content of the aggregate.

Course outcome:
Upon the successful completion of the course:
- The student should be able to identify different building materials and their importance in building construction.
- The student is expected to differentiate brick masonry, stone masonry construction and use of lime and cement in various constructions.
- The student should have learnt the importance of building components and finishings.
- The student is expected to know the classification of aggregates, sieve analysis and moisture content usually required in building construction.

CO	STATEMENT	Blooms level
CO 1	The student should be able to identify different building materials and their importance in building construction	L2
CO 2	The student is expected to differentiate brick masonry, stone masonry construction	L2
CO 3	The student is expected use of lime and cement in various constructions	L3
CO 4	The student should have learnt the importance of building components and finishings.	L2
CO 5	The student is expected to know the classification of aggregates, sieve analysis and moisture content usually required in building construction.	L3

Course Articulation Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	-	3	2	-
CO2	2	-	-	-	2	-	3	-	-	-	-	-	2	-	-
CO3	-	-	2	-	-	3	-	-	-	-	-	-	-	-	2
CO4	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO5	3	-	-	3	2	-	-	-	-	-	-	-	3	-	-

SVIET B.Tech Civil. R 23 Regulations

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UNIT.I : STONES, BRICKS AND TILES

Properties of building stones – relation to their structural requirements, classification of stones – stone quarrying – precautions in blasting, dressing of stone, composition of good brick earth, various methods of manufacturing of bricks. Characteristics of good tile – manufacturing methods, types of tiles. Uses of materials like Aluminium, Gypsum, Glass and Bituminous materials – their quality.

UNIT. II MASONRY

Types of masonry, English and Flemish bonds, Rubble and Ashlar Masonry. Cavity and partition walls. WOOD: Structure – Properties- Seasoning of timber- Classification of various types of woods used in buildings- Defects in timber. Alternative materials for wood – Galvanized Iron, Fiver – Reinforced Plastics, Steel, Aluminium.

UNIT. III: LIME AND CEMENT

Lime: Various ingredients of lime – Constituents of lime stone – classification of lime – various methods of manufacture of lime. Cement: Portland cement- Chemical Composition – Hydration, setting and fineness of cement. Various types of cement and their properties.Various field and laboratory tests for Cement. Various ingredients of cement concrete and their importance – various tests for concrete.

UNIT. IV:BUILDING COMPONENTS

Lintels, arches, vaults, stair cases – types. Different types of floors – Concrete, Mosaic, Terrazzo floors, Pitched, flat roofs. Lean to roof, Coupled Roofs. Trussed roofs – King and Queen post Trusses. R.C.C Roofs, Madras Terrace and Pre fabricated roofs.

UNIT.V : FINISHINGS

Damp Proofing and water proofing materials and uses – Plastering Pointing, white washing and distempering –Paints: Constituents of a paint – Types of paints – Painting of new/old wood- Varnish. Form Works and Scaffoldings.

AGGEGATES

Classification of aggregate – Coarse and fine aggregates- particle shape and texture – Bond and Strength of aggregate – Specific gravity – Bulk Density, porosity and absorption – Moisture content of Aggregate- Bulking of sand – Sieve analysis.

TEXT BOOKS:
1. S.S. Bhavikatti, Building Materials ,Vices publications House private ltd.
2. S.S. Bhavikatti, Building Construction, Vices publications House private ltd.
3. B.C. Punmia, Building Materials, Laxmi Publications private ltd.
4. B.C. Punmia, Building Construction ,Laxmi Publications (p) ltd.

References:
1. S.K.Duggal, Building Materials, New Age International Publications.
2. P.C.Verghese ,Building Materials, PHI learning (P) ltd.
3. M.L.Gambhir ,Building Materials , Tata McGraw Hill Publishing Co. Ltd. New Delhi.
4. P.C.Verghese ,Building construction, PHI Learning (P) Ltd.

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II Year II Semester

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2	0	0	--

ENVIRONMENTAL SCIENCE

Course Objectives:
- To make the students to get awareness on environment
- To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day-to-day activities of human life
- To save earth from the inventions by the engineers.

Course Outcomes:

CO	STATEMENT	Blooms level
CO1	Grasp multi disciplinary nature of environmental studies and various renewable and non-renewable resources.	L2
CO2	Understand flow and bio-geo- chemical cycles and ecological pyramids.	L2
CO3	Understand various causes of pollution and solid waste management and related preventive measures.	L2
CO4	Understand the rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation.	L2
CO5	Illustrate the causes of population explosion, value education and welfare programmes.	L3

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 – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

UNIT – II

Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:
   a. Forest ecosystem.
   b. Grassland ecosystem
   c. Desert ecosystem
   d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

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Biodiversity and Its Conservation : Introduction and Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – III
Environmental Pollution: Definition, Cause, effects and control measures of:
    a. Air Pollution.
    b. Water pollution
    c. Soil pollution
    d. Marine pollution
    e. Noise pollution
    f. Thermal pollution
    g. Nuclear hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT – IV
Social Issues And The Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – 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. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

Field Work: Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc.

Textbooks:
    1. Erach Bharucha, Text book of Environmental Studies for Undergraduate Courses, Universities Press (India) Private Limited, 2019.
    2. Palaniswamy, Environmental Studies, 2/e, Pearson education, 2014.
    3. S.Azeem Unnisa, Environmental Studies, Academic Publishing Company, 2021.
    4. K.Raghavan Nambiar, "Text book of Environmental Studies for Undergraduate Courses as per UGC model syllabus", SciTech Publications (India), Pvt. Ltd, 2010.

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Reference Books:

1. Deeksha Dave and E.Sai Baba Reddy, Textbook of Environmental Science, 2/e, Cengage Publications, 2012.
2. M.Anji Reddy, "Textbook of Environmental Sciences and Technology", BS Publication, 2014.
3. J.P. Sharma, Comprehensive Environmental studies, Laxmi publications, 2006.
4. J. Glynn Henry and Gary W. Heinke, Environmental Sciences and Engineering, Prentice Hall of India Private limited, 1988.
5. G.R. Chatwal, A Text Book of Environmental Studies, Himalaya Publishing House, 2018.
6. Gilbert M. Masters and Wendell P. Ela, Introduction to Environmental Engineering and Science, 1/e, Prentice Hall of India Private limited, 1991.

Online Learning Resources:

- https://onlinecourses.nptel.ac.in/noc23_hs155/preview
- https://www.edx.org/learn/environmental-science/rice-university-ap-r-environmental-science-part-3-pollution-and-resources?index=product&objectID=course-3a6da9f2-d84c-4773-8388-1b2f8f6a75f2&webview=false&campaign=AP%C2%AE+Environmental+Science++Part+3%3A+Pollution+and+Resources&source=edX&product_category=course&placement_url=https%3A%2F%2Fwww.edx.org%2Flearn%2Fenvironmental-science
- http://ecoursesonline.iasri.res.in/Courses/Environmental%20Science-I/Data%20Files/pdf/lec07.pdf
- https://www.youtube.com/watch?v=5QxxaVfgQ3k