

Lingayas Institute of Management and Technology (AUTONOMOUS), Vijayawada

B.Tech. (CIVIL Engineering)

COURSE STRUCTURE (LIMAT-23)

I- B.TECH I -SEMESTER

S.No	Course Code	Course Title	Lecture hours/ week			Credits
			L	T	P	
Theory and Lab Courses						
1	BS&H (CSC111)	Communicative English	2	0	2	3
2	BS&H(CSC112)	Engineering Mathematics-I	3	0	0	3
3	BS&H(CSC113)	Physics	3	0	0	3
4	ESC(CSC114)	C programming language	3	0	3	4.5
5	ESC(CSC115)	Basic Civil & Mechanical Engineering	3	0	0	3
6	ESC(CSC116)	Engineering workshop	0	0	2	1
7	ECS(CSC117)	IT Workshop	0	0	2	1
8	BS&H (CSC118)	NSS/NCC/Scouts & Guides/Community Service/Indian Constitution	0	0	1	0.5
		Total	14	0	10	19
	ESC (CS104)	Basics of Electrical and Electronics Engineering	3	0	0	3

I- B.TECH II -SEMESTER

S.No	Course Code	Course Title	Lecture hours/ week			Credits
			L	T	P	
Theory and Lab Courses						
1	BS&H (HS101)	Engineering Chemistry	3	0	2	4
2	BS&H (HS102)	Engineering Mathematics-II	3	0	0	3
3	PC(CE103)	Engineering Geology	3	0	3	4.5
4	ESC (ME105)	Engineering Graphics	0	1	4	3
5	ESC(ME106)	Engineering Mechanics	3	0	0	3
6		Data Structures with C (Nptel)	3	0	0	3
7	BS&H (HS107)	Health and wellness, Yoga and Sports	0	0	1	0.5
		Total	15	01	10	21

I B.Tech I Semester Communicative English BS&H (CSC111)

L	T	P	C
2	0	2	3

Objectives:

- To improve the language proficiency of the students in English with emphasis on LSRW skills
- Ability to develop style in speech and writing and manipulate the tools of language for effective communication.
- To develop communication skills of the students in both formal and informal situations
- Ability to use receptive skills through reading and listening to acquire good exposure to language and literature

COs: Upon successful completion of the course, the student will be able to achieve

CO-1 Understand how to make use of English language, both written and spoken, competently and correctly

Lesson: Importance of English Language Communication

Listening: Listen to a conversation about ‘Afternoon picnic’

Speaking: Self Introduction - Explanation.

Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information. “ An interview with Arundhati Roy” By David Barsamian the April 2001 issue

Writing: Mechanics of writing – Punctuation

Functional

Grammar: Understanding basic structure of a sentence; Subject - Verb -Object. Parts of speech;

Nouns: countable and uncountable; singular and plural,

Vocabulary: GRE Vocabulary (5) Synonyms & Antonyms

Call Lab:

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants- Consonant clusters

CO-2 Develop their knowledge in usage of vocabulary and grammar in different situations.

Lesson: The Gift of Magi by O Henry

Listening: Listen to a conversation about ‘Going to the Amusement Park’

Speaking: Descriptive words to describe people/ places/things.

Reading: Stephen Hawking-Positivity ‘Benchmark’

Writing: 7 C’s of writing

Grammar: Articles & Question tags

Vocabulary: GRE Vocabulary (8) Synonyms & Antonyms.

Call Lab:

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Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong

CO-3 Evaluate reading texts for effective communication

Lesson: Elen Musk

Listening: Listen to a conversation about ‘Borrowing Things from Friend’

Speaking: Small conversations between people in different situations Teacher- Student, Hostel warden - Student. Father- Son etc. Formal & Informal situations

Reading: ‘A perspective on Kalpana Chawla’s achievement’

Writing: Letter writing (Formal& Informal)

Grammar: Phrasal verbs

Vocabulary :GRE Vocabulary (8) Antonyms and Synonyms.

Call Lab

Forms in Context- Minimal pairs

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

CO-4 Analyze spoken/written texts to process the information for various purposes.

Lesson: The Toys of Pease by Saki

Listening: Listen to a conversation about ‘Great Hotel Experience’

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. Permissions, Requesting, Inviting etc.

Reading: ‘Analysis of a short piece on the Tsunami

Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables.

Grammar: Types of Tenses

Vocabulary: GRE Vocabulary (13). Synonyms & Antonyms.

Call Lab:

Understand: Past tense and Plural markers- Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

CO-5 deciphers the mechanism of language and use it for success in competitive examinations and job related speaking and writing tasks

Lesson: The Power of Intra personal Communication

Listening: Identifying key terms, understanding concepts and interpreting the concepts both in speaking and writing.

Speaking: Formal oral presentations on topics from academic contexts (Technical or General)

Reading: Nehru’s letter to his daughter Indira on her birthday from “InfoTech English”, Maruthi Publications

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Writing : Report writing for magazines, news paper etc

Grammar: Reporting verb Direct and Indirect Speech

Vocabulary: GRE Vocabulary (15) Synonyms & Antonyms

CALL LAB

Practice: Common Indian Variants in Pronunciation – Differences in British and American
Pronunciation- Listening to foreign speakers

Reference Books:

1. Read theory-[https://reading theory.org](https://readingtheory.org)
2. English for Engineers- Satyabhama University
3. [Fluentu.com/ blog/educator-English/els speaking](https://www.fluentu.com/blog/educator-English/els-speaking)

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3	0	0	3

I B.Tech I Semester Engineering Mathematics-I BS&H (CSC112)

Objectives:

- To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- To familiarize the students with differential calculus.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To make the students understand various techniques of integration.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.

COs: Upon successful completion of the course, the student will be able to achieve

CO-1 Develop and use of matrix algebra techniques that are needed by engineers for practical Applications.

Matrices:

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

CO2: Utilize mean value theorems to real life problems.

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

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

Calculus Mean Value Theorems:

Basic differentiation and integration. 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.

CO4: Learn important tools of calculus in higher dimensions.

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

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series expansion of functions of two variables . Jacobians, Functional dependence, maxima and minima of functions of two variables, method of Lagrange multipliers.

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.

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, Micheael Greenberg, , Pearson publishers, 9th edition

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Objectives:

- Physics curriculum which is re-oriented to the needs of Circuital branches of graduate engineering courses. That serves as a transit to understand the branch specific advanced topics.
- The courses are designed to Impart Knowledge of Physical Optics phenomena like Interference, Diffraction and Polarization involving required to design instruments with higher resolution.
- Teach Concepts of coherent sources, its realization and utility optical instrumentation.
- Study the concepts regarding the bulk response of materials to the EM fields and their analytically study in the back-drop of basic quantum mechanics.
- Understand the physics of Semiconductors and their working mechanism for their utility in sensors.

COs: Upon successful completion of the course, the student will be able to achieve

CO-1 the students will recognize, apply the concepts of interference, diffraction, polarization to experience the analysis of optical effects and contribute to engineering applications.

Wave Optics

Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colours in thin films- Newton’s Rings, Determination of wavelength and refractive index.

Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative).

Polarization: Introduction -Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol’s Prism -Half wave and Quarter wave plates.

CO-2 Comprehend coherence, total internal reflection of light in lasers and fiber optics to utilize in the analysis of the materials and their properties.

Crystallography and X-ray diffraction

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (hkl) planes. **X-ray diffraction:** Bragg’s law - X-ray Diffractometer – crystal structure determination by Laue’s and powder methods

CO-3 Understand the phenomenon of electrical & thermal Conductivities related to sub- microscopic particles.and their role in engineering applications.

Dielectric and Magnetic Materials

Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector – Relation between the electric vectors - Types of polarizations- Electronic

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(Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius-Mossotti equation - complex

dielectric constant – Frequency dependence of polarization – dielectric loss

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials. Introduction to superconductors, General properties, Meissner effect, Type I and Type II superconductors, A.C and D.C Josephson effect, Applications of superconducting materials.

CO-4 Apply the basics of electronics, superconductivity in engineering applications

Quantum Mechanics and Free electron Theory

Quantum Mechanics: Dual nature of matter – Heisenberg’s Uncertainty Principle –Significance and properties of wave function – Schrodinger’s time independent and dependent wave equations– 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 – electrical conductivity based on quantum free electron theory - Fermi-Dirac distribution - Density of states - Fermi energy

CO-5 Comprehensive study of the concepts of magnetism, dielectrics phenomenon and their role in engineering applications.

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

Text books:

1. Engineering Physics – Dr. M.N. Avadhanulu& Dr. P.G. Kshirsagar, S. Chand and Company
2. Engineering physics – D.K. Battacharya and PoonamTandon, Oxford University press.
3. Engineering Physics by P.K.Palanisamy SciTech publications.

Reference Books:

1. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley & Sons
2. Engineering Physics – M.R.Srinivasan, New Age Publications
3. Engineering Physics – D K Pandey, S. Chaturvedi, Cengage Learning
4. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish, University Press

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3	0	3	4.5

Objective:

The Objective of the course is to make learn the basic elements of C programming,

- Design solutions to simple engineering problem by applying the basic programming principles of C language and basic mathematical knowledge.
- Choose a suitable C-construct to develop C code for a given problem.
- Recognize the bugs in the C program.
- Apply the C-language syntax rules to correct the bugs in the C program.
- Develop simple C programs to illustrate the applications of different data types such as arrays, pointers, functions

COs: Upon successful completion of the course, the student will be able to achieve

CO-1: Familiar with syntax and semantics of the basic programming language constructs

Introduction to Problem solving through C-Programming: Problem Specification, Algorithm / pseudo code, flowchart, examples.

C-Programming: Structure of C program, identifiers, basic data types and sizes, Constants, variables, Input-output statements, A sample c program, operators, expressions, type conversions, conditional expressions, precedence of operators and order of evaluation.

Control statements: if, if else, else if ladder and switch statements, while, do-while and for statements, break, continue, go to and labels.

Exercise 1:

1. Write a C program to find the sum of individual digits of a positive integer.
2. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
3. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user

Exercise 2:

1. Write a C program to calculate the distance between the two points.
2. Write a C program that accepts 4 integers' p, q, r, s from the user where r and s are positive and p is even. If q is greater than r and s is greater than p and if the sum of r and s is greater than the sum of p and q print "Correct values", otherwise print "Wrong values".
3. Write a C program to calculate the factorial of a given number.

Exercise 3:

1. Write a C program to convert a string to a long integer.

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2. Write a program in C which is a Menu-Driven Program to compute the area of the various geometrical shapes.

Exercise 4:

1. Write a program in C to display the n terms of even natural number and their sum.
2. Write a C program to check whether a given number is an Armstrong number or not.

CO-2: Construct derived data types like arrays in solving problem.

Arrays: concept, declaration, definition, accessing elements, storing elements, two dimensional and multi-dimensional arrays.

Character Arrays: declaration, initialization, reading, writing strings, string handling functions, pre-processor Directives, and macros.

Applications of Arrays: Linear search, Binary search, Bubble Sort.

Exercise 1:

1. Write a C program to find both the largest and smallest number in a list of integers.
2. Write a C program that uses functions to perform the following:
 - i) Addition of Two Matrices
 - ii) Multiplication of Two Matrices

Exercise 2:

1. Write a program in C to compare two strings without using string library functions.
2. Write a program in C to copy one string to another string.

CO-3: Decompose a problem into modules and reconstruct it using various ways of user defined functions.

Pointers: concepts, declaring & initialization of pointer variables, pointer expressions, pointer arithmetic, pointers and arrays, pointers and character arrays, pointers to pointers.

Functions: basics, category of functions, parameter passing techniques, recursive functions comparison with Iteration, Functions with arrays, Standard library functions, dynamic memory management functions, command line arguments.

Storage classes: auto, register, static and extern

Exercise 1:

1. Write a program in C to demonstrate how to handle the pointers in the program.
2. Write a program in C to add two numbers using pointers.

Exercise 2:

1. Write a program in C to add numbers using call by reference.
2. Write a program in C to find the largest element using Dynamic Memory Allocation.

Exercise 3:

1. Write a program in C to swap elements using call by reference.
2. Write a program in C to count the number of vowels and consonants in a string using a pointer.

Exercise 4:

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1. Write a program in C to check whether a number is a prime number or not using the function.
2. Write a program in C to get the largest element of an array using the function.

CO-4: Use user-defined data types like structures memory allocations and unions and its applications to solve problems.

Derived types: structures- declaration, definition, and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, type def, memory allocations

Exercise 1:

1. Write a C Programs and Code Examples on Structures and Union
 - Accept & display employee details
 - Print details of customers
 - Program for Library operations

Exercise 2:

1. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc() function.
2. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc() function. Understand the difference between the above two programs

CO-5: Discuss various file I/O operations and its application.

Files: concept of a file, text files and binary files, streams, standard I/O, Formatted I/O, file I/O operations, error handling

Exercise 1:

1. Write a C Programs and Code Examples on file I/O operations and its application
 - Creation of a new file (fopen with attributes as “a” or “a+” or “w” or “w+”).
 - Opening an existing file (fopenopen).
 - Reading from file (fscanf or fgets).

Textbook:

1. ReemaThareja, Programming in C, Oxford University Press, 2nd Edition, 2015

Reference books:

1. Jeri R.Hanly, Elliot B.Koffman, Problem Solving and Program Design in C, Pearson Publishers, 7th Edition, 2013
2. PradeepDey, ManasGhosh, Programming in C, Oxford University Press, 2nd Edition, 2011.
3. Stephen G.Kochan, Programming in C, Pearson Education, 3rd Edition, 2005

L	T	P	C
3	0	0	3

I B.Tech I Semester Basic Civil and Mechanical Engineering BS&H (CSC115)

Course Objectives:

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

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

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

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

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

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

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

CO1:

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.

CO2:

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

CO3:

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

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

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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, SatheeshGopi, 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 and power plants.

Describe the basics of robotics and its applications.

CO1:

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.

CO2:

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-

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conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid Vehicles.

CO3:

Power plants – Working principle of Steam, Diesel, Hydro, Nuclear power plants.

Mechanical Power Transmission - Belt Drives, Chain, Rope drives, Gear Drives and their applications.

Introduction to Robotics - Joints & links, configurations, and applications of robotics. (Note: The subject covers only the basic principles of Civil and Mechanical Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject.)

Textbooks:

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

Reference Books:

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

L	T	P	C
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Course Objectives:

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

COs: Upon successful completion of the course, the student will be able to achieve

CO1: Fabricate various basic prototypes in fitting trade

Demonstration: Safety practices and precautions to be observed in workshop

Fitting shop:

Preparation of dovetail fit Work piece as per the given specifications

- Preparation of V-Shape, Semi circular Work piece which contains: Filing (Tradition filing and contemporary cutting machine), Sawing,
- Practice marking operations.

CO2: Develop different prototypes in the carpentry section

Carpentry:

- Study of Carpentry Tools, Equipment and different joints.

1.) Practice of T Lap joint, Cross Lap Joint, Mortise and Tenon joint, Corner Dovetail joint or Bridle joint

CO3: Perform various basic house wiring techniques.

Electrical wiring

- Familiarity with different types of basic electrical circuits and make the following connections.
- a) Parallel and series b) Two-way switch c) d) Tube light e) Three phase motor f) Soldering of wires

CO4: Demonstrate various operations related to Sheet Metal Working

Sheet Metal Working

- Tapered tray
- Conical funnel
- Elbow pipe

CO5: Demonstrate various operations related to Foundry.

Foundry Trade:

Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Patterns.

CO6: Demonstrate various Surveying Methods.

Surveying:Survey by chain survey of road profile with offsets in case of road widening

CO7: Demonstrate various Plumbing Methods.

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Plumbing: Demonstration and practice of Plumbing tools, Preparation of Pipe joints with coupling for same diameter and with reducer for different diameters.

CO8: Demonstrate various operations related basic repairs of two-wheeler vehicle.

Basic repairs of Two-wheeler vehicle – Demonstration of working of two-wheeler vehicle and its repairs.

Text Books:

1. Raghuwanshi B.S., Workshop Technology Vol. I & II, DhanpathRai& Sons.
2. Kannaiah P. and Narayana K.L., Workshop Manual, 2nd Edn, Scitech publishers.
3. John K.C., Mechanical Workshop Practice. 2nd Edn.PHI 2010.

ReferenceBooks:

1. ElementsofWorkshopTechnology, Vol.IbyS.K.HajraChoudhury&Others,MediaPromotersand Publishers, Mumbai. 2007, 14th edition
2. WorkshopPracticebyH. S. Bawa,Tata-McGraw Hill,2004.
3. WiringEstimating,CostingandContracting;SoniP.M.&UpadhyayP.A.;AtulPrakashan,2021-22

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Objectives

- Explain the internal parts of a computer, peripherals, I/O ports, connecting cables
- Demonstrate basic command line interface commands on Linux
- Teach the usage of Internet for productivity and self-paced lifelong learning
- Describe about Compression, Multimedia and Antivirus tools
- Demonstrate Office Tools such as Word processors, Spreadsheets and Presentation tools

COs: Upon successful completion of the course, the student will be able to achieve.

CO1: Identify the basic hardware components, keyboard shortcuts, assembling and disassembling of the system (PC)

Experiment 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral

Experiment 2: Every student should disassemble and assemble the PC back to working condition.

CO-2: Demonstrate Operating System installation & Troubleshooting. Apply various commands of linux operating system, and networking.

Experiment 3: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux.

Experiment 4:

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

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

CO-3: Create web pages using HTML, documents using applications like LaTeX, Google forms and use application software packages: MS-Word, MS-Excel, MS-Power Point to create documents and presentation.

Experiment 5:

Word Orientation: Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of MS office 2007/ 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.

Task 1: Using LaTeX and Word to create project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting

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Header and Footer, Using Date and Time option in both LaTeX and Word.

Task 2: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 3: 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.

CO-4: Create software packages: MS-Excel, MS-Power Point to create documents and presentation.

Experiment 6:

Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

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

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

Task 3: Performance Analysis - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

Experiment 7:

Power Point Orientation

Task 1: PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint. Students will be given model PowerPoint presentation which needs to be replicated (exactly how it's asked).

Task 2: 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.

CO-5: Demonstrate Local Area Network installation &configure the TCP/IP setting, Cyber Hygiene antivirus.

Experiment 8:

Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Web Browsers, Surfing the Web Students customize their web browsers with the LAN proxy settings, bookmarks, Search Engines, search toolbars and pop up blockers.

Experiment 9:

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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 first install antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Experiment 10:

AI TOOLS – ChatGPT

Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds.

Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.

- Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas

- Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write a story about how society adapted to this new reality."

Task 3: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output 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 tool kit Vikas Gupta, WILEY Dream tech
2. The Complete Computer upgrade and repair book, 3rd edition Cheryl A Schmidt, WILEY Dream tech
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.

L	T	P	C
0	0	1	0.5

I B.Tech I Sem NSS/NCC/SCOUTS/Community Service /Indian constitution BS&H

(CSC118)

Objectives

- To enable the student to understand the importance of constitution.
- To understand the structure of Executive, Legislature and Judiciary.
- To understand Philosophy of fundamental rights and duties.
- To understand the autonomous nature of constitution bodies like Supreme Court and High Court Controller and Auditor General of India and Election Commission of India.
- To understand the Central and State relation, financial and administrative.

COs: Upon successful completion of the course, the student will be able to achieve

CO-1: Understand history and philosophy of constitution with reference to Preamble, Fundamental Rights and Duties

Introduction to Indian Constitution: 'Constitution' meaning of the term, Indian Constitution – Sources and Constitutional History, Features – Citizenship ,Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

CO-2: Understand the concept of Unitary and Federal Government along with the role of President, Prime Minister and Judicial System

Union Government and its Administration Structure of the Indian Union: Federalism Centre – State relationship, President: Role, Power and Position. Prime Minister (PM) and Council of Ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha. The Supreme Court and High Court: Powers and Functions.

CO-3: Understand the structure of the state government, Secretariat, Governor and Chief Minister and their functions

State Government and its Administration Governor – Role and Position – Chief Minister (CM) and Council of Ministers. State Secretariat: Organization, Structure and Functions.

CO-4: learn local administration viz. Panchayat, Block, Municipality And Corporation

A Local Administration – District's Administration Head – Role and Importance, Municipalities – Mayor and Role of Elected Representative – Chief Executive Officer (CEO) of Municipal Corporation Panchayati Raj : Functions Panchayati Raj Institution (PRI), Zilla Panchayat, Elected Officials and their roles, CEO Zilla Panchayat: Block level organizational Hierarchy – (Different Departments), Village level – Role of Elected and Appointed officials – Importance of grass root democracy.

CO-5: learn about Election Commission and the process and about SC, ST, OBC and women

B.Tech. (CIVIL Engineering)

Election Commission: Election Commission – Role of Chief Election Commissioner and Election Commissionerate State Election Commission: Functions and Commissions for the welfare of SC/ST/OBC and Women.

NSS /NCC/ Scouts /Community Service activities Orientation

General Orientation on NSS/NCC/ Scouts /Community Service activities, careerguidance.

Activities:

- Conducting –ice breaking sessions-expectations from the course-knowing personal talents
- and skills
- Conducting orientations programs for the students –future plans-activities-releasing road map etc.
- Displaying success stories-motivational biopics- award winning movies on societal issues etc.
- Conducting talent show in singing patriotic songs-paintings- any other contribution.

Nature & Care

Activities:

- Best out of waste competition.
- Poster and signs making competition to spread environmental awareness.
- Recycling and environmental pollution article writing competition.
- Organizing Zero-waste day.
- Digital Environmental awareness activity via various social media platforms.
- Virtual demonstration of different eco-friendly approaches for sustainable living.
- Write a summary on any book related to environmental issues.

Community Service

Activities:

- 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.
- Conducting awareness programs on Health-related issues such as General Health, Mental health,
- Spiritual Health, HIV/AIDS,
- Conducting consumer Awareness. Explaining various legal provisions etc.
- Women Empowerment Programmes- Sexual Abuse, Adolescent Health and Population Education.
- Any other programmes in collaboration with local charities, NGOs etc.

Reference Books

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt.Ltd., New Delhi.
2. SubashKashyap, Indian Constitution, National Book Trust.
3. J.A. Siwach, Dynamics of Indian Government and Politics.
4. D.C. Gupta, Indian Government and Politics.

B.Tech. (CIVIL Engineering)

5. H.M.Sreevai. Constitutional Law of India, 4th edition in 3 volumes (UniversalLaw Publication).

I B.Tech I Semester Subject code Basic Electrical & Electronics Engineering

L	T	P	C
3	0	0	3

Course Objectives

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

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

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

CO2. Demonstrate the working of electrical machines, measuring instruments and power generation stations.

CO3. Apply mathematical tools and fundamental concepts to derive various equations related to electrical circuits and machines.

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

PART A: BASIC ELECTRICAL ENGINEERING

C01: DC & AC Circuits

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

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

C02 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.

CO3: Energy Resources, Electricity Bill & Safety Measures

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

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

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

Textbooks:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition 2.
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. Bhattacharya, Person Publications, 2018, Second Edition.

PART B: BASIC ELECTRONICS ENGINEERING

Course Objectives:

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

CO1: 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 Characteristics — Elementary Treatment of Small

Signal CE Amplifier.

B.Tech. (CIVIL Engineering)

CO2: Basic Electronic Circuits and Instrumentation

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.

CO3: Digital Electronics

Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of 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. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009

Reference Books:

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

I B.Tech II Semester Subject code: BS&H (HS101)

Engineering Chemistry

L	T	P	C
3	0	2	4

Course Objectives:

- To familiarize engineering chemistry and its applications.
- To train the students on the principles and applications of electrochemistry and polymers.
- To introduce instrumental methods, molecular machines and switches.

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

CO1: Compare the materials of construction for battery and electrochemical sensors.

Structure and Bonding Models:

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ^2 , particle in one dimensional box, molecular orbital theory – bonding in homo- and hetero nuclear diatomic molecules – energy level diagrams of O₂ and CO, etc. π -molecular orbitals of butadiene and benzene, calculation of bond order.

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

Modern engineering materials:

Semi conductors - Introduction, basic concept, application

Super conductors - Introduction basic concept, applications.

Super capacitors - Introduction, Basic Concept-Classification – Applications.

Liquid crystals - Types of liquid crystals (Thermotropic, Lyotropic), General engineering applications of LCs.

Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphines nano particles, General methods of preparation: sol-gel method, Chemical reduction **method**.

CO3: Explain the principles of spectrometry, slc in separation of solid and liquid mixtures.

Electrochemistry and Applications:

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conducto metric titrations (acid-base titrations).

Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygenfuel cell– working of the cells. Polymer Electrolyte Membrane

B.Tech. (CIVIL Engineering)

Fuel cells (PEMFC).

CO4: Apply the principle of Band diagrams in the application of conductors and semiconductors

Polymer Chemistry:

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation.

Plastics – Thermo and Thermosetting plastics, Preparation, properties and applications of –PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres

Elastomers– Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications. Bio-Degradable polymers - Poly Glycolic Acid (PGA), Polyl Lactic Acid (PLA).

CO5: Summarize the concepts of Instrumental methods

Instrumental Methods and Applications:

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Instrumentation, IR spectroscopies, fundamental modes and selection rules, Instrumentation. Chromatography-Basic Principle, Classification-HPLC: Principle, Instrumentation and Applications.

Textbooks:

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

Reference Books:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition

Engineering Chemistry Lab

Course Objectives:

- Verify the fundamental concepts with experiments.

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

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CO1: Determine the cell constant and conductance of solutions.

CO2: Prepare advanced polymer Bakelite materials.

CO3: Measure the strength of an acid present in secondary batteries.

CO4: Analyse the IR spectra of some organic compounds.

CO5: Calculate strength of acid in Pb-Acid battery.

List of Experiments:

1. Measurement of $10Dq$ by spectrophotometric method
2. Conductometric titration of strong acid vs. strong base
3. Conductometric titration of weak acid vs. strong base
4. Determination of cell constant and conductance of solutions
5. Potentiometry - determination of redox potentials and emfs
6. Determination of Strength of an acid in Pb-Acid battery
7. Preparation of Bakelite
8. Verify Lambert-Beer's law
9. Wavelength measurement of sample through UV-Visible Spectroscopy
10. Identification of simple organic compounds by IR
11. Preparation of nanomaterials by precipitation method
12. Estimation of Ferrous Iron by Dichrometry.
13. Determination of HCL using standard Na_2CO_3 solution.
14. Estimation of Vitamin C.
15. Determination of Ferrous Iron using standard $K_2Cr_2O_7$ solution.
16. Determination of Total hardness of water using standard EDTA solution.
17. Determination of alkalinity of sample containing Na_2CO_3 and NaOH.
18. Potentiometric titration between strong acid and strong base.

Reference:

1. "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R.C.Denney, J.D.Barnes and B. Sivasankar, Fred W. Billmeyer Jr, 3rd Edition

L	T	P	C
3	0	0	3

ENGINEERING MATHEMATICS

BS&H (HS102)

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 a plus 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 linear first order ordinary differential equations related to various engineering fields.
- CO2: Solve the higher order ordinary differential equations related to various engineering fields.
- CO3: Identify solution methods for partial differential equations that model physical processes.
- CO4: Interpret the physical meaning of differential operator such as gradient, curl and divergence.
- CO5: Estimate the work done against a field, circulation and flux using vector calculus.

CO1: Solve the linear first order ordinary differential equations related to various engineering fields

Differential equations of first order and first degree

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

CO2: Solve the higher order ordinary differential equations related to various engineering fields.

Linear differential equations of higher order (Constant Coefficients)

Definitions, homogeneous and non -

homogeneous, complementary function, particular integral and general solution. Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to, R-L, R-C, L-C-R for A.C, D.C, Circuit problems and Simple Harmonic motion.

CO3: Identify solution methods for partial differential equations that model physical processes

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.

CO4: Interpret the physical meaning of differential operator such as gradient, curl and divergence

Vector differentiation

B.Tech. (CIVIL Engineering)

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, solenoidal function and irrotational vectors.

CO5: Estimate the work done against a field ,circulation and flux using vector calculus.

Vector integration

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

Text books:

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

Reference Books:

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

L	T	P	C
3	0	3	4.5

I B.Tech II Semester Subject Code: PC(CE103)

Engineering Geology

-Objectives

The course introduces the concepts of Geology in civil engineering perspective. The student is exposed to properties of different minerals and rocks. The importance of structural geological features and geophysical principles will be addressed for their interpretation in civil engineering designs.

COs: Upon successful completion of the course, the student will be able to achieve

CO1: Understand and interpret fundamental geological processes and geological formations

General Geology

GENERAL GEOLOGY in Civil Engineering – Branches of geology – Earth’s structure and composition

– Continental drift, Plate tectonics, Weathering – types, products and soil profile,– Geological work of Rivers, Wind and Sea -Seismic zones of India.

CO2: Differentiate various properties of minerals and rocks.

Minerology

Physical properties of Minerals – Crystallographic systems – Silicate structures - Study of following families of rock forming minerals- Quartz, Feldspar, Pyroxene, Amphibole, Mica, Calcite, Gypsum and Clay

CO3: Illustrate geological structural features

Petrology

Classification of Rocks – Igneous, Sedimentary and Metamorphic Rocks – Origin, Structure, texture and Classification – Study of physical properties, distribution and occurrence of important rock types viz. Granite, Diorite, Gabbro , Dolerite, Basalt, Limestone, Conglomerate, Breccia , Sandstone, Quartzite, Marble, Gneiss, and Schist etc.

CO4: Apply geological principles in civil engineering applications.

Structural Geology

Outcrop, Dip and Strike, Study of common structures associated with rocks such as Folds, Faults,

Unconformities and Joints, their classification, types, their relevance, and importance in civil engineering.

CO5: Apply Geological considerations in construction of Dam, Reservoir, Tunnel..

Engineering Applications In Geology

Importance of Geophysical studies, Brief introduction of principles of geophysical studies - Gravity

B.Tech. (CIVIL Engineering)

method, Magnetic methods, Electrical methods, Seismic methods, Radio metric methods and geothermal method. Geological considerations in construction of Dam, Reservoir, Tunnel.

TEXT BOOKS

1. Parbin Singh., “Engineering and General Geology”, Katson Publication House, 2009.
2. ChennaKesavulu N., “Text book of Engineering Geology”, Macmillan India Ltd, 2003.

REFERENCES

1. Legget., “Geology and Engineering”, 2nd Edition, McGraw Hill Book Company, 2006.
2. Blyth. “Geology for Engineers”, 7th Edition, ELBS, 1995.
3. KVGK Gokhale, “Principles of Engineering Geology”, B.S Publications, 2005

Engineering Geology Lab

Objective: The laboratory course is intended to impart skills in identifying minerals and rocks based on physical properties. Through these practical sessions a student is equipped to interpret geological structural features in civil engineering perspective.

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

CO1: Demonstrate the importance of geological principles.

CO2: Distinguish various types of minerals and rocks based on physical properties and physical observations.

CO3: Interpret structural patterns of various geological structures.

List of Experiments

1. Description of Minerals by physical properties.
2. Description and Engineering uses of Rocks
3. Description and engineering consideration of Structural Models
4. Microscopic study of minerals and Microscopic study of rocks
5. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc

ENGINEERING GRAPHICS

L	T	P	C
2	1	3	3

Course Objectives:

- To demonstrate the concepts of Engineering graphics and projection of straight lines using CAD software
- To visualize and draw views of the object 3D models to 2D drawings using CAD tools
- To familiarize students with the use of MS Office-MS Word,
- To familiarize students with the use of MS Excel & MS Power Point
- To enhances images using advance editing tools to create photos.

Course Outcomes:

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

- CO1: Make use of AutoCAD commands to develop regular polygons and curves
- CO2: Apply the commands in AutoCAD to develop the plane regular geometric figures&projections of solids
- CO3: Make use of the basic skills of MS office word tools to prepare reports & MS excel workbook tools to prepare databases
- CO4: Make use of the basic skills of MS excel workbook to prepare presentations and MS office PowerPoint presentation tools to prepare presentations slides for seminars
- CO5: Make use of Photoshop tools to for cropping, straightening& graphics

CO1: Make use of AutoCAD commands to develop regular polygons and curves

Introduction: Principles of Dimensioning, Introduction to CAD – views, commands. File menu of AutoCAD with New, Open, Save as and close, Tool bars: Draw toolbars- Line, circle, Rectangle, Donut, Ellipse, Arc, Modify tool bars: Erase, Snap, Redraw, Zoom, Pan. Editing: Modify properties of drawing entity, Copy, Move, Rotate, Mirror, Offset, Array, Stretch, Lengthen, Trim, Extend, Break, Chamfer, Fillet etc.,. Function keys

B.Tech. (CIVIL Engineering)

CO2: Apply the commands in AutoCAD to develop the plane regular geometric figures & projections of solids

2D Drawings ,Computer aided orthographic projections

3D Drawings: 3D Tool bars: ,Subtract, Computer aided projections of solids., Prism Cylinder, Pyramid,Cone

CO3: Make use of the basic skills of MS office word tools to prepare reports & MS excel workbook tools to prepare databases

Features of MS-Word – MS-Word Window Components – Creating, Editing, Formatting and Printing of Documents – Headers and Footers – Insert/Draw Tables, Table Auto format –Page Borders and Shading – Inserting Symbols, Shapes, Word Art, Page Numbers, Equations – Spelling and Grammar – Thesaurus – Mail Merge. Overview of Excel features – Creating a new worksheet, selecting cells, Entering and editing Text, Numbers,

CO4: Make use of the basic skills of MS excel workbook to prepare presentations and MS office PowerPoint presentation tools to prepare presentations slides for seminars

Formulating Excel, referencing cells – Inserting Rows/Columns –Changing column widths and row heights, auto format, changing font sizes, colors, shading, Features of PowerPoint – Creating a Blank Presentation - Creating a Presentation using a Template - Inserting and Deleting Slides in a Presentation – Adding Clip Art/Pictures - Inserting Other Objects, Audio, Video - Resizing and Scaling of an Object – Slide Transition – Custom Animation

CO5: Make use of Photoshop tools to for cropping, straightening& graphics

Photoshop: Getting started, photo retouching, cropping photos, resolution Creating graphics: combing photos, text& graphics.

Text Books:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar PublishingHouse.
2. (Corresponding set of) CAD Software Theory and User Manuals.

REFERENCE BOOKS

1. Alf Yarwood, Introduction to AutoCAD – 2D and 3D Design, Newnes Elsevier, 2011
2. Microsoft office2010 Bible by John walkenback,Herb Tyson,Michael R.Groh and faithe Wempen,Publishesr:Wile

L	T	P	C
3	0	0	3

I B.Tech II Semester Subject code : ESC(ME106)

ENGINEERING MECHANICS

body diagrams representing forces and moments acting on a body to analyze the equilibrium of system of forces.

To teach the basic principles of center of gravity, centroid and moment of inertia and determine them for different simple and composite bodies.

To apply the Work- Energy method to particle motion.

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

CO1: Understand the fundamental concepts in mechanics and determine the frictional forces for bodies in contact.

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

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

CO4: Apply the principles of work-energy and impulse-momentum to solve the problems of rectilinear and curvilinear motion of a particle.

CO5: Solve the problems involving the translational and rotational motion of rigid bodies.

CO1: Understand the fundamental concepts in mechanics and determine the frictional forces for bodies in contact.

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–Couple and Resultant of Force Systems.

Friction: Introduction, limiting friction and impending motion, Coulomb’s laws of dry friction, coefficient of friction, Cone of Static friction.

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

Equilibrium of Systems of Forces: Free Body Diagrams, Lami’s Theorem, Equations of Equilibrium of Coplanar Systems, 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.

B.Tech. (CIVIL Engineering)

Principle of **virtual work with simple examples**

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

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.

CO4: Apply the principles of work-energy and impulse-momentum to solve the problems of rectilinear and curvilinear motion of a particle.

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.

CO5: Solve the problems involving the translational and rotational motion of rigid bodies.

Rigid body Motion: Kinematics and Kinetics of translation, Rotation about fixed axis and plane motion, Work Energy method and Impulse Momentum method.

Textbooks:

1. Engineering Mechanics ,S .Timoshenko ,D.H. Young, J.V.Rao,S.Pati.,McGrawHillEducation2017. 5thEdition.
2. Engineering Mechanics, P.C .Dumir- S. Sen gupta and Srinivas V veera valli , Universitypress.2020. First Edition.
3. A Textbook of Engineering Mechanics ,S.S Bhavikatti. New age international publications 2018. 4thEdition.

Reference Books:

1. Engineering Mechanics ,Statics and Dynamics, Rogersand MA.Nelson.,McGrawHillEducation.2017. First Edition.
2. Engineering Mechanics, Statics and Dynamics, I .H .Shames. ,PHI, 2002.4th Edition.

B.Tech. (CIVIL Engineering)

3. Engineering Mechanics, Volume-I: Statics, Volume-II: Dynamics, J.L .Meriam and L.G. Kraige.,John Wiley ,2008.6thEdition.
4. IntroductiontoStaticsandDynamics,BasudevBattachatia,OxfordUniversityPress,2014.Second Edition
5. EngineeringMechanics:StaticsandDynamics,HibbelerR.C.,PearsonEducation,Inc.,NewDelhi, 2022, 14thEdition

B.Tech. (Common to all Branches)

I B.Tech II Semester Subject Code: BS&H (HS107)

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Health and Wellness, Yoga and Sports

Course Objectives:

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

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

CO1: Understand the importance of yoga and sports for Physical fitness and sound health.

CO2: Demonstrate an understanding of health-related fitness components.

CO3: Compare and contrast various activities that help enhance their health.

CO4: Assess current personal fitness levels.

CO5: Develop Positive Personality

CO1: Understand the importance of yoga and sports for Physical fitness and sound health

CO5: Develop Positive Personality

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

Activities:

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

CO2: Demonstrate an understanding of health-related fitness components.

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

CO3: Compare and contrast various activities that help enhance their health

B.Tech. (Common to all Branches)

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