JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (AUTONOMOUS) ANANTHAPURAMU–515002 (A.P) INDIA

Academic Regulations (R23) for B. Tech (Regular-Full time)

(Effective for the students admitted into I year from the Academic Year **2023-24** onwards)

CIVIL ENGINEERING

I YEAR COURSE STRUCTURE AND SYLLABUS

B. TECH - CIVIL ENGINEERING-COURSE STRUCTURE& SYLLABUS–R23
(Applicable from the academic year 2023-24 onwards)

INDUCTION PROGRAMME

S. No.	Course Name	Category	L-T-P-C
1	Physical Activities--Sports, Yoga and Meditation, Plantation	MC	0-0-6-0
2	Career Counseling	MC	2-0-2-0
3	Orientation to all branches --career options, tools, etc.	MC	3-0-0-0
4	Orientation on admitted Branch—corresponding labs, tools and platforms	EC	2-0-3-0
5	Proficiency Modules & Productivity Tools	ES	2-1-2-0
6	Assessment on basic aptitude and mathematical skills	MC	2-0-3-0
7	Remedial Training in Foundation Courses	MC	2-1-2-0
8	Human Values & Professional Ethics	MC	3-0-0-0
9	Communication Skills—focus on Listening, Speaking, Reading, Writing skills	BS	2-1-2-0
10	Concepts of Programming	ES	2-0-2-0

B. Tech. – I Year I Semester (CIVIL Engineering)

S. No.	Subject Code	Subject	L/D	T	P	Credits
1	23A15201	Engineering Physics Common to CIVIL, MECH, CHEM	3	0	0	3
2	23A15101	Linear Algebra & Calculus Common to All Branches	3	0	0	3
3	23A12401	Basic Electrical and Electronics Engineering Common to CIVIL, MECH, CHEM	3	0	0	3
4	23A10301	Engineering Graphics Common to CIVIL, MECH, CHEM	1	0	4	3
5	23A10501	Introduction to Programming Common to All Branches	3	0	0	3
6	23A10503	IT Work Shop Common to CIVIL, MECH, CHEM	0	0	2	1
7	23A15202	Engineering Physics Lab Common to CIVIL, MECH, CHEM	0	0	2	1
8	23A12402	Electrical and Electronics Engineering Work Shop Common to CIVIL, MECH, CHEM	0	0	3	1.5
9	23A10502	Computer Programming Lab Common to All Branches	0	0	3	1.5
10	23A15902	NSS/NCC /SCOUTS and Guides/ Community Service (Common to CIVIL, MECH, CHE)	-	-	1	0.5
Total			13	0	15	20.5

B. Tech. – I Year II Semester

S. No.	Subject Code	Subject	L/D	T	P	Credits
1	23A25501	Communicative English Common to CE, ME, CHEM	2	0	0	2
2	23A25301	Engineering Chemistry Common to CE, ME, CHEM	3	0	0	3
3	23A25101	Differential Equations and Vector Calculus (Common to All Branches)	3	0	0	3
4	23A21301	Basic Civil and Mechanical Engineering Common to CE, ME, CHEM	3	0	0	3
5	23A21302	Engineering Mechanics Common to Civil, Mechanical	3	0	0	3
6	23A25502	Communicative English Lab Common to CE, ME, CHEM	0	0	2	1
7	23A25302	Engineering Chemistry Lab Common to CE, ME, CHEM	0	0	2	1
8	23A20301	Engineering Workshop Common to CE, ME, CHEM	0	0	3	1.5
9	23A20101	Building Practices Lab	0	0	3	1.5
10	23A25901	Health and Wellness, Yoga and Sports Common to CE, ME, CHEM	-	-	1	0.5
Total			14	0	11	19.5

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B. Tech. – I Year I Semester
(Common to Civil, Mechanical &Chemical Engineering)

Subject Code	Title of the Subject	L	T	P	C
23A15201	**Engineering Physics**	**3**	**0**	**0**	**3**

PREAMBLE

There has been an exponential growth of knowledge in the recent past opening up new areas and challenges in the understanding of basic laws of nature. This helped to the discovery of new phenomena in macro, micro and Nano scale device technologies. The laws of physics play a key role in the development of science, engineering and technology. Sound knowledge of physical principles is of paramount importance in understanding new discoveries, recent trends and latest developments in the field of engineering.

To keep in pace with the recent scientific advancements in the areas of emerging technologies, the syllabi has been thoroughly revised keeping in view of the basic needs of all branches of Engineering by including the topics like Physical Optics, Dielectric and Magnetic materials, Crystallography and X-ray Diffraction, Quantum Mechanics, Free Electron Theory, Semiconductors and superconductors.

COURSE OBJECTIVES	
1	Bridging the gap between the Physics in school at 10+2 level and UG level engineering courses.
2	To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
3	Enlighten the periodic arrangement of atoms in Crystal line solids by Bragg's law– Learning the structural analysis through X-ray diffraction techniques.
4	Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of DE Broglie matter waves, quantum mechanical wave equation and its application, the importance of free electron theory for metals.
5	To Understand the Physics of Semiconductors and their working mechanism, Concepts utilization of transport phenomenon of charge carriers in semiconductors. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.
6.	To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.

COURSE OUTCOMES	
CO1	Explain the need of coherent sources and the conditions for sustained interference (L2). Identify the applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of polarization(L2)
CO2	Interpret various crystal systems (L2) and Analyze the characterization of materials by XRD(L4). Identify the important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction technique (L3). Analysis of structure of the crystals by Laue's method(L2).
CO3	Describe the dual nature of matter(L1). Explain the significance of wave function(L2). Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the study of electrical conductivity(L3).
CO4	Classify the crystalline solids (L2). Outline the properties of charge carriers in semiconductors(L2). Identify the type of semiconductor using Hall effect (L2). Classify super conductors based on Meissner's effect (L2). Explain Meissner's effect, BCS theory & Josephs on effect in superconductors(L2).
CO5	Explain the concept of dielectric constant and polarization in dielectric materials(L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius-Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility(L2).

Unit-I: Wave Optics 12hrs

Interference- Principle of superposition – Interference of light – Conditions for sustained interference –Interference in thin films (Reflection Geometry)–Colors in thin films–Newton's Rings–Determination of wavelength and refractive index.

Diffraction-Introduction – Fresnel and Fraunhofer diffraction – Fraunhofer diffraction due to singles lit, double slit and 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 8hrs

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Crystal systems Brava is Lattices — 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 method.

Unit-III: Quantum Mechanics and Free Electron Theory9hrs

Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle - Schrodinger's time in dependent and dependent wave equation – Significance and properties of wave function – Particle in a one-dimensional infinite potential well.

Free Electron Theory-Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory – Equation for electrical conductivity based on quantum free electron theory–Fermi-Dirac distribution– Fermi energy -Failures of free electron theory.

Unit–IV: Semiconductors and Superconductors 8hrs

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 - Drift and diffusion currents – Einstein's equation – Hall effect and its Applications.

Superconductors: Introduction – Properties of superconductors – Meissner effect– Type I and Type IIsuperconductors–AC and DC Josephs on effects–BCS theory (qualitative treatment)–Heightc super conductors–Applications of superconductors.

Unit–V: Dielectric and Magnetic Materials 8hrs

Dielectric Materials- Introduction – Dielectric polarization – Dielectric polarizability, Susceptibility and Dielectric constant and Displacement Vector – Relation between the electric vectors - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) –Lorentz field- Clausius-Mossotti equation–Dielectric loss.

MagneticMaterials-Introduction–Magneticdipolemoment–Magnetization–Magneticsusceptibility and Permeability – Atomic origin of magnetism – Classification of magnetic materials: Dia, Para, Ferro, Ferri & Anti ferro – Domain concept of Ferromagnetism (Qualitative) – Hysteresis –Soft and Hard magnetic materials.

Textbooks:

1. Engineering Physics by M.N. Avadhanulu, P.G.K. shirsagar & TVS Arun Murthy S. Chand Publications,11th Edition 2019.
2. Engineering Physics" by D.K. Bhattacharya and Poonam Tandon, Oxford press (2018).

Reference Books:

1. "Engineering Physics"-B. K. Pandey and S. Chaturvedi, Cengage Learning
2. "Fundamentals of Physics"-Halliday, Resnick and Walker, John Wiley &Sons.
3. "Fundamentals of Physics with Applications", Arthur Beiser ,Samarjit Sengupta, Schaum Series.
4. "Engineering Physics"-Shatendra Sharma, Jyotsna Sharma, Pearson Education,2018.
5. "Engineering Physics"-Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press.
6. "Semiconductor physics and devices: Basic principle"-A. Donald, Neamen, McGraw Hill.
7. "Solid state physics"–A. J. Dekker, Pan Macmillan publishers
8. "Introduction to Solid State Physics"-Charles Kittel, Wiley

Mapping between Course Outcomes and Programme Outcomes

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

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(Common to All branches of Engineering)

Subject Code	Title of the Subject	L	T	P	C
23A15101	**Linear Algebra & Calculus**	3	0	0	3

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, consistency of linear system of equations Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.

UNIT II: Eigen values, 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 canonical forms by similarity transformation, Lagrange's reduction and Orthogonal Transformation, types of complex matrices (Hermition skew Hermition & unitary)

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. Radius of curvature, centre of curvature and circle of curvature.

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, Differentiation under the integral sign (Liebntiz's rule)

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, 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, R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
3) Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4) Advanced Engineering Mathematics, Michael Greenberg, Pearson publishers, 9th edition
5) Higher Engineering Mathematics, H. K Das, Er. Rajnish Verma, S. Chand Publications,2014, Third Edition (Reprint 2021).

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B. Tech. – I Year I Semester
(Common to Civil, Mechanical& Chemical Engineering)

Subject Code	Title of the Subject	L	T	P	C
23A12401	**Basic Electrical &Electronics Engineering**	3	0	0	3

PART A: BASIC ELECTRICAL ENGINEERING

Course Objectives: To expose to the field of electrical engineering, laws and principles of electrical engineering and to acquire fundamental knowledge in the relevant field.
Course Outcomes:
CO1: Remember the fundamental laws, operating principles of motors, generators, MC and MI instruments (L1)
CO2: Understand the problem-solving concepts associated to AC and DC circuits, construction and operation of AC and DC machines, measuring instruments; different power generation mechanisms, Electricity billing concept and important safety measures related to electrical operations (L2)
CO3: Apply mathematical tools and fundamental concepts to derive various equations related to machines, circuits and measuring instruments; electricity bill calculations and layout representation of electrical power systems (L3)
CO4: Analyse different electrical circuits, performance of machines and measuring instruments (L4)
CO5: Evaluate different circuit configurations, Machine performance and Power systems operation (L5)

Syllabus:

UNITI: 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, Analysis of R-L, R-C, R-L-C Series circuits, Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

UNITII: 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.

1. **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 electricity tariff, calculation of electricity bill for domestic consumers.
2. **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.

Learning Resources:

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, Third Edition

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 University Press, 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 of digital electronics.
Course Objectives: At the end of the course, the student will be able to
CO1: Understand the principle of working of diodes, transistors and their characteristics.
CO2: Understand the fundamental concepts of various semiconductor devices in electronic circuits and instruments.
CO3: Apply the concepts of diodes in rectifiers and regulated power supplies
CO4: Explain the concepts of various number systems and the functionality of logic gates with Boolean functions.
CO5: Understand the simple combinational circuits and sequential circuits.

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

UNIT I: SEMICONDUCTOR DEVICES

Introduction - Evolution of electronics – Vacuum tubes to Nano electronics - Characteristics of PN Junction Diode — Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and V-I 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, Grey code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, 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. Santiram Kal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata McGraw Hill, 2009

Reference Books:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010.
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

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B. Tech. – I Year I Semester
(Common to Civil, Mechanical & Chemical Engineering)

Subject Code	Title of the Subject	L	T	P	C
23A10301	**Engineering Graphics**	1	0	4	3

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 Development 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: Polyhedral 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 view sand 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 of objects including PCB and Transformations using AutoCAD (*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, TataMcGrawHill,2013.
2. Engineering Drawing, M.B. Shahand B.C. Rana, PearsonEducationInc,2009.
3. Engineering Drawing with an Introduction to AutoCAD, Dhanan jay Jolhe, Tata McGraw Hill,2017.

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

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B. Tech. – I Year I Semester
(Common to All branches of Engineering)

Subject Code	Title of the Subject	L	T	P	C
23A10501	**Introduction to Programming**	3	0	0	3

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.

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

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, Dynamic memory allocation, 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, Command line arguments,

Basics of File Handling: why files, file opening and closing a data files, reading and writing a data file, processing data files.

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, Bala guru samy, E., McGraw-Hill Education, 2008.
2. Programming in C, Rema Theraja, Oxford, 2016, 2nd edition
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE, 3rd edition

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B. Tech. – I Year I Semester
(Common to Civil, Mechanical &Chemical Engineering)

Subject Code	Title of the Subject	L	T	P	C
23A10503	IT Work Shop	0	0	2	1

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 comm and line interface comm and son 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:
CO1: Perform Hardware troubleshooting.
CO2: Understand Hardware components and inter dependencies.
CO3: Safeguard computer systems from viruses/worms.
CO4: Document/ Presentation preparation. CO5: Perform calculations using spread sheets.

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

PC Hardware & Software Installation:

Task1: 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

thevideowhichshowstheprocessofassemblingaPC.AvideowouldbegivenaspartofthecourseContent.
Task3: Every student should individually install MS windows on the personal computer. Lab in struct or 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)withbothWindowsandBOSS.Labinstructorsshouldverifytheinstallationandfollowit up with a Viva.

Internet &World Wide Web:

Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local AreaNetworkandaccesstheInternet.IntheprocesstheyconfiguretheTCP/IPsetting.Finallystudentsshouldde monstrate, 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 WW Won the LAN.
Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search tool bar sand popup blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.
Task3: 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

Task1–Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of LaTeX 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 LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.
Task2: Using LaTeX 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 Head errand Footer, Using Date and Time option in both Latex and Word.
Task 3: Creating project abstract Features to be covered: -Formatting Styles, inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Foot note, 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 Spread sheet tool, give the details of the four tasks and features that would be covered in each. Using Excel– Accessing, overview of tool bars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task2: 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.

POWERPOINT

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.

AITOOLS –Chat GPT

Task1: 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 story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brain storm 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 to see 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 toolkit, Vikas Gupta, WILEY Dreamtech,2003
2. The Complete Computer upgrade and repair book, Cheryl A Schmidt, WILEY Dream tech,2013,3rdedition
3. Introduction to Information Technology, ITL Education Solutions limited, PearsonEducation,2012,2nd edition
4. 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 Anfinsen and Ken Quamme. –CISCO Press, Pearson Education,3rd edition.

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B. Tech. – I Year I Semester

(Common to Civil, Mechanical &Chemical Engineering)

Subject Code	Title of the Subject	L	T	P	C
23A15202	**Engineering Physics Lab**	0	0	2	1

Course Objectives:
Understands the concepts of interference, diffraction and their applications.
Understand the role of optical fibre parameters in communication.
Recognize the importance of energy gap in the study of conductivity and Hall Effect in a semiconductor.
Illustrates them agentic and dielectric materials applications.
Apply the principles of semiconductors in various electronic devices.

(Any **TEN** of the following list of experiments)

(Out of which any **TWO** experiments may be conducted in virtual mode)

List of Engineering Physics 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. Determination of dispersive power of prism.
4. Verification of Brewster's law
5. Determination of the resistivity of semiconductor by four probe method.
6. Determination of energy gap of a semiconductor using p-n junction diode.
7. DeterminationofHallvoltageandHallcoefficientofagivensemiconductorusingHalleffect.
8. Determinationofdielectricconstantusingcharginganddischargingmethod.
9. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
10. Magnetic field along the axis of a current carrying circular coil by Stewart & Gee's Method.
11. Determination of wavelength of Laser light using diffraction grating.
12. Estimation of Planck's constant using photo electric effect.
13. Determination of temperature coefficients of a thermistor.
14. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.
15. DeterminationofrigiditymodulusofthematerialofthegivenwireusingTorsionalpendulum.
16. Sonometer: Verification of laws of stretched string.

17. Determination of young's modulus for the given material of wooden scale by non-uniform bending (or double cantilever) method.
18. DeterminationofFrequencyofelectricallymaintainedtuningforkbyMelde'sexperiment.

Course Outcomes: The students will be able to
Operate optical instruments like microscope and spectrometer(L2)
Estimate the wavelength of different colours using diffraction grating and resolving power(L2)
Plot the intensity of the magnetic field of circular coil carrying current with distance(L3)
Determinetheresistivityofthegivensemiconductorusingfourprobemethod(L3)
Identify the type of semiconductor i.e. –type or p-type using hall effect(L3)
Calculate the band gap of a given semiconductor(L3)

	PO 1	**PO 2**	**PO3**	**PO 4**	**PO 5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO1 0**	**PO1 1**	**PO1 2**
CO1	**3**			**2**								
CO2	**3**	**2**		**2**								
CO3	**3**	**1**		**2**								
CO4	**3**	**3**		**3**	**2**							
CO5	**3**											

References: 1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"-SChandPublishers,2017.

- ***URL***:*www.vlab.co.in*

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B. Tech. – I Year I Semester
(Common to Civil, Mechanical &Chemical Engineering)

Subject Code	Title of the Subject	L	T	P	C
23A12402	**Electrical and Electronics Engineering Work Shop**	0	0	3	1.5

PART A: ELECTRICAL ENGINEERING LAB

Course Objectives:
To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.
Course Outcomes:
CO1: Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer (L2)
CO2: Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor (L3)
CO3: Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor (L3)
CO4: Analyze various characteristics of electrical circuits, electrical machines and measuring instruments (L4)
CO5: Design suitable circuits and methodologies for the measurement of various electrical parameters; Household and commercial wiring (L5)

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

Learning Resources:

Reference books:

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, Third Edition

PART B: ELECTRONICS ENGINEERING LAB

Course Objectives:
To impart knowledge on the principles of digital electronics and fundamentals of electron devices& its applications.
Course Outcomes: At the end of the course, the student will be able to
CO1: Identify and 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.

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	2	3	2	1	2	1					1	
CO2	2		2	2	1				1		2	
CO3	2	2		3	1						1	
CO4		2	1	2	2	1						

List of Experiments:

1. Determine and Demonstrate V-I characteristics of PN Junction diode:
   (a) Forward bias (b) Reverse bias.
2. Determine and Demonstrate – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Determine and Demonstrate Input& Output characteristics of BJT in CE & 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 Gates using 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, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata McGraw Hill, 2009
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

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

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B. Tech. – I Year I Semester
(Common to All Branches)

Subject Code	Title of the Subject	L	T	P	C
23A10502	**Computer Programming Lab**	0	0	3	1.5

Course Objectives:
The course aims to give students hands – on experience and train them on the concepts of the
C- programming language.
Course Outcomes:
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 constructs
like pointers.
CO4: Develop, Debug and Execute programs to demonstrate the applications of arrays,
functions, basic concepts of pointers in C.

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PS O3
CO1	1	1	1									1	1	1	
CO2	1	2	1										1	1	
CO3	2	2	1										1	1	
CO4	2	1	1										1	1	
CO5	2	2	1										1	1	

UNITI:

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 2: 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 used with 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 full 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.

UNITIII:

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 reallot()

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: Bit fields, Self-Referential Structures, Linked lists
Lab10: Bit fields, 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 bit fields.
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() and fwrite()
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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B. Tech. – I Year I Semester
(Common to Civil, Mechanical &Chemical Engineering)

Subject Code	Title of the Subject	L	T	P	C
23A15902	**NSS/NCC/Scouts &Guides/ Community Service**	0	0	1	0.5

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 analysing social problems
CO4: Determine to extend their help for the fellow beings and down trodden people
CO5: Develop leadership skills and civic responsibilities.

SYLLABUS

UNIT I Orientation

General Orientation on NSS/NCC/Scouts and Guides/Community Service activities, Career guidance.

Activities:

i) Conducting –ice breaking sessions-expectations from the course-knowing personal talents and skills
ii) Conducting orientation programsforthestudents–futureplans-activities-releasingroadmapetc.
iii) Displayingsuccessstories-motivationalbiopics-awardwinningmoviesonsocietalissuesetc.
iv) Conductingtalentshowinsingingpatrioticsongs-paintings-anyothercontribution.

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) Organizing Zero-waste day.

v) DigitalEnvironmentalawarenessactivityviavarioussocialmediaplatforms.
vi) Virtualdemonstrationofdifferenteco-friendlyapproachesforsustainableliving.
vii) Write a summary on any book related to environmental issues.

UNIT III Community Service

Activities:

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 Population Education.
v) 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 EnvironmentalEngineering 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:

1. Evaluated for a total of 100 marks.
2. 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, totaling to 90 marks.
3. A student shall be evaluated by the concerned teacher for 10 marks by conducting vivavoce on the subject.

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I B. TECH (R23) – II SEMESTER
(Common to CIVIL, MECH & CHEM)

Subject Code	Title of the Subject	L	T	P	C
23A25501	**COMMUNICATIVE ENGLISH**	**2**	**0**	**0**	**2**

Course Objectives:

The main objective of introducing this course, C**ommunicative 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.

SYLLABUS

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 afterlistening to audio texts.
Speaking: Discussion in pairs/small groups on specific topics followed by shortstructuredtalks.
Reading: Identifying sequence of ideas; recognizing verbal techniques that help to linkthe ideas in a paragraph together.
Writing: Structure of a paragraph - Paragraph writing (specific topics)

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: Reading a text in detail by making basic inferences - ecognizing and interpreting specific context clues; strategies to use text clues for comprehension.
Writing: Summarizing, Note-making, paraphrasing**Grammar:** Verbs - tenses; subject-verb agreement; **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 andinformal) - 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: Academic Writing (Letter Writing, Letter writing, creative writing, critical thinking)
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 andusage (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. *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 UniversityPress, 2019.
4. Lewis, Norman. *Word Power Made Easy- The Complete Handbook for Building aSuperior 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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I B. TECH (R23) – II SEMESTER

(Common to CIVIL, MECH & CHEM)

Subject Code	Title of the Subject	L	T	P	C
23A25301	**ENGINEERING CHEMISTRY**	**3**	**0**	**0**	**3**

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 electrochemistry, polymers, surface chemistry, and cement

COURSE OUTCOMES	
CO1	List the differences between temporary and permanent hardness of water, Explain the principles of reverse osmosis and electro dialysis. Compare quality of drinking water with BIS and WHO standards. Illustrate problems associated with hard water - scale and sludge. Explain the working principles of different Industrial water treatment processes
CO2	Apply Nernst equation for calculating electrode and cell potentials, Apply Pilling Bed worth rule for corrosion and corrosion prevention, Demonstrate the corrosion prevention methods and factors affecting corrosion, Compare different batteries and their applications
CO3	Explain different types of polymers and their applications, Solve the numerical problems based on Calorific value, select suitable fuels for IC engines, Explain calorific values, octane number, refining of petroleum and cracking of oils
CO4	Explain the constituents of Composites and its classification, Identify the factors affecting the refractory material, Illustrate the functions and properties of lubricants, demonstrate the phases and reactivity of concrete formation, Identify the constituents of Portland cement, Enumerate the reactions at setting and hardening of the cement
CO5	Summarize the concepts of colloids, micelle and nanomaterial's, Explain the synthesis of colloids with examples, Outline the preparation of nanomaterial's and metal oxides Identify the application of colloids and nanomaterial's in medicine, sensors and catalysis

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

UNIT I Water Technology (8 hrs)

Soft and hard water, 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 electro dialysis.

Learning outcomes:

The student will be able to

- **list** the differences between temporary and permanent hardness of water (L1)
- **Explain** the principles of reverse osmosis and electro dialysis. (L2)
- **Compare** quality of drinking water with BIS and WHO standards. (L2)
- **Illustrate** problems associated with hard water - scale and sludge**.** (L2)
- **explain** the working principles of different Industrial water treatment processes (L2)

UNIT II Electrochemistry and Applications (10 hrs)

Electrodes –electrochemical cell, Nernst equation, cell potential calculations.
Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium (NiCad), and lithium-ion batteries-principle, working 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 aeration cell corrosion, galvanic corrosion, metal oxide formation by dry electrochemical corrosion, Pilling Bed worth ratios and uses, Factors affecting the corrosion**,** cathodic and anodic protection, electroplating and electro less plating (Nickel and Copper).

Learning Outcomes:

At the end of this unit, the students will be able to

- **apply** Nernst equation for calculating electrode and cell potentials (L3)
- **apply** Pilling Bed worth rule for corrosion and corrosion prevention (L3)
- **demonstrate** the corrosion prevention methods and factors affecting corrosion (L2)
- **compare** different batteries, Fuel Cells and their applications (L2)

UNIT III Polymers and Fuel Chemistry (10 hrs)

Introduction to polymers, functionality of monomers, Mechanism of chain growth, step growth polymerization, Poly dispersity index (PDI)- significance
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, Octane and Cetane number-alternative fuels- propane, methanol, ethanol and bio fuel-bio diesel.

Learning Outcomes:

At the end of this unit, the students will be able to

- **explain** different types of polymers and their applications (L2)
- **Solve** the numerical problems based on Calorific value(L3)
- **Discuss** the different types of Fuels and their applications (L2)
- **explain** calorific values, octane number, refining of petroleum(L2)

UNIT IV Modern Engineering Materials (10 hrs)

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.

Learning Outcomes:

At the end of this unit, the students will be able to

- **explain** the constituents of Composites and its classification (L2)
- **identify** the factors affecting the refractory material(L3)
- **illustrate** the functions and properties of lubricants (L2)
- **demonstrate** the phases and reactivity of concrete formation (L2)
- **identify** the constituents of Portland cement (L3)
- **enumerate** the reactions at setting and hardening of the cement (L3)

UNIT V Surface Chemistry and Nanomaterials (10 hrs)

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 nanomaterial's by stabilizing agents, adsorption isotherm (Freundlich and Longmuir), BET equation (no derivation) applications of colloids and nano material's – catalysis, medicine, sensors, etc.

Learning Outcomes:

At the end of this unit, the students will be able to

- **summarize** the concepts of colloids, micelle and nanomaterials (L2)
- **explain** the synthesis of colloids with examples (L2)
- **outline** the preparation of nanomaterials and metal oxides (L2)
- **identify** the application of colloids and nanomaterials in medicine, sensors and catalysis (L2)

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.
3. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition

Learning Outcomes:

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

- **demonstrate** the differences between temporary and permanent hardness of water (L2)
- **explain** the preparation, properties, and applications of thermoplastics &thermos setting, elastomers & conducting polymers. (L2)
- **explain** calorific values, octane number, refining of petroleum and cracking of oils (L2)
- **explain** the setting and hardening of cement and concrete phase (L2)
- **summarize** the concepts of colloids, micelle and nanomaterials (L2).

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I B. TECH (R23) – II SEMESTER

(23A25101) DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

(Common to All Branches of Engineering)

Subject Code	Title of the Subject	L	T	P	C
23A25101	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	3	0	0	3

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 orthogonal Trajectories, 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,Equations reducible to Linear Differential equations with constant coefficients (Caushy's equation, Lagendre's equation) 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, Non-linear partial differential equations (Standard forms)

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, physical interpretation, examples and 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) physical interpretation 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)

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I B. TECH (R23) – II SEMESTER

(23A21301) BASIC CIVIL AND MECHANICAL ENGINEERING
(Common to CIVIL, MECH & CHEM)

Subject Code	Title of the Subject	L	T	P	C
23A21301	BASIC CIVIL AND MECHANICAL ENGINEERING	3	0	0	3

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, anglesand 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 socialresponsibilities of water conservation will be appreciated.
CO5: Understand the basic characteristics of Civil Engineering Materials and attain knowledgeon prefabricated technology.

PART A: BASIC CIVIL ENGINEERING

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 leveling -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 EngineerigWater 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 and Brothers 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.
CO4: Describe the working of different power plants.
CO5: 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 Tear 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, Cengagelearning India Pvt. Ltd.

Reference Books:

1. Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I
2. 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak MPandey, Springer publications
3. Thermal Engineering by Mahesh M Rathore Tata McGraw Hill publications (India) Pvt.Ltd.

4. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, TataMcGraw Hill publications (India) Pvt. Ltd.

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓				✓						✓	
CO2	✓						✓				✓	
CO3	✓						✓				✓	
CO4	✓					✓					✓	
CO5	✓										✓	

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I B. TECH (R23) – II SEMESTER

(23A213012) ENGINEERING MECHANICS
(Common to CIVIL, MECH)

Subject Code	Title of the Subject	L	T	P	C
23A21302	**ENGINEERING MECHANICS**	**3**	**0**	**0**	**3**

Course Objectives:

- To get familiarized with different types of force systems.
- To draw accurate free body diagrams representing forces and moments acting on abody to analyze the equilibrium of system of forces.
- To teach the basic principles of center of gravity, centroid and moment of inertia anddetermine 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 ofrigid 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 forcesfor bodies in contact.

CO2: Analyze different force systems such as concurrent, coplanar and spatial systems andcalculate their resultant forces and moments.

CO3: Calculate the centroids, center of gravity and moment of inertia of different geometricalshapes.

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 Theorm, 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 Moments of 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.

Learning Resources:

Textbooks:

1. Engineering Mechanics , S. Timoshenko, D. H. Young, J.V. Rao, S. Pati., , McGrawHill Education 2017. 5th Edition.
2. Engineering Mechanics, P.C.Dumir- S.Sengupta and Srinivas V veeravalli , University press. 2020 .First Edition.
3. A Text book 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., McGrawHill Education. 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

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	□	□	□	□								
CO2	□	□	□	□								
CO3	□	□	□	□	□							
CO4		□	□	□	□	□						
CO5		□	□	□								

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I B. TECH (R23) – II SEMESTER

(23A25502) COMMUNICATIVE ENGLISH LAB

(Common to CIVIL, MECH & CHEM)

Subject Code	Title of the Subject	L	T	P	C
23A25502	COMMUNICATIVE ENGLISH LAB	0	0	2	1

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 the 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 **o**n LSRWskills.

CO2: Apply communication skills through various language learning activities.

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

CO4: Evaluate and exhibit professionalism in participating in debates and group discussions.CO5:

Create effective resume and prepare themselves to face interviews in future.

List of Topics:

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

Suggested Software:

- Walden Infotech
- Young India Films
- K-Van Solutions

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:

1. https://www.youtube.com/user/letstalkaccent/videos
2. https://www.youtube.com/c/EngLanguageClub/featured
3. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
4. https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

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I B. TECH (R23) – II SEMESTER

(23A2503) ENGINEERING CHEMISTRY LAB

(Common to CIVIL, MECH & CHEM)

Subject Code	Title of the Subject	L	T	P	C
23A2503	ENGINEERING CHEMISTRY LAB	0	0	2	1

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.

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

List of Experiments:

1. Determination of Hardness of a groundwater sample.
2. Determination of Hardness of a drinking water sample.
3. Estimation of Dissolved Oxygen by Winkler's method.
4. Determination of Strength of an acid in Pb-Acid battery.
5. Preparation of a polymer (Bakelite).

6. Determination of percentage of Iron in Cement sample by colorimetry.
7. Estimation of Calcium in port land Cement.
8. Preparation of nanomaterials by precipitation method.
9. Adsorption of acetic acid by charcoal.
10. Determination of percentage Moisture content in a coal sample.
11. Determination of Viscosity of lubricating oil by Redwood Viscometer 1.
12. Determination of Viscosity of lubricating oil by Redwood Viscometer 2.
13. Determination of Calorific value of gases by Junker's gas Calorimeter.

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

1. **determine** the Strength of solutions, Dissolved oxygen (L3)
2. **prepare** advanced polymer materials (L2)
3. **determine** the physical properties like surface tension, adsorption and viscosity (L3)
4. **estimate** the Iron and Calcium in cement (L3)
5. **calculate** the hardness of water (L4)

Reference:

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

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I B. TECH (R23) – II SEMESTER

(23A250302) ENGINEERING WORKSHOP

(Common to CIVIL, MECH & CHEM)

Subject Code	Title of the Subject	L	T	P	C
23A250302	**ENGINEERING WORKSHOP**	**0**	**0**	**3**	**1.5**

Course Objectives:

To familiarize students with wood working, sheet metal operations, fitting and electrical housewiring skills

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.

CO5: Demonstration and Practice of plumbing and welding.

SYLLABUS

Demonstration: Safety practices and precautions to be observed in workshop.

1. **Wood Working:** Familiarity with different types of woods and tools used in woodworking and make following joints.

a) Half – Lap joint b) Mortise and Tenon joint c) Corner Dovetail joint or Bridle joint d) Demonstration of Power tools

2. **Sheet Metal Working**: Familiarity with different types of tools used in sheet metalworking, Developments of following sheet metal job from GI sheets.

a) Tapered tray b) Conical funnel c) Elbow pipe d) Brazing

3. **Fitting:** Familiarity with different types of tools used in fitting and do the followingfitting exercises.

a) V-fit b) Dovetail fit c) Semi-circular fit d) Bicycle tire punctureand change of two-wheeler tyre

4. **Electrical Wiring**: Familiarity with different types of basic electrical circuits and makethe following connections.

a) Parallel and series b) Two-way switch c) Godown lighting
d) Tube light e) Three phase motor f) Soldering of wires

5. **Foundry Trade:** Demonstration and practice on Moulding tools and processes,Preparation of Green Sand Moulds for given Patterns.
6. **Welding Shop**: Demonstration and practice on Arc Welding and Gas welding.Preparation of Lap joint and Butt joint.
7. **Plumbing:** Demonstration and practice of Plumbing tools, Preparation of Pipe jointswith coupling for same diameter and with reducer for different diameter

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, DhanpathRai & 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 Prakashan, 2021-22.

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1					✓	✓	✓		✓			
CO2					✓						✓	✓
CO3						✓					✓	✓
CO4						✓			✓		✓	✓
CO5						✓			✓		✓	✓

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, ANANTAPUR

COLLEGE OF ENGINEERING (AUTONOMOUS)ANANTHAPURAMU –515 002 (A.P) INDIA

I B. TECH (R23) – II SEMESTER

(23A20101) BUILDING PRACTICES LAB

(Civil Engineering Workshop)

Subject Code	Title of the Subject	L	T	P	C
23A20101	**BUILDING PRACTICES LAB**	**0**	**0**	**3**	**1.5**

Pre-requisite

Course Objectives

The student will be able

1. To analyze the plan and carry out setting out of building with the help of tape and cross staff
2. To construct brick wall of English bond with different thickness
3. To determine the center of gravity & moment of inertia of rolled steel sections by actual measurements
4. To successfully apply the various finishing works onto a wall
5. To successfully install various plumbing fixtures like Tap, T-Joint, Elbow, Bend, threading etc.,

LIST OF EXPERIMENTS:

1) Setting out of a building: The student should set out a building (single room only) as per the given building plan using tape and cross staff.
2) Construct a wall of height 50 cm and wall thickness 1½ bricks using English bond (No mortar required) - corner portion – length of side walls 60 cm.
3) Construct a wall of height 50 cm and wall thickness 2 bricks using English bond (No mortar required) - corner portion – length of side walls 60 cm.
4) Construct a wall of height 50 cm and wall thickness 2 bricks using Flemish bond (No mortar required) - corner portion – length of side walls 60 cm.
5) Computation of Centre of gravity and Moment of inertia of a given rolled steel section by actual measurements.
6) Installation of plumbing and fixtures like Tap, T-Joint, Elbow, Bend, Threading etc;
7) Plastering and Finishing of wall
8) Application of wall putty and painting a wall
9) Application of base coat and laying of Tile flooring of one square meter

10) Preparation of soil cement blocks for masonry and testing for compressive strength
11) Casting and testing of Fly ash Blocks
12) Preparation of cover blocks for providing cover to reinforcement

Course Outcomes

The student will be able to

1. Set-out a building as per the given plan using tape and cross staff
2. Construct brick wall of English bond with different thicknesses
3. Determine the center of gravity & moment of inertia of rolled steel sections by actual measurements
4. Apply the various finishing works onto a wall
5. Install various plumbing fixtures like Tap, T-Joint, Elbow, Bend, threading etc.,

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I B. TECH (R23) – II SEMESTER

(23A25901) HEALTH AND WELLNESS YOGA AND SPORTS

(Common to CIVIL, MECH & CHEM)

Subject Code	Title of the Subject	L	T	P	C
23A25901	HEALTH AND WELLNESS YOGA AND SPORTS	0	0	1	0.5

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 developmentof 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

SYLLABUS

UNIT I

Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship

betweendiet 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 balanced 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 cardiorespiratory 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 Surviving Anywhere* Third Edition, William Morrow Paperbacks, 2014
5. *The Sports Rules Book*/ Human Kinetics with Thomas Hanlon. -- 3rd ed. Human Kinetics, 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:

1. Evaluated for a total of 100 marks.
2. 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, totaling to90 marks.
3. A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.

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Department of Civil Engineering
II B.Tech (R23) Course Structure & Syllabus

B.Tech–II Year I Semester (R23) Course Structure

S.No.	Course Code	Title	L	T	P	Credits
1	23A35101	Numerical and Statistical Methods	3	0	0	3
2	23A39901	Universal Human Values– Understanding Harmony and Ethical Human Conduct (Common to CE,ME,CHEM)	2	1	0	3
3	23A30101	Surveying	3	0	0	3
4	23A30102	Strength of Materials	3	0	0	3
5	23A30103	Fluid Mechanics	3	0	0	3
6	23A30104	Surveying Lab	0	0	3	1.5
7	23A30105	Strength of Materials Lab	0	0	3	1.5
8	23A30106	Building Planning and Drawing (Skill Enhancement course)	0	1	2	2
9	23A39902	Environmental Science (Audit Course) (Common to All Branches)	2	0	0	-
Total			16	02	08	20

B.Tech–II Year II Semester (R23) Course Structure

S.No.	Course Code	Title	L	T	P	Credits
1	23A45401a 23A45401b 23A45401c	Managerial Economics and Financial Analysis Organizational Behavior Business Environment (Common to CE,CHEM)	2	0	0	2
2	23A40101	Engineering Geology	3	0	0	3
3	23A40102	Concrete Technology	3	0	0	3
4	23A40103	Structural Analysis	3	0	0	3
5	23A40104	Hydraulics & Hydraulic Machinery	3	0	0	3
6	23A40105	Concrete Technology Lab	0	0	3	1.5
7	23A40106	Engineering Geology lab	0	0	3	1.5
8	23A45501	Soft Skills (Skill Oriented Course) (Common to CE,ME, ECE,CHEM)	0	1	2	2
9	23A49901	Design Thinking & Innovation (Common to All Branches)	1	0	2	2
Total			15	1	10	21
(23A49903) Mandatory Community Service Project Internship of 08 weeks duration during summer vacation						

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Department of Civil Engineering

II B.Tech I Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A35101	**NUMERICAL & STATISTICAL METHODS**	**3**	**0**	**0**	**3**

Course Outcomes:

After successful completion of this course, the students should be able to:

COs	Statements	Blooms level
CO1	Apply numerical methods to solve algebraic and transcendental equations	L2,L3
CO2	Derive interpolating polynomials using interpolation formulae	L3,L5
CO3	Solve differential and integral equations numerically	L3
CO4	To identify real life problems into Mathematical Models.	L2,L3
CO5	To apply the probability theory and testing of hypothesis in the field of civil Engineering Applications.	L3,L5

Pre-requisite: Basic algebraic Equations, Probability, random variables (discrete and continuous) and probability distributions.

UNIT I: Solution of Algebraic & Transcendental Equations

Introduction-Bisection Method-Iterative method, Regula-falsi method and Newton Raphson method System of Algebraic equations: Gauss Elimination, Jacoby and Gauss Siedal method.

UNIT II Interpolation

Finite differences-Newton's forward and backward interpolation formulae – Lagrange's formulae. Curve fitting: Fitting of straight line, second-degree and Exponential curve by method of least squares.

UNIT III Solution of Initial value problems to Ordinary differential equations

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's and modified Euler's methods-Runge-Kutta methods (second and fourth order).

UNIT IV Estimation and Testing of hypothesis, larges ample tests

Estimation-parameters, statistics, sampling distribution, point estimation, Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors and power of the test. Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems

UNIT V Small sample tests

Student t-distribution (test for single mean, two means and paired t-test),testing of equality of variances (F-test), $\chi 2$ - test for goodness of fit, $\chi 2$ - test for independence of attributes.

Textbooks:

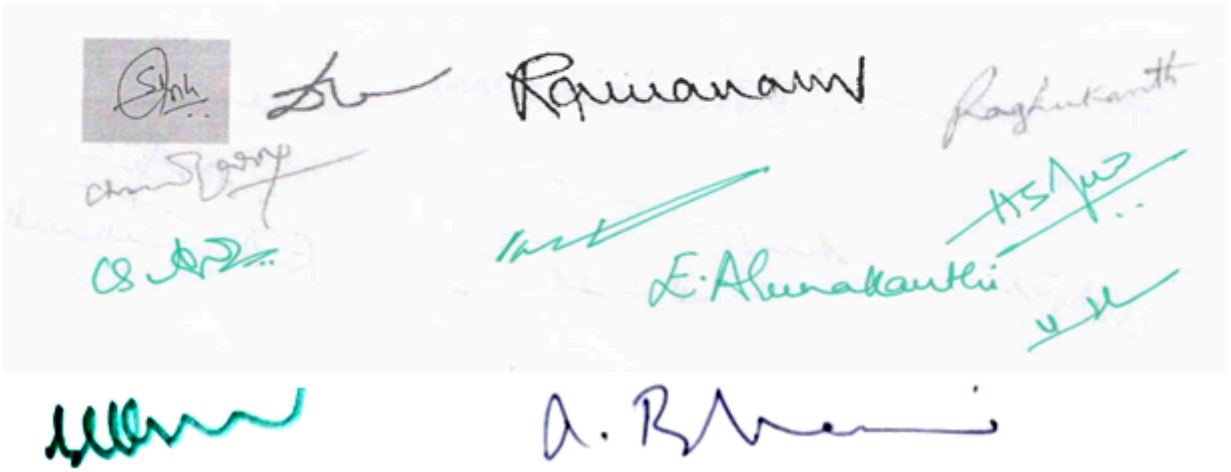
1. S S Sastry, Introductory Methods of Numerical Analysis, PHIL earning Private Limited.
2. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers,2017,44th Edition
3. Millerand Freunds, Probability and Statistics for Engineers,7/e,Pearson,2008.India.

Reference Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 2018, 10th Edition.
2. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
3. Ronald E.Walpole, Probability and Statistics for Engineers and Scientists, PNIE
4. H. K Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand Publications,2014, Third Edition (Reprint 2021)

Online Learning Resources:

1. https://onlinecourses.nptel.ac.in/noc17_ma14/preview
2. https://onlinecourses.nptel.ac.in/noc24_ma05/preview
3. http://nptel.ac.in/courses/111105090



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Department of Civil Engineering

II B.Tech I Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A39901	**UNIVERSAL HUMAN VALUES – UNDERSTANDING HARMONY AND ETHICAL HUMAN CONDUCT (Common to CE, ME, CHEM)**	**2**	**1**	**0**	**3**

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: At the end of the course, students will be able to		**Blooms Level**
CO1	Define the terms like Natural Acceptance, Happiness and Prosperity	L1, L2
CO2	Identify one's self, and one's surroundings (family, society nature)	L1, L2
CO3	Apply what they have learnt to their own self in different day-to-day settings in real life	L3
CO4	Relate human values with human relationship and human society.	L4
CO5	Justify the need for universal human values and harmonious existence	L5
CO6	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
Lecture4: 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

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 fulfil 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 Fulfilment 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

Practice Sessions for UNIT I – Introduction to Value Education
PS1 Sharing about Oneself
PS2 Exploring Human Consciousness
PS3 Exploring Natural Acceptance

Practice Sessions for UNIT II – Harmony in the Human Being
PS4 Exploring the difference of Needs of self and body

PS5 Exploring Sources of Imagination in the self
PS6 Exploring Harmony of self with the body

Practice Sessions for UNIT III – Harmony in the Family and Society
PS7 Exploring the Feeling of Trust
PS8 Exploring the Feeling of Respect
PS9 Exploring Systems to fulfil Human Goal

Practice Sessions for UNIT IV – Harmony in the Nature (Existence)
PS10 Exploring the Four Orders of Nature
PS11 Exploring Co-existence in Existence

Practice Sessions for UNIT V – Implications of the Holistic Understanding – a Look at Professional 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. *Jeevan Vidya: Ek Parichaya,* A Nagaraj, Jeevan Vidya Prakashan, 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)

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%2023.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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Department of Civil Engineering

II B.Tech I Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A30101	**SURVEYING**	**3**	**0**	**0**	**3**

Course Objectives:

The objective of this course is to:

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

Course Outcomes:

CO	Statement	**Blooms level**
CO1	Apply the principle and methods of surveying and measuring of horizontal and vertical- distances and angles	**L2**
CO2	Identify the source of errors and rectification methods	**L3**
CO3	Apply surveying principles to determine areas and volumes	**L2**
CO4	Setting out curves and using modern surveying equipments	**L3**
CO5	Apply the basics of Photogrammetry Surveying in field	**L4**

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.

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, Trigonometrically 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 LDAR Survey (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:

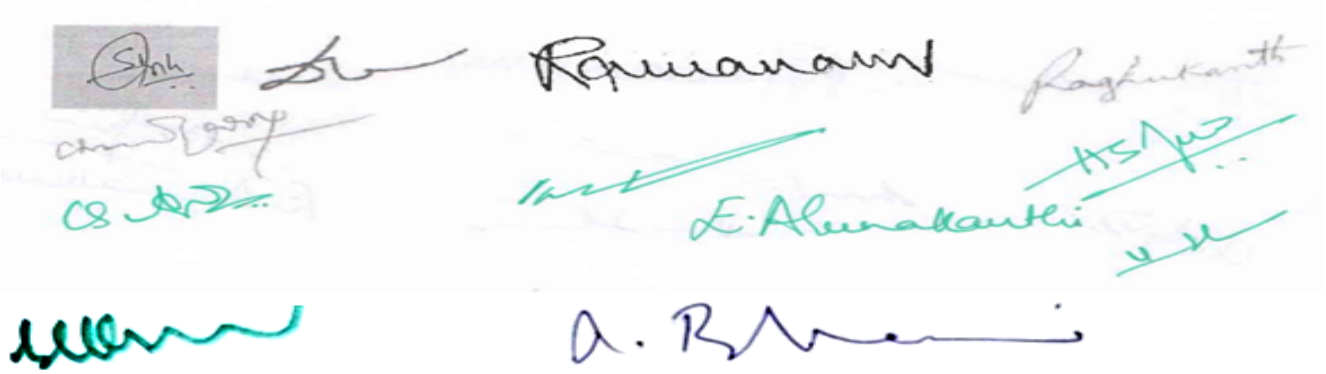
1. Surveying(Vol– 1& 2) by Duggal SK, Tata Mc Graw Hill Publishing Co. Ltd. New Delhi, 5th edition, 2019.
2. Text book of Surveying by C Venkatramaiah, Universities Press1stEdition,2011.

Reference Books:

1. Surveying(Vol–1),by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain- Laxmi Publications (P) ltd., New Delhi, 18thedition 2024.
2. Surveying(Vol–2),by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain- Laxmi Publications (P) ltd., New Delhi 17th 2022.
3. Surveying(Vol–3),byB.C.Punmia, Ashok Kumar Jainand Arun Kumar Jain- Laxmi Publications (P) ltd., New Delhi 16th 2023.
4. PlaneSurveyingandHigherSurveying‖byChandraAM,NewageInternational Pvt.Ltd., Publishers, New Delhi,3rdEdition,2015.
5. Surveying and Levelling by N.Basak Tata Mc Graw Hill Publishing Co.Ltd .New Delhi, 4th edition, 2014.
6. Surveying (Vol 1, 2 & 3), by Arora K R, 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



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR COLLEGE OF ENGINEERING (AUTONOMOUS) ANANTHAPURAMU– 515002 (A.P) INDIA

Department of Civil Engineering

II B.Tech I Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A30102	**STRENGTH OF MATERIALS**	**3**	**0**	**0**	**3**

Course Objectives:

- To impart Fundamental concepts of Strength of Material and Principles of Elasticity and Plasticity Stress
- To impart concepts of shear force and bending moment on various types of beam sand loading conditions
- To impart concepts of stresses developed in the cross section and bending equations calculation of section modulus of sections with different cross sections.
- The concepts above will be utilized in measuring deflections in beams under various loading and support conditions.
- 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:

CO	Statement	**Blooms level**
CO1	To understand the basic materials behavior under the influence of different External loading conditions and the support conditions.	**L2**
CO2	To draw the diagrams indicating the variation of the key performance features Like axial forces, bending moment and shear forces in structural members.	**L3**
CO3	To acquire knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams	**L2**
CO4	To analyze the deflections due to various loading conditions.	**L3**
CO5	To assess stresses across section of the thin, thick cylinders and columns to arrive At optimum sections to with stand the internal pressure using Lame's equation	**L4**

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 - Thermal stresses.

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, 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 and Shear Stresses:

Flexural Stresses: Theory of simple bending—Assumptions—Derivation of bending

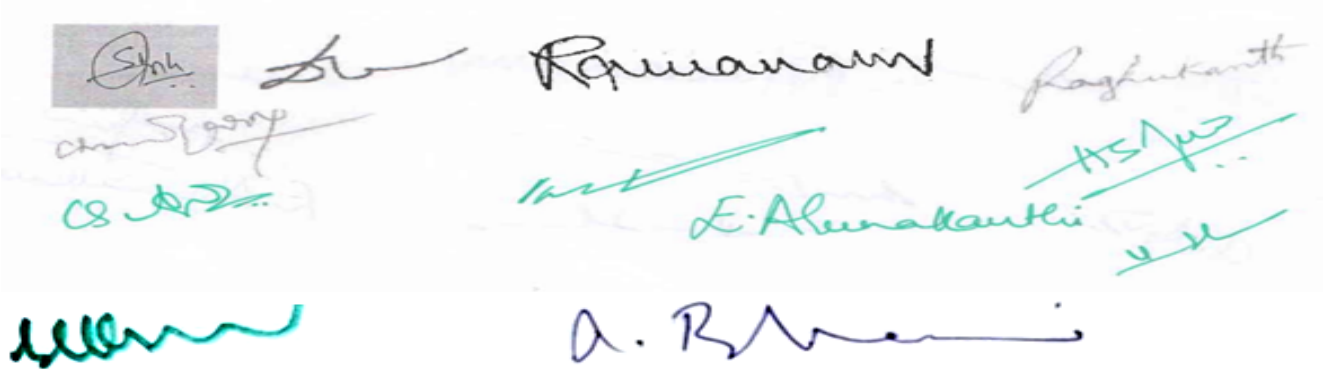
equation, Neutral axis — Determination of bending stresses — section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections — Design of simple beams –Simple concepts of Direct combined bending stresses.
Shear Stresses: Derivation of formula — Shear stress distribution 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:
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 – 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, wire wound stresses longitudinal and volumetric strains — changes in diameter, and volume of thin cylinders. Lames theory for thick cylinders, Derivation of Lames formulae, distribution of hoop and radial stresses across the thickness, compound cylinders- distribution of stresses

Textbooks:
1. Strength of Materials by R.K.Bansal, Lakshmi Publications, 16thEdition, 2022.
2. Strength of Materials by B. S.Basavarajaiah and P. Mahadevappa, Universities Press 3rd Edition, 2010

References:
1. Advanced Mechanics of Solids, L. S Srinath, McGraw HillEducation,2017,3rdEdition
2. Strength of Materials-Fundamentals and Applications,T.D.Gunneswara Rao and Mudim by And al, Cambridge University Press, 2018, 1st Edition
3. Mechanics of Materials, Beer and Johnston, McGraw Hill India Pvt. Ltd., 2020, 8th Edition (SI Units).
4. Mechanics of Solids—EP Popov, Prentice Hall, 2ndEdition, 2015.
5. A Textbook of Strength of Materials, by R. K. Rajput, 7e (Mechanics of Solids) SI Units S. Chand & Co, New Delhi 7thedition 2022.
6. Strength of Materials by S.S.Ratan Tata Mc Grill Publications 3rd Edition, 2016.



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Department of Civil Engineering

II B.Tech I Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A30103	**FLUID MECHANICS**	**3**	**0**	**0**	**3**

Course Objectives:

- To explain basics of statics, kinematics and dynamics of fluids and various measuring techniques of hydrostatic forces on objects.
- To impartibility to solve engineering problems in fluid mechanics
- Toenablethestudentsmeasurequantitiesoffluidflowinginpipes,tanksand channels
- Toteachintegralformsoffundamentallawsoffluidmechanicstopredictrelevant pressures, velocities and forces.
- To strengthen the students with fundamentals useful in application-intensive courses dealing with hydraulics, hydraulic machinery and hydrology in future courses.

Course Outcomes:

COs	STATEMENTS	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	Understandthefundamentalsoffluidkinematicsanddifferentiatetypesoffluid flows	**L2**
CO4	Apply the Principle of conservation of energy for flow measurement.	**L3**
CO5	Analyze the losses in pipes and discharge through pipe network.	**L4**

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 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

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:

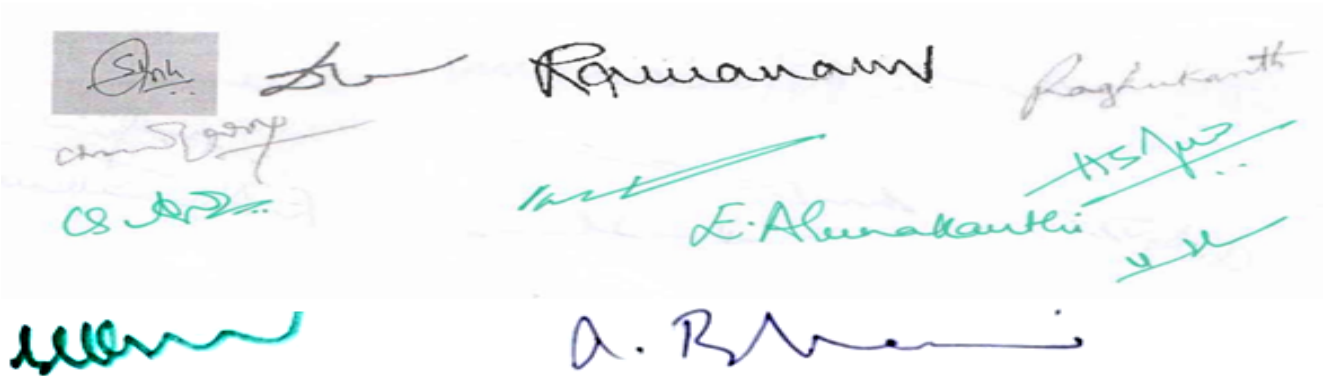
1. P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House22nd,2019.
2. K.Subrahmanya, Theory and Applications of Fluid Mechanics, Tata McGraw Hill, 2nd edition 2018

Reference Books:

1. R.K.Bansal,AtextofFluidmechanicsandhydraulicmachines,LaxmiPublications (P)Ltd., NewDelhi11thedition, 2024.
2. N. Narayana Pillai, Principles of Fluid Mechanics and Fluid Machines, Universities Press Pvt Ltd, Hyderabad. 3rd Edition 2009.
3. Fluid Mechanics by Frank M.White, Henry Xue, TataMcGrawHill,9thedition, 2022.
4. C.S.P.Ojha, R.Berndtsson and P.N.Chadramouli, Fluid Mechanics and Machinery, Oxford University Press, 2010.
5. Introduction to Fluid Mechanics & Fluid Machines by S K Som, Gautam Biswas, S Chakraborty Tata McGraw Hill, 3rd edition 2011

Online Learning Resources:

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



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Department of Civil Engineering

II B.Tech I Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A30104	**SURVEYING LAB**	**0**	**0**	**3**	**1.5**

Course Objectives:

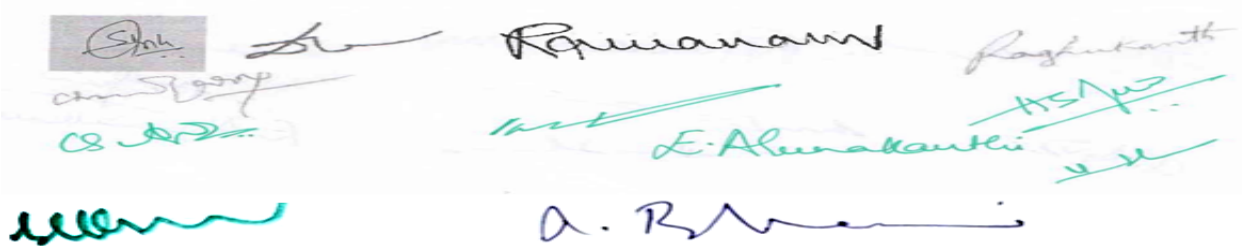
- Know about various linear and angular measuring instruments
- Take Measurements in the linear and angular view
- Determine the area and volume by interpreting the data obtained from surveying activities
- Know modern equipment such as total station
- Draft field notes from survey data

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

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

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. Planetablesurvey;findingtheareaofagivenboundarybythemethodofRadiation
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 inaccessible 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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Department of Civil Engineering

II B.Tech I Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A30105	**STRENGTH OF MATERIALS LAB**	**0**	**0**	**3**	**1.5**

Course objectives:

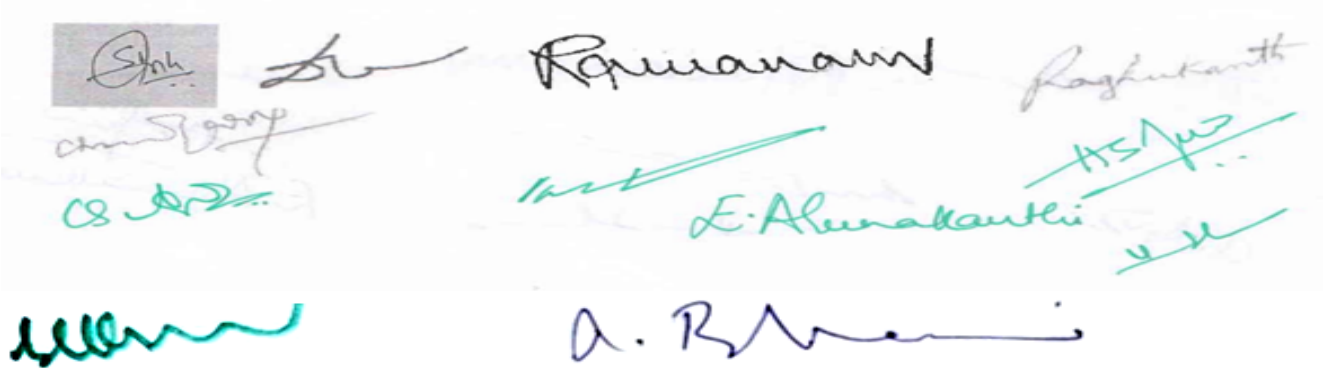
- To determine the tensile strength and yield parameters of mild steel
- To find out flexural strengths of Steel/Wood specimens and measure deflections
- To determine the torsion parameters of mild steel bar
  To determine the hardness numbers, impact and shear strengths of metals
- To determine the load-deflection parameters for springs

Course Outcomes:

- Conducttensilestrengthtestanddrawstress-straindiagramsforductilemetals
- Perform bending test and determine load-deflection curve of steel/wood
- Able to conduct torsion test and determine torsion parameters
- Perform hardness, impact and shear strength tests and calculate hardness numbers, impact and shear strengths
- Abletoconducttestsoncloselycoiledandopencoiledspringsandcalculate deflections

LISTOFEXPERIMENTS:

1. Tension test.
2. Bending test on (Steel/Wood)Cantilever beam.
3. Bending test on simply supported beam.
4. Torsion test.
5. Hardness test.
6. Compression test on Open coiled springs
7. Tension test on Closely coiled springs
8. Compression test on wood/concrete
9. Izod/Charpy Impact test on metals
10. Shear test on metals
11. Continuous beam–deflection test.



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Department of Civil Engineering

II B.Tech I Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A30106	**BUILDING PLANNING AND DRAWING (Skill Enhancement Course)**	**0**	**1**	**2**	**2**

Course Objectives:

- Initiating the student to different building bye-laws and regulations.
- Imparting the planning aspects of residential buildings and public buildings.
- Giving training exercises on various signs and bonds.
- Giving training exercises on different building units.
- Imparting the skills and methods of planning of various buildings.

Course Outcomes:

- Plan various buildings as per the building by-laws.
- Distinguish the relation between the plan, elevation and cross section and identify the form and functions among the buildings.
- Draw signs and bonds
- Draw different building units
- Learn the skills of drawing building elements and plan the buildings as per requirements.

Syllabus:

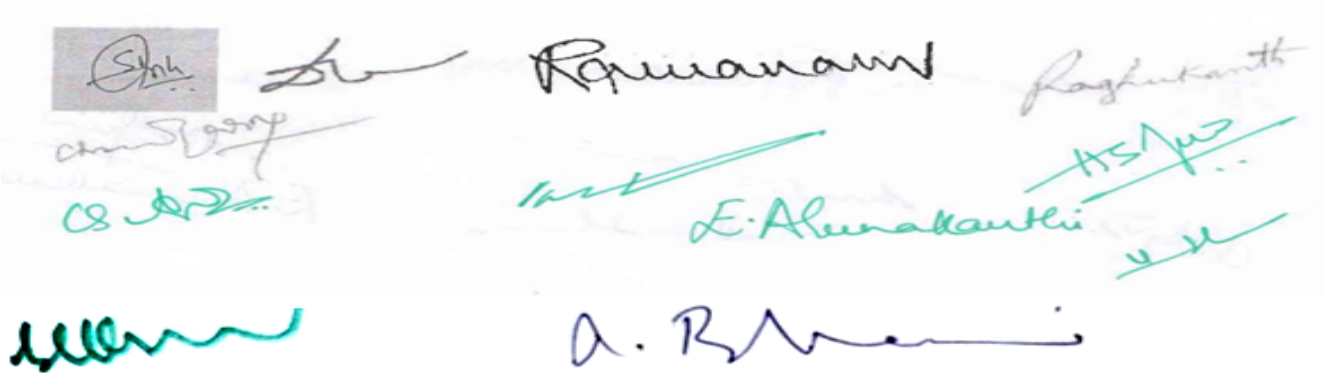
1. Detailing & Drawing of Sign Conventions.
2. Detailing & Drawing of English Bond.
3. Detailing & Drawing of Flemish Bond.
4. Detailing & Drawing of Doors.
5. Detailing & Drawing of Windows.
6. Detailing & Drawing of Ventilators &Roofs.
7. Planning and Drawing of Line Diagram of Residential Buildings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

Text books:

1. Planning, designing and Scheduling, Gurcharan Singh and Jagdish Singh
2. Building planning and drawing by M.Chakraborti.

Reference Books:

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



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Department of Civil Engineering

II B.Tech I Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A39902	**Environmental Science (Audit Course) (Common to All Branches)**	**2**	**0**	**0**	**0**

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.

UNIT – I:

NATURAL RESOURCES:

Energy resources: Sources of energy and their classification, renewable and non-renewable sources of energy; Conventional energy sources, Non-conventional energy sources; Implications of energy use on the environment.

Forest resources – Use and over – exploitation, deforestation, **Water resources** – Use and over utilization of surface and ground water–**Mineral resources**: Use and exploitation, environmental effects of extracting and using mineral resources

Introduction to sustainable development: Sustainable Development Goals (SDGs) - targets and indicators, challenges and strategies for SDGs.

UNIT – II:

ECOSYSTEMS: Concept of an ecosystem, Structure and function of an ecosystem, Energy flow in the ecosystem, Ecological succession. Introduction, types, characteristic features, structure and function of Forest, Grassland, Desert and aquatic ecosystems.

BIODIVERSITY AND ITS CONSERVATION : 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

UNIT – III:

ENVIRONMENTAL POLLUTION: Definition, Cause, effects and control measures of Air, Water, Soil, Marine, Noise, Thermal and Nuclear Pollutions.

SOLID WASTE MANAGEMENT: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.

UNIT – IV:

Climate Change: Impacts, Adaptation and Mitigation:

Understanding climate change: Natural variations in climate; Structure of atmosphere; **Anthropogenic climate change from greenhouse gas emissions**– past, present and future; Projections of global climate change

Impacts, vulnerability and adaptation to climate change. Observed impacts of climate change on ocean and land systems.

Mitigation of climate change: Green House Gas (GHG) reduction vs. sink enhancement; Concept of carbon intensity, energy intensity and carbon neutrality; Energy efficiency measures; Renewable energy sources; Carbon capture and storage.

UNIT – V: **Environmental Management**

Introduction to environmental laws and regulation: Constitutional provisions- Article 48A, Article 51A (g) and other derived environmental rights; Introduction to environmental legislations on the

forest, wildlife and pollution control.

Environmental management system: ISO 14001, Concept of Circular Economy, Life cycle analysis; Cost-benefit analysis, Environmental audit and impact assessment; Environmental risk assessment Pollution control and management; Waste Management- Concept of 3R (Reduce, Recycle and Reuse) and sustainability; Eco labeling /Eco mark scheme.

TEXT BOOKS:

1. Text book of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission, Universities Press.
2. Environmental Studies by Palani Swamy – Pearson education
3. Environmental Studies by Dr.S.Azeem Unnisa, Academic Publishing Company

REFERENCES:

1. Textbook of Environmental Science by Deeksha Dave and E.Sai Baba Reddy, Cengage Pubilications.
2. Text book of Environmental Sciences and Technology by M.Anji Reddy, BS Publication.
3. Comprehensive Environmental studies byJ.P.Sharma, Laxmi publications.
4. Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Printice hall of India Private limited.
5. A Text Book of Environmental Studies by G.R.Chatwal, Himalaya Pubilishing House
6. Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Printice hall of India Private limited

Course Outcomes:

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

CO1: Gain knowledge on natural resources that sustain life and govern economy

CO2: Understand various causes of pollution and solid waste management and related preventive measures.

CO3: Develop critical thinking for shaping strategies (scientific, social, economic, administrative, and legal) for environmental protection, conservation of biodiversity, environmental equity, and sustainable development.

CO4: Gain knowledge on climate change, adaptation and mitigation.

CO5: Adopt sustainability as a practice in life, society, and industry

Course Articulation Matrix:

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

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Department of Civil Engineering

II B.Tech II Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A45401a	**MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS (Common to CE, Chem)**	**2**	**0**	**0**	**2**

Course Objectives:

- To inculcate the basic knowledge of microeconomics and financial accounting
- To make the students learn how demand is estimated for different products, input-output relationship for optimizing production and cost
- To Know the Various types of market structure and pricing methods and strategy
- 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(L1)
- Understand the fundamentals of Economics viz., Demand, Production, cost, revenue and markets (L2)
- Apply the Concept of Production cost and revenues for effective Business decision (L3)
- Analyze how to invest their capital and maximize returns (L4)
- Evaluate the capital budgeting techniques. (L5)
- Develop the accounting statements and evaluate the financial performance of business entity (L6)

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 – meaning, functions - Production Function– Least-cost combination – Short run and long run Production Function- Isoquants and Isocosts, Cost & Break-Even Analysis - Cost concepts - Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)

UNIT - III Business Organizations and Markets

Introduction – Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition–Oligopoly-Price-Output Determination - Pricing Methods and Strategies

UNIT - IV Capital Budgeting

Introduction –Meaning, Capital Budgeting– Features, Proposals, Methods and Evaluation - 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 –- Double-Entry Bookkeeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments) - Introduction to

Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

Textbooks:

1. Varshney & Maheswari, *Managerial Economics*, Sultan Chand & sons. 2014
2. Aryasri, *Business Economics and Financial Analysis*, 4/e, MGH. 2008

Reference Books:

1. Ahuja H, *Managerial Economics,* S Chand. 2022
2. S.A. Siddiqui and A.S. Siddiqui, *Managerial Economics and Financial Analysis*, New Age International. Third edition 2022
3. Joseph G. Nellis and David Parker, *Principles of Business Economics*, Pearson, 2/e, New Delhi. 2002
4. Domnick Salvatore, *Managerial Economics in a Global Economy*, Cengage. 2004

Online Learning Resources:

https://www.slideshare.net/123ps/managerial-economics-ppt
https://www.slideshare.net/rossanz/production-and-cost-45827016
https://www.slideshare.net/darkyla/business-organizations-19917607
https://www.slideshare.net/balarajbl/market-and-classification-of-market
https://www.slideshare.net/ruchi101/capital-budgeting-ppt-59565396
https://www.slideshare.net/ashu1983/financial-accounting

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR COLLEGE OF ENGINEERING (AUTONOMOUS) ANANTHAPURAMU– 515002 (A.P) INDIA

Department of Civil Engineering

II B.Tech II Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A45401b	**ORGANIZATIONAL BEHAVIOR (Common to CE, Chem)**	**2**	**0**	**0**	**2**

Course Objectives:

- To enable student's comprehension of organizational behavior
- To offer knowledge to students on self-motivation, leadership and management
- To facilitate them to become powerful leaders
- To impart knowledge about group dynamics
- To make them understand the importance of change and development

Course Outcomes:

- Define the Organizational Behavior, its nature and scope (L1)
- Understand the nature and concept of Organizational behavior (L2)
- Apply theories of motivation to analyze the performance problems (L3)
- Analyze the different theories of leadership (L4)
- Evaluate group dynamics (L5)
- Develop as powerful leader (L3,L6)

UNIT - I Introduction to Organizational Behavior

Meaning, definition, nature, scope and functions - Organizing Process – Making organizing effective - Understanding Individual Behavior – Attitude - Perception - Learning – Personality

UNIT - II Motivation

Theories of Motivation- Maslow's Hierarchy of Needs - Hertzberg's Two Factor Theory - Vroom's theory of expectancy – Mc Cleland's theory of needs–Mc Gregory's theory X and theory Y– Adam's equity theory

UNIT - III Organizational Culture & Leadership

Meaning definition - Organizational Climate - Leadership - Traits Theory–Managerial Grid - Transactional Vs Transformational Leadership - Qualities of good Leader - Conflict Management -Evaluating Leader

UNIT - IV Group Dynamics

Introduction – Meaning, definition - Types of groups - Determinants of group behavior - Group process – Group Development - Group norms - Group cohesiveness - Small Groups - Group decision making - Team building

UNIT - V Organizational Change and Development

Introduction –Meaning, definition and functions - Organizational Culture - Changing the Culture – Change Management – Work Stress Management - Organizational management

Textbooks:

1. Fred Luthans, Organizational *Behavior*, McGraw-Hill, 12 Th edition. 2011

2. P Subba Rao, *Organizational Behavior*, Himalaya Publishing House. 2010

Reference Books:

1. McShane, *Organizational Behavior*, TMH. 2022
2. Nelson, *Organisational Behaviour*, Thomson. 2012
3. Robbins, P. Stephen, Timothy A. Judge, *Organisational Behaviour*, Pearson. 2013
4. Aswathappa, *Organisational Behaviour*, Himalaya. 2010

Online Learning Resources:

https://www.slideshare.net/Knight1040/organizational-culture
9608857s://www.slideshare.net/Abhay
Rajpoot3/motivation-165556714
https://www.slideshare.net/harshrastogi1/group-dynamics-159412405
https://www.slideshare.net/vanyasingla1/organizational-change-development-26565951

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR COLLEGE OF ENGINEERING (AUTONOMOUS) ANANTHAPURAMU– 515002 (A.P) INDIA

Department of Civil Engineering

II B.Tech II Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A45401c	**BUSINESS ENVIRONMENT (Common to CE, Chem)**	**2**	**0**	**0**	**2**

Course Objectives:

- To make the student to understand about the business environment
- To enable them in knowing the importance of fiscal and monitory policy
- To facilitate them in understanding the export policy of the country
- To Impart knowledge about the functioning and role of WTO
- To Encourage the student in knowing the structure of stock markets

Course Outcomes:

- Define Business Environment and its Importance. (L1)
- Understand various types of business environment. (L2)
- Apply the knowledge of Money markets in future investment (L3)
- Analyze India's Trade Policy (L4)
- Evaluate fiscal and monitory policy (L5)
- Develop a personal synthesis and approach for identifying business opportunities (L6)

UNIT - I Overview of Business Environment

Introduction – meaning nature, scope, significance, functions and advantages - Internal & External environment - Competitive structure of industries -Environmental analysis

UNIT - II Fiscal & Monetary Policy

Meaning – advantages of Public Revenues - Public Expenditure - Evaluation of recent fiscal policy of GOI - Monetary Policy – RBI -Objectives of monetary and credit policy - Role of Finance Commission.

UNIT - III India's Trade Policy

Meaning- Magnitude and direction of Indian International Trade - Bilateral and Multilateral Trade Agreements - EXIM policy and role of EXIM bank -Balance of Payments – Causes for Disequilibrium in Balance of Payments.

UNIT - IV World Trade Organization

Nature, significance, functions and advantages - Organization and Structure - Role and functions of WTO in promoting world trade - GATT -Agreements in the Uruguay Round –TRIPS, TRIMS - Disputes Settlement Mechanism - Dumping and Anti-dumping Measures.

UNIT - V Money Markets and Capital Markets

Nature, meaning - Features and components of Indian financial systems - Objectives and structure of money markets and capital markets – SEBI – Stock Exchanges- Investor protection and role of SEBI

Textbooks:

1. Cherunilam Francis, *International Business*: Text and Cases, Prentice Hall of India. 2010
2. K. Aswathappa, *Essentials of Business Environment*: Texts and Cases & Exercises 13th Revised Edition.HPH 2015

Reference Books:

1. K. V. Sivayya, V. B. M Das, *Indian Industrial Economy*, Sultan Chand Publishers, New Delhi, India. 1975
2. Sundaram, Black, *International Business Environment* Text and Cases, Prentice Hall of India, New Delhi, India. 2015
3. Chari. S. N, *International Business*, Wiley India. 2005
4.E. Bhattacharya, *International Business*, Excel Publications, New Delhi. 2022

Online Learning Resources:

https://www.slideshare.net/ShompaDhali/business-environment-53111245
https://www.slideshare.net/rbalsells/fiscal-policy-ppt
https://www.slideshare.net/aguness/monetary-policy-presentationppt
https://www.slideshare.net/DaudRizwan/monetary-policy-of-india-69561982
https://www.slideshare.net/ShikhaGupta31/indias-trade-policyppt
https://www.slideshare.net/viking2690/wto-ppt-60260883
https://www.slideshare.net/prateeknepal3/ppt-mo

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Department of Civil Engineering

II B.Tech II Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A40101	**ENGINEERING GEOLOGY**	**3**	**0**	**0**	**3**

Course Objectives:

- To know the importance of Engineering Geology to the Civil Engineering.
- To enable the students understand what minerals and rocks are and their formation and identification.
- To highlight significance/ importance/ role of Engineering Geology in construction of Civil Engineering structures.
- To enable the student realize its importance and applications of Engineering Geology in Civil Engineering constructions.
- Concepts of Ground water and its geo physical methods

Course Outcomes:

- Understand the significance of geological agents on Earth surface and its significance in Civil Engineering.
- Identify and understand the properties of Minerals and Rocks.
- Understand the concepts of Ground water and its geophysical methods.
- Classify and measure the Earth quake prone areas, Landslides and subsidence to practice the hazardzonation.
- Investigate the project site for mega/mini civil engineering projects and site selection for mega engineering projects like Dams, Reservoirs and Tunnels.

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.

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, SandStone, 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 Tunneling.

Textbooks:

1. Engineering Geology by N.Chenna Kesavulu, LaxmiPublications.2ndEdn2014.
2. Engineering & General Geology by Parbin Singh Katson educational series 8th2023

References:

1. Engineering Geology by Subinoy Gango padhay Oxford University press1st edition, 2012.
2. Engineering GeologybyD.VenkatReddy,VikasPublishing,2nd Edn,2017,
3. Geology for Engineers and Environmental Society' Alan EKehew, 3rd edn., 2013)Pearson publications.
4. 'Environmental Geology'(2013)K.S.Valdiya,2nded.,McGrawHillPublications.

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 B.Tech II Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A40102	**CONCRETE TECHNOLOGY**	**3**	**0**	**0**	**3**

Course Objectives

- Learn materials and their properties used in the production of concrete
- Learn the behavior of concrete at fresh stage
- Learn the behavior of concrete at hardened stage
- Learn the influence of elasticity, creep and shrinkage on concrete
- Learn the mix design methodology and special concretes

Course Outcomes:

CO1 Familiarize 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.

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&moisturecontentofaggregate–Bulkingofsand–Deleterioussubstances– 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, Shot crete.

UNIT-III

HARDENED CONCRETE: Water / Cement ratio – Abram's Law – Gel/space ratio – Nature of strength of concrete –Maturity concept – Strength in tension & compression –

Factorsaffectingstrength–Relationbetweencompression&tensilestrength–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:

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

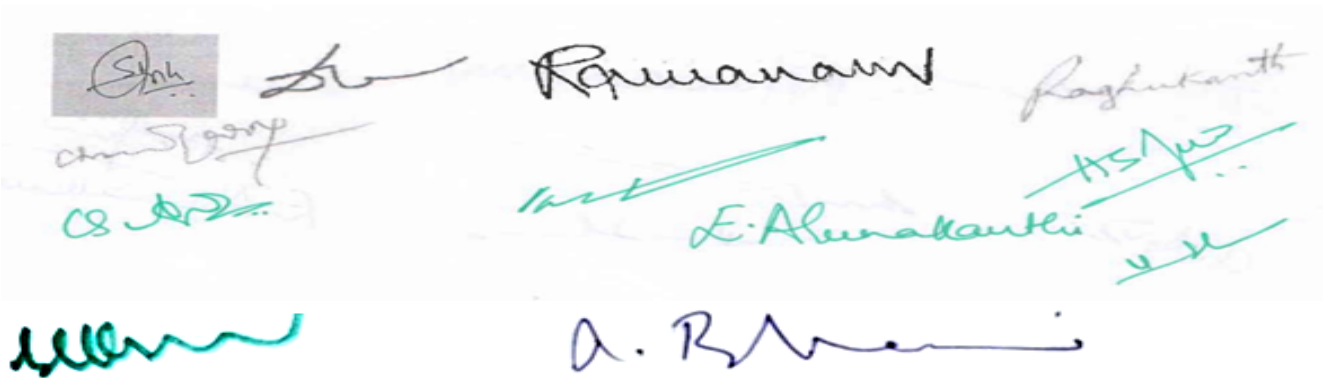
Ready mixed concrete, Fibre reinforced concrete–Different types of fibres– Factors affecting properties of FRC, High performance concrete – Self consolidating concrete, Self-healing concrete.

Textbooks:

1. PropertiesofConcretebyA.M.Neville–PEARSON–4thedition
2. Concrete Technology by M.L. Gambhir. – Tata Mc.Graw Hill Publishers, New Delhi 5th edition 2013.
3. ConcreteTechnologybyJobThomas,CengagaePublications,1stedition,2015

References

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



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II B.Tech II Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A40103	**STRUCTURAL ANALYSIS**	**3**	**0**	**0**	**3**

Course Objectives

Learn energy theorems
Learn the analysis of indeterminate structures
Analysis of fixed and continuous beams
Learn about slope-deflection method
Learn about Moment–distribution method

Course Outcomes:

- Apply energy theorems to analyze trusses
- Analyze indeterminate structures by using Castigliano‘s –II theorem
- Analysis of fixed and continuous beams
- Analyze continuous beams and portal frames by using slope-deflection method
- Analyze continuous beams and portal frames by using Moment–distribution method

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 TRUSSES: 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 & CONTINUOUS 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 fixed beams effect of sinking of support, effect of rotation of a support.

UNIT-IV

SLOPE-DEFLECTION METHOD: Introduction-derivation of slope deflection equations-application to continuous beams with and without settlement of supports - Analysis of single bay portal frames without sway.

UNIT-V

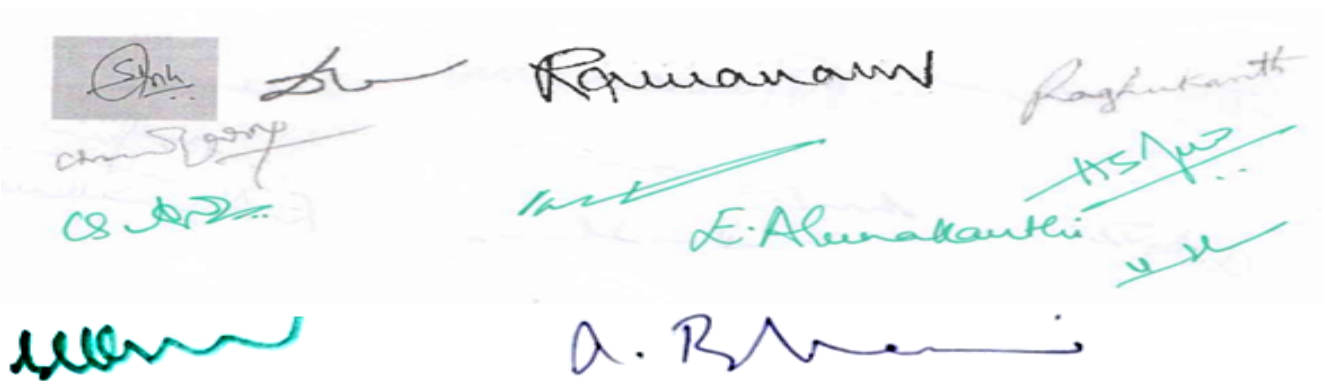
MOMENT DISTRIBUTION METHOD: Introduction to moment distribution method-Application to continuous beams with and without settlement of supports-Analysis of single bay storey portal frames without sway.

Textbooks:

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

Reference Books:

1. StructuralanalysisbyAslamKassimaliCengagepublications6thedition2020.
2. StructuralanalysisVol.IandIIbyDr.R.VaidyanathanandDr.PPerumal–Laxmi publications. 3rd 2016
3. Introduction to structural analysis by B.D.Nautiyal, New Age international publishers, New Delhi.
4. Structural Analysis–D.S. Prakasarao - Univeristy press.
5. Strength of Materials and Mechanics of Structures by B.C.Punmia, Khanna Publications, New Delhi.



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Department of Civil Engineering

II B.Tech II Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A40104	**HYDRAULICS AND HYDRAULIC MACHINERY**	**3**	**0**	**0**	**3**

Pre-requisite: Fluid Mechanics

Course Objectives:

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

Course Outcomes:

COs	**STATEMENTS**	**Blooms level**
CO1	Understand the characteristics of laminar and turbulent flows.	**L2**
CO2	Applytheknowledgeoffluidmechanicstoaddresstheuniformflowproblemsin 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**

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

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:Classificationofturbines;peltonwheelanditsdesign.Francisturbine and its design -

efficiency - Draft tube: theory - characteristic curves of hydraulic turbines. Cavitation: causes and effects.

UNIT–V

Pumps: Working principles ofa 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

TEXTBOOKS:

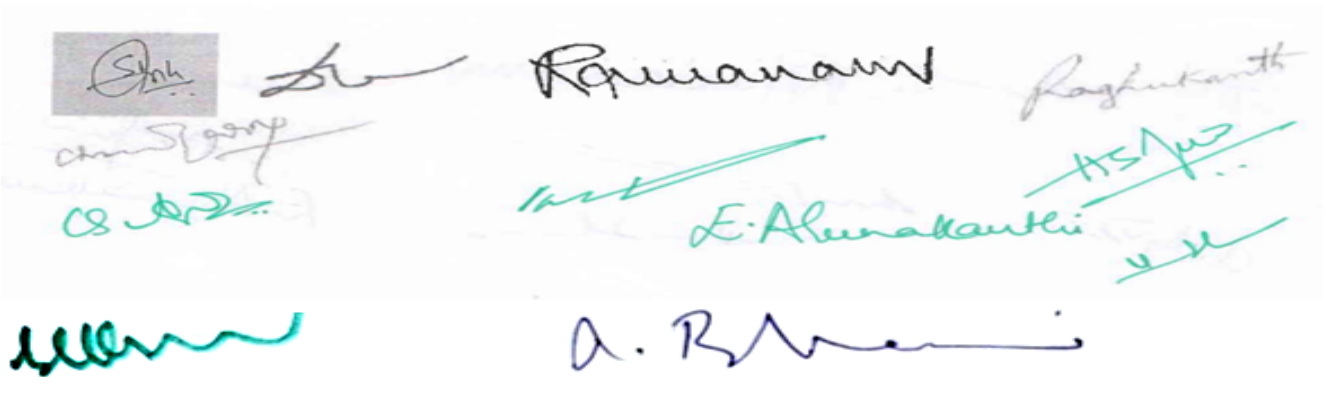
1. P.M.ModiandS.M.Seth,HydraulicsandFluidMechanics,StandardBookHouse22nd, 2019.
2. K.Subrahmanya,Theory andApplicationsofFluidMechanics,TataMcGrawHill,2nd edition 2018

Reference Books:

1. R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) Ltd., New Delhi 11thedition, 2024.
2. Fluid Mechanics by FrankM.White, HenryXue,Tata McGrawHill,9thedition,2022.
3. C.S.P.Ojha, R.Berndtss on and P.N.Chadramouli, Fluid Mechanics and Machinery, Oxford University Press, 2010.
4. IntroductiontoFluidMechanics&FluidMachinesbySKSom,GautamBiswas,S Chakra borty 3rd edition 2011

Online Learning Resources:

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



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II B.Tech II Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A40105	**CONCRETE TECHNOLOGY LAB**	**0**	**0**	**3**	**1.5**

Course Objectives : To test basic properties of ingredients of concrete fresh and hardened concrete properties

Course Outcomes:

CO1 Outline importance of testing cement and its properties
CO2 Assess different properties of Aggregates
CO3 Assessfreshconcretepropertiesandtheirrelevancetohardenedconcrete
CO4 Assess hardened concrete properties

Detailed Syllabus:

1.Tests on Cement

Normal Consistency and Fineness of cement.
Initial setting time and Final setting time of cement.
Specific gravity and soundness of cement.
Compressive strength of cement.

2.Tests on Fine Aggregates

Grading and fineness modulus of Fine aggregate by sieve analysis.
Specific gravity of fine aggregate
Water absorption and Bulking of sand.

3.Tests on Coarse Aggregates

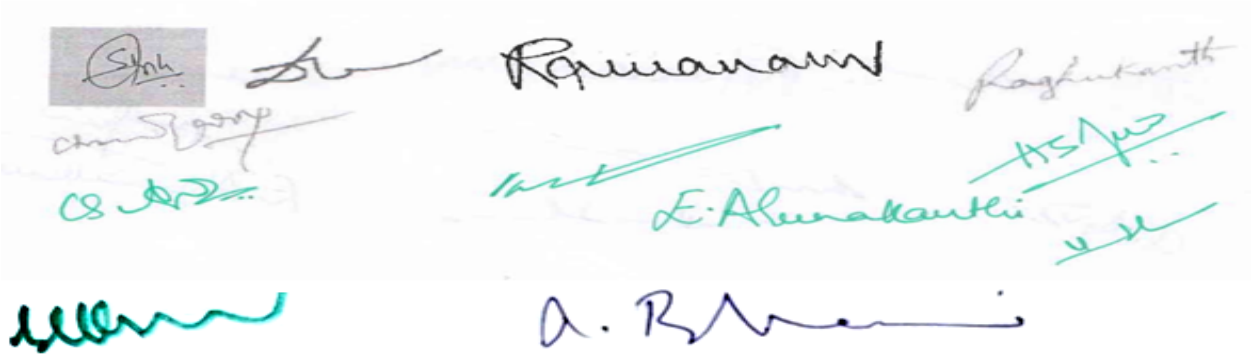
Grading of Coarse aggregate by sieve analysis.
Specific gravity of coarse aggregate
Water absorption of Coarse aggregates

4.Tests on fresh Concrete

Workability of concrete by compaction factor method
Workability of concrete by slump test
Workability of concrete by Vee-bee test.

5.Tests on Hardened Concrete

Compressive strength of cement concrete and Modulus of rupture
Young's Modulus and Poisson's Ratio
Split tensile strength of concrete.
Non-Destructive testing on concrete(for demonstration)



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II B.Tech II Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A40106	**ENGINEERING GEOLOGY LAB**	**0**	**0**	**3**	**1.5**

Course Objectives:

- 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:

- Identify Mega scopic minerals & their properties.
- Identify Mega scopic rocks & their properties.
- Identify the site parameters such as contour, slope & aspect for topography.
- Know the occurrence of materials using the strike & dip problems.

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. Mega scopic description and identification of rocks.
   a) Igneousrocks–TypesofGranite, Pegmatite, Gabbro, Dolerite,Syenite,Granite Poryphery, Basalt, etc.
   b) Sedimentaryrocks–Sandstone, Ferrugineoussandstone,Limestone,Shale,Laterite, Conglomerate, etc.
   c) Metamorphicrocks–Biotite–Granite Gneiss,Slate, Muscovite & Biotiteschist, Marble, Khondalite, etc.
3. Interpretationanddrawingofsectionsforgeologicalmapsshowingtiltedbeds,faults, unconformities etc.
4. Simple Structural Geology problems.
5. Borehole data.
6. Strength of the rock using laboratory tests.
7. Fieldwork–To identify Minerals, Rocks, Geomorphology & Structural Geology.

References:

1. 'Applied Engineering Geology Practicals' by MT Mauthesha Reddy, New Age International Publishers, 2nd Edition.
2. 'Foundations of Engineering Geology' by Tony Waltham, Spon Press, 3rdedition, 2009

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Subject Code	Title of the Subject	L	T	P	C
23A45501	**SOFT SKILLS** **(Skill Oriented Course)** **(Common to CE,ME, ECE,CHEM)**	**0**	**1**	**2**	**2**

Course Objectives:

- To encourage all round development of the students by focusing on soft skills
- To make the students aware of critical thinking and problem-solving skills
- To enhance healthy relationship and understanding within and outside an organization

Course Outcomes

- List out various elements of soft skills(L1, L2)
- Describe methods for building professional image(L1,L2)
- Apply critical thinking skills in problem solving(L3)
- Analyse the needs of an individual and team for well-being(L4)
- Assess the situation and take necessary decisions(L5)
- Create a productive workplace atmosphere using social and work-life skills ensuring personal and emotional well-being (L6)

UNITI Soft Skills & Communication Skills

Soft Skills - Introduction, Need - Mastering Techniques of Soft Skills – Communication Skills -Significance, process, types - Barriers of communication - Improving techniques

Activities:

Intrapersonal Skills- Narration about self- strengths and weaknesses- clarity of thought – self-expression – articulating with felicity

(The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes and literary sources)

Interpersonal Skills- Group Discussion – Debate – Team Tasks - Book and film Reviews by groups - Group leader presenting views (non- controversial and secular) on contemporary issues or on a given topic.

Verbal Communication- Oral Presentations- Extempore- brief addresses and speeches- convincing- negotiating- agreeing and disagreeing with professional grace.

Non-verbal communication – Public speaking – Mock interviews – presentations with an objective to identify non- verbal clues and remedy the lapses on observation

UNITII Critical Thinking

Active Listening – Observation – Curiosity – Introspection – Analytical Thinking – Open-mindedness – Creative Thinking - Positive thinking - Reflection

Activities:

Gathering information and statistics on a topic - sequencing – assorting – reasoning – critiquing issues –placing the problem – finding the root cause - seeking viable solution – judging with rationale – evaluating the views of others - Case Study, Story Analysis

UNIT III Problem Solving & Decision Making

Meaning & features of Problem Solving – Managing Conflict – Conflict resolution – Team building - Effective decision making in teams – Methods & Styles

Activities:

Placing a problem which involves conflict of interests, choice and views – formulating the problem – exploring solutions by proper reasoning – Discussion on important professional, career and organizational decisions and initiate debate on the appropriateness of the decision.

Case Study & Group Discussion

UNITIV

Managing Emotions – Thinking before Reacting – Empathy for Others – Self-awareness – Self-Regulation – Stress factors – Controlling Stress – Tips

Activities:

Providing situations for the participants to express emotions such as happiness, enthusiasm, gratitude, and sympathy, and confidence, compassion in the form of written or oral presentations.

Providing opportunities for the participants to narrate certain crisis and stress –ridden situations caused by failure, anger, jealousy, resentment and frustration in the form of written and oral presentation, Organizing Debates

UNITV Corporate Etiquette

Etiquette- Introduction, concept, significance - Corporate etiquette - meaning, modern etiquette, benefits - Global and local culture sensitivity - Gender Sensitivity - Etiquette in interaction- Cell phone etiquette - Dining etiquette - Netiquette - Job interview etiquette- Corporate grooming tips -Overcoming challenges

Activities

Providing situations to take part in the Role Plays where the students will learn about bad and good manners and etiquette - Group Activities to showcase gender sensitivity, dining etiquette etc. - Conducting mock job interviews - Case Study- Business Etiquette Games

NOTE-:

1. The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes, epics, scriptures, autobiographies and literary sources which bear true relevance to the prescribed skill.
2. Case studies may be given wherever feasible for example for Decision Making- The decision of King Lear.

Prescribed Books:

1. Mitra Barun K, Personality Development and Soft Skills, Oxford University Press, Pap/Cdr edition 2012
2. Dr Shikha Kapoor, Personality Development and Soft Skills: Preparing for Tomorrow, I K International Publishing House, 2018

ReferenceBooks

1. Sharma, Prashant, Soft Skills: Personality Development for Life Success, BPB Publications 2018.
2. AlexK,SoftSkillsS.Chand&Co,2012(Revised edition)
3. Gajendra Singh Chauhan & Sangeetha Sharma, Soft Skills: An Integrated Approach to Maximize Personality Published by Wiley, 2013
4. Pillai, Sabina &Fernandez Agna, Soft Skills and Employability Skills, Cambridge University Press, 2018

5. SoftSkillsforaBigImpact(English,Paperback,RenuShorey)Publisher:Notion Press
6. Dr.RajivKumarJain,Dr.UshaJain,LifeSkills(PaperbackEnglish)Publisher: Vayu Education of India, 2014

Online Learning Resources:

1. https://youtu.be/DUlsNJtg2L8?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_q
2. https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUgj7KlJ
3. https://youtu.be/-Y-R9hDl7lU
4. https://youtu.be/gkLsn4ddmTs
5. https://youtu.be/2bf9K2rRWwo
6. https://youtu.be/FchfE3c2jzc
7. https://www.businesstrainingworks.com/training-resource/five-free-business-etiquette-training-games/
8. https://onlinecourses.nptel.ac.in/noc24_hs15/preview
9. https://onlinecourses.nptel.ac.in/noc21_hs76/preview

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR COLLEGE OF ENGINEERING (AUTONOMOUS) ANANTHAPURAMU– 515002 (A.P) INDIA

Department of Civil Engineering

II B.Tech II Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A49901	**DESIGN THINKING & INNOVATION (Common to All Branches)**	**1**	**0**	**2**	**2**

Course Objectives:

The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation. It aims to equip students with design thinking skills and ignite the minds to create innovative ideas, develop solutions for real-time problems.

Course Outcomes:

- Define the concepts related to design thinking. L1, l2
- Explain the fundamentals of Design Thinking and innovation L1, L2
- Apply the design thinking techniques for solving problems in various sectors. L3
- Analyse to work in a multidisciplinary environment L4
- Evaluate the value of creativity L5
- Formulate specific problem statements of real time issues L3, L6

UNITI 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.

UNITII 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, brain storming, 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.

UNITIII 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.

UNITIV 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.

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, Harper Bollins(2009)
2. Idris Mootee, Design Thinking for Strategic Innovation,2013,JohnWiley&Sons.

ReferenceBooks:

1. David Lee, Design Thinking in the Classroom, Ulysses press
2. Shrutin N Shetty, Design the Future, Norton Press
3. William Lidwell, Universal Principles of Design- Kritinaholden, JillButter.
4. Ches brough. H, The Era of Open Innovation– 2013

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

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Department of Civil Engineering

II B.Tech II Semester (R23)

Title of the Subject-23A49903
COMMUNITY SERVICE PROJECT ……Experiential learning through community engagement

Introduction

Community Service Project is an experiential learning strategy that integrates meaningful community service with instruction, participation, learning and community development.

Community Service Project involves students in community development and service activities and applies the experience to personal and academic development.

Community Service Project is meant to link the community with the college for mutual benefit. The community will benefit with the focused contribution of the college students for the village/ local development. The college finds an opportunity to develop social sensibility and responsibility among students and emerge as a socially responsible institution.

Objective

Community Service Project should be an integral part of the curriculum, as an alternative to the 2 months of Summer Internships / Apprenticeships / On the Job Training, whenever there is an exigency when students cannot pursue their summer internships. The specific objectives are;

To sensitize the students to the living conditions of the people who are around them,

To help students to realize the stark realities of society.

To bring about an attitudinal change in the students and help them to develop societal consciousness, sensibility, responsibility and accountability

To make students aware of their inner strength and help them to find new /out of box solutions to social problems.

To make students socially responsible citizens who are sensitive to the needs of the disadvantaged sections.

To help students to initiate developmental activities in the community in coordination with public and government authorities.

To develop a holistic life perspective among the students by making them study culture, traditions, habits, lifestyles, resource utilization, wastages and its management, social problems, public administration system and the roles and responsibilities of different persons across different social systems.

Implementation of Community Service Project

Every student should put in 6 weeks for the Community Service Project during the summer vacation.

Each class/section should be assigned with a mentor.

Specific Departments could concentrate on their major areas of concern. For example, Dept. of Computer Science can take up activities related to Computer Literacy to different sections of people like - youth, women, housewives, etc

A logbook must be maintained by each of the students, where the activities undertaken/involved to be recorded.

The logbook has to be countersigned by the concerned mentor/faculty in charge.

An evaluation to be done based on the active participation of the student and grade could be awarded by the mentor/faculty member.

The final evaluation to be reflected in the grade memo of the student.

The Community Service Project should be different from the regular programs of NSS/NCC/Green Corps/Red Ribbon Club, etc.

Minor project reports should be submitted by each student. An internal Viva shall also be conducted by a committee constituted by the principal of the college.

Award of marks shall be made as per the guidelines of Internship/apprentice/ on the job training.

Procedure

A group of students or even a single student could be assigned for a particular habitation or village or municipal ward, as far as possible, in the near vicinity of their place of stay, to enable them to commute from their residence and return back by evening or so.

The Community Service Project is a twofold one –

- First, the student/s could conduct a survey of the habitation, if necessary, in terms of their own domain or subject area. Or it can even be a general survey, incorporating all the different areas. A common survey format could be designed. This should not be viewed as a duplication of work by the Village or Ward volunteers, rather, it could be another primary source of data.
- Secondly, the student/s could take up a social activity, concerning their domain or subject area. The different areas, could be like –
  - Agriculture
  - Health
  - Marketing and Cooperation
  - Animal Husbandry
  - Horticulture
  - Fisheries
  - Sericulture
  - Revenue and Survey
  - Natural Disaster Management
  - Irrigation
  - Law & Order
  - Excise and Prohibition
  - Mines and Geology

- Energy
- Internet
- Free Electricity
- Drinking Water

EXPECTED OUTCOMES

BENEFITS OF COMMUNITY SERVICE PROJECT TO STUDENTS

Learning Outcomes

Positive impact on students' academic learning

Improves students' ability to apply what they have learned in "the real world"

Positive impact on academic outcomes such as demonstrated complexity of understanding, problem analysis, problem-solving, critical thinking, and cognitive development.
Improved ability to understand complexity and ambiguity

Personal Outcomes

Greater sense of personal efficacy, personal identity, spiritual growth, and moral development
Greater interpersonal development, particularly the ability to work well with others, and build leadership and communication skills.

Social Outcomes

Reduced stereotypes and greater inter-cultural understanding

Improved social responsibility and citizenship skills

Greater involvement in community service after graduation

Career Development

Connections with professionals and community members for learning and career opportunities
Greater academic learning, leadership skills, and personal efficacy can lead to greater opportunity.

Relationship with the Institution

Stronger relationships with faculty

Greater satisfaction with college

Improved graduation rates

BENEFITS OF COMMUNITY SERVICE PROJECT TO FACULTY MEMBERS

Satisfaction with the quality of student learning

New avenues for research and publication via new relationships between faculty and community

Providing networking opportunities with engaged faculty in other disciplines or institutions

A stronger commitment to one's research.

BENEFITS OF COMMUNITY SERVICE PROJECT TO COLLEGES AND UNIVERSITIES

Improved institutional commitment.

Improved student retention

Enhanced community relations

BENEFITS OF COMMUNITY SERVICE PROJECT TO COMMUNITY

Satisfaction with student participation

Valuable human resources needed to achieve community goals.

New energy, enthusiasm and perspectives applied to community work.

Enhanced community-university relations.

SUGGESTIVE LIST OF PROGRAMMES UNDER COMMUNITY SERVICE PROJECT

The following the recommended list of projects for Engineering students. The lists are not exhaustive and open for additions, deletions, and modifications. Colleges are expected to focus on specific local issues for this kind of project. The students are expected to carry out these projects with involvement, commitment, responsibility, and accountability. The mentors of a group of students should take the responsibility of motivating, facilitating, and guiding the students. They have to interact with local leadership and people and appraise the objectives and benefits of this kind of project. The project reports shall be placed in the college website for reference. Systematic, Factual, methodical and honest reporting should be ensured.

For Engineering Students

1. Water facilities and drinking water availability
2. Health and hygiene
3. Stress levels and coping mechanisms
4. Health intervention programmes
5. Horticulture
6. Herbal plants
7. Botanical survey
8. Zoological survey
9. Marine products
10. Aqua culture
11. Inland fisheries
12. Animals and species
13. Nutrition
14. Traditional health care methods
15. Food habits
16. Air pollution
17. Water pollution

18. Plantation
19. Soil protection
20. Renewable energy
21. Plant diseases
22. Yoga awareness and practice
23. Health care awareness programmes and their impact
24. Use of chemicals on fruits and vegetables
25. Organic farming
26. Crop rotation
27. Floury culture
28. Access to safe drinking water
29. Geographical survey
30. Geological survey
31. Sericulture
32. Study of species
33. Food adulteration
34. Incidence of Diabetes and other chronic diseases
35. Human genetics
36. Blood groups and blood levels
37. Internet Usage in Villages
38. Android Phone usage by different people
39. Utilisation of free electricity to farmers and related issues
40. Gender ration in schooling lvel- observation.

Complimenting the community service project the students may be involved to take up some awareness campaigns on social issues/special groups. The suggested list of programs

Programs for School Children

1. Reading Skill Program (Reading Competition)
2. Preparation of Study Materials for the next class.
3. Personality / Leadership Development
4. Career Guidance for X class students
5. Screening Documentary and other educational films
6. Awareness Program on Good Touch and Bad Touch (Sexual abuse)
7. Awareness Program on Socially relevant themes.

Programs for Women Empowerment

1. Government Guidelines and Policy Guidelines
2. Women's Rights
3. Domestic Violence
4. Prevention and Control of Cancer
5. Promotion of Social Entrepreneurship

General Camps

1. General Medical camps
2. Eye Camps
3. Dental Camps
4. Importance of protected drinking water
5. ODF awareness camp

6. Swatch Bharath
7. AIDS awareness camp
8. Anti Plastic Awareness
9. Programs on Environment
10. Health and Hygiene
11. Hand wash programmes
12. Commemoration and Celebration of important days

Programs for Youth Empowerment

1. Leadership
2. Anti-alcoholism and Drug addiction
3. Anti-tobacco
4. Awareness on Competitive Examinations
5. Personality Development

Common Programs

1. Awareness on RTI
2. Health intervention programmes
3. Yoga
4. Tree plantation
5. Programs in consonance with the Govt. Departments like –
    i. Agriculture
    ii. Health
    iii. Marketing and Cooperation
    iv. Animal Husbandry
    v. Horticulture
    vi. Fisheries
    vii. Sericulture
    viii. Revenue and Survey
    ix. Natural Disaster Management
    x. Irrigation
    xi. Law & Order
    xii. Excise and Prohibition
    xiii. Mines and Geology
    xiv. Energy

Role of Students:

Students may not have the expertise to conduct all the programmes on their own. The students then can play a facilitator role.

For conducting special camps like Health related, they will be coordinating with the Governmental agencies.

As and when required the College faculty themselves act as Resource Persons.

Students can work in close association with Non-Governmental Organizations like Lions Club, Rotary Club, etc or with any NGO actively working in that habitation.

And also, with the Governmental Departments. If the program is rolled out, the District

Administration could be roped in for the successful deployment of the program.

An in-house training and induction program could be arranged for the faculty and participating students, to expose them to the methodology of Service Learning.

Timeline for the Community Service Project Activity

Duration: 8 weeks

1. **Preliminary Survey (One Week)**
   - A preliminary survey including the socio-economic conditions of the allotted habitation to be conducted.
   - A survey form based on the type of habitation to be prepared before visiting the habitation with the help of social sciences faculty. (However, a template could be designed for different habitations, rural/urban.
   - The Governmental agencies, like revenue administration, corporation and municipal authorities and village secreteriats could be aligned for the survey.

2. **Community Awareness Campaigns (One Week)**
   - Based on the survey and the specific requirements of the habitation, different awareness campaigns and programmesto be conducted, spread over two weeks of time. The list of activities suggested could be taken into consideration.

3. **Community Immersion Programme (Three Weeks)**

   Along with the Community Awareness Programmes, the student batch can also work with any one of the below-listed governmental agencies and work in tandem with them. This community involvement programme will involve the students in exposing themselves to experiential learning about the community and its dynamics. Programs could be in consonance with the Govt. Departments.

4. **Community Exit Report (One Week)**
   - During the last week of the Community Service Project, a detailed report of the outcome of the 8 weeks' works to be drafted and a copy shall be submitted to the local administration. This report will be a basis for the next batch of students visiting that habitation. The same report submitted to the teacher-mentor will be evaluated by the mentor and suitable marks are awarded for onward submission to the University. Throughout the Community Service Project, a daily logbook need to be maintained by the students batch, which should be countersigned by the governmental agency representative and the teacher-mentor, who is required to periodically visit the students and guide them.

1. Awareness Program on Good Touch and Bad Touch(Sexual abuse)
2. Awareness Program on Socially relevant themes. Programs for Women Empowerment

Government Guidelines and Policy Guidelines

1. Women's Rights
2. Domestic Violence
3. Prevention and Control of Cancer
4. Promotion of Social

Entrepreneurship General Camps

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    v. Horticulture
    vi. Fisheries
    vii. Sericulture
    viii. Revenue and Survey
    ix. Natural Disaster Management
    x. Irrigation
    xi. Law & Order
    xii. Excise and Prohibition
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