B.Tech - CIVIL ENGINEERING
II YEAR - Course Structure And Syllabus (R20)
Applicable From 2020-21 Admitted Batch

II YEAR I SEMESTER

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	2030112	Strength of Materials - I	PC	3	0	0	3	30	70	100
2	2030113	Surveying and Geomatics	PC	3	0	0	3	30	70	100
3	2030004	Probability and Statistics	BS	3	1	0	4	30	70	100
4	2030202	Basic Electrical and Electronics Engineering	ES	3	0	0	3	30	70	100
5	2030502	Data Structures	ES	3	0	0	3	30	70	100
6	2030171	Surveying Laboratory	PC	0	0	3	1.5	30	70	100
7	2030272	Basic Electrical and Electronics Engineering Laboratory	ES	0	0	2	1	30	70	100
8	2030572	Data Structures Laboratory	ES	0	0	2	1	30	70	100
9	2030022	Gender Sensitization	MC	2	0	0	0	-	-	-
Total Credits				**17**	**1**	**7**	**19.5**	**240**	**560**	**800**

II YEAR II SEMESTER

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	2040114	Strength of Materials - II	PC	3	0	0	3	30	70	100
2	2040115	Building Materials, Construction and Planning	PC	3	0	0	3	30	70	100
3	2040116	Fluid Mechanics	PC	3	0	0	3	30	70	100
4	2040117	Structural Analysis - I	PC	3	0	0	3	30	70	100
5	2040118	Engineering Geology	PC	2	0	0	2	30	70	100
6	2040504	Python	ES	2	0	0	2	30	70	100
7	2040172	Strength of Materials Laboratory	PC	0	0	3	1.5	30	70	100
8	2040173	Computer Aided Civil Engineering Drawing Laboratory	PC	0	0	2	1	30	70	100
9	2040573	Python Laboratory	ES	0	0	2	1	30	70	100
Total Credits				**16**	**0**	**7**	**19.5**	**270**	**630**	**900**

II – I

2030112 - STRENGTH OF MATERIALS – I

B.Tech. II Year I Sem. **L T P C**

Pre-requisites: Engineering Mechanics **3 0 0 3**

Course Objective:

1. To understand the concepts of stress, strain and strain energy
2. To calculate the shear force and bending moments for various loading conditions
3. To analyze the beams under flexural stresses
4. To analyze the beams under shear stresses
5. To calculate the deflections of beams under different loading conditions
6. To understand principal stresses and strains in structural members and various theories of failures.

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

1. Evaluate the strength and deformation of members subjected to axial load.
2. Draw the shear force and bending moment diagrams for determinate beams.
3. Analyze the bending stresses in various beam sections
4. Evaluate the shear stress distribution across various beam sections
5. Assess the slope and deflection of beams by various methods
6. Understand and evaluate the stresses on oblique plane and various theories of failures.

UNIT – I

Simple stresses and strains: Concept of stress and strain- Strain diagram - Elasticity and plasticity – Hooke's law – Elastic constants – Poisson's ratio – Bars of varying section – composite bars – Temperature stresses.

Strain energy: Resilience – Gradual, sudden, and impact loadings – simple applications.

Learning Outcomes:

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

1. Understand the behaviour of axially loded members of different cross section.
2. Analyse bars subjected to thermal stresses.
3. Evaluate strain energy stored in a body subjected to external load.

UNIT - II

Shear force and bending moment: Beam - Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for determinate beams – Point of contraflexure – Relation between S.F., B.M and rate of loading at a section of a beam.

Learning Outcomes:

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

1. Know the various types of beams and external loads.
2. Evaluate the variation of Shear Force and Bending Moment along the length of the beam.

UNIT – III

Flexural stresses: Theory of simple bending – Section Modulus - bending stresses

Shear stresses: Formula for shear stress distribution – Shear stress distribution for different

sections.

Learning Outcomes:

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

1. Understand the concept bending stress and shear stress.
2. Evaluate the variation of shear stress and bending stress distribution across the section.

UNIT – IV

Deflection of beams: Slope and deflection– Double integration method - Macaulay's method – Moment area method - Conjugate beam method

Learning Outcomes:

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

1. Understand the concept slope, deflection and elastic curve of beams.
2. Evaluate the slope and deflection of beams by different methods.

UNIT - V

Principal stresses: Stresses on an oblique section –Analytical and graphical solutions.

Theories of failure: Introduction – Various theories of failure

Learning Outcomes:

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

1. Understand the concept of principal stresses
2. Evaluate stresses and factor of safety according to various theories of failure.

TEXT BOOKS:

1. Strength of Materials by R. K Rajput, S. Chand & Company Ltd.
2. Mechanics of Materials by Dr. B.C Punmia, Dr. Ashok Kumar Jain and Dr. Arun Kumar Jain, Laxmi Publications Pvt Limited.
3. Strength of Materials by R. Subramanian, Oxford University Press.
4. Strength of Materials by S. Ramamrutham, Dhanpat Rai Publishing Company (p) Ltd.
5. Strength of Materials by R.S.Khurmi, S.Chand and Co

REFERENCES:

1. Mechanics of Materials by R.C. Hibbeler, Prentice Hall publications.
2. Engineering Mechanics of Solids by Egor P. Popov, Prentice Hall publications.
3. Strength of Materials by T.D.Gunneswara Rao and M.Andal, Cambridge University Press.
4. Strength of Materials by R.K. Bansal, Lakshmi Publications Pvt. Ltd.
5. Strength of Materials by B.S.Basavarajaiah and P. Mahadevappa, Universities Press.

2030113 - SURVEYING AND GEOMATICS

B.Tech. II Year I Sem **L T P C**

Pre-requisites: Nil **3 0 0 3**

Course Objectives:

1. Know the principles and methods of surveying
2. Measure horizontal and vertical- distances and angles
3. Recording of observation accurately and Perform calculations based on the observation
4. Identification of source of errors and rectification methods
5. Apply surveying principles to determine areas and volumes and setting out curves
6. Use modern surveying equipment's for accurate results

Course Outcomes:

1. Apply the knowledge to calculate angles, distances and levels
2. Identify data collection methods and prepare field notes for levels, Interpret survey data and compute areas and volumes
3. Understand working principles of survey instruments and apply the knowledge of trigonometric leveling
4. Understand and apply the corrective measures on measurement errors
5. Apply the knowledge on curve alignment by different methods
6. Understand & apply the principles and concepts of modern equipment and its methodologies

UNIT - I

Introduction and Basic Concepts: Introduction, Objectives, classification and principles of surveying, Scales, Shrinkage of Map, Conventional symbols and Code of Signals, Surveying accessories, phases of surveying.

Different methods of distance measurement, direct methods of distance measurement using chain/tape, ranging, Tape corrections.

Compass and its types, Bearings, Included angles, Local Attraction, Magnetic Declination and dip

Learning Outcomes:

At the end of the unit, students should able to

1. Understand the concepts and classification of surveying, conventional symbols used for mentioning the different objects in the field, list of accessories used for surveying.
2. Do the corrections if any during the measurement of distances.
3. Measure the bearings in prismatic compass, converting WCB to RB and vice versa, Also to correct the bearings if any local attraction and calculate the included angle of a traverse.

UNIT - II

Leveling- Types of levels and levelling staves, temporary adjustments, methods of levelling, booking and Determination of levels, Effect of Curvature of Earth and Refraction.

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

Areas and volumes - Determination of areas for regular and irregular boundary, Determination of volume of earth work for level section, volume of borrow pits, capacity of reservoirs.

Learning Outcomes:

At the end of the unit, students should able to

1. Understand reduced level, elevation, fore sight, inter sight, back sight, bench mark, different levels & staves and also to write field book by different methods.
2. Draw the contour map using different methods; understand the characteristics and uses of contour lines.
3. Calculate the quantity of earth work from contour map using different formula

UNIT - III

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

Tacheometric Surveying: Principles of Tacheometry, stadia and tangential methods of Tacheometry

Learning Outcomes:

At the end of the unit, students should able to

1. Understand the components of theodolite, terminologies used in theodolite, temporary adjustments, how to measure the horizontal and vertical angles using theodolite.
2. Perform trigonometric leveling under the category of base is accessible and inaccessible to measure the height of the object using angular and linear measurements.
3. Perform tachometric leveling to measure the height and distance of the object using angular and stadia hair measurements.

UNIT - IV

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

Curves: Types of curves and their necessity, elements of simple, compound, reverse, transition and vertical curves.

Learning Outcomes:

At the end of the unit, students should able to

1. Perform traverse surveying using chain and compass or by optical means.
2. Do corrections if any in the traverse measurements.
3. Perform the calculation for road alignment using different methods in the field too.

UNIT - V

Modern Surveying Methods: Principle and types of E.D.M. Instruments, Total station- advantages, Applications and Field Procedure, Errors in Total Station Survey, GPS- Principle and Applications.

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.

Learning Outcomes:

At the end of the unit, students should able to

1. Know the advanced instruments used for surveying and its principle, application, errors due to various circumstances
2. Handle total station, GPS for calculating distance, area
3. Application and principles of photogrammetry for doing reconnaissance survey, different types, methods and mapping of photogrammetry.

TEXT BOOKS:

1. Surveying (Vol – 1, 2 & 3), by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain – Laxmi Publications (P) ltd., New Delhi.
2. Duggal S K, "Surveying (Vol – 1 & 2)", Tata McGraw Hill Publishing Co. Ltd. New Delhi.
3. N N Basak, "Surveying and Levelling", Tata McGraw Hill Publishing Co. Ltd. New Delhi.
4. Chandra A M, "Plane Surveying and Higher Surveying", New age International Pvt. Ltd., Publishers, New Delhi.

REFERENCES:

1. Arthur R Benton and Philip J Taety, Elements of Plane Surveying, Tata McGraw Hill Publishing Co. Ltd. New Delhi.
2. Arora K R "Surveying Vol 1, 2 & 3), Standard Book House, Delhi.
3. R Subramanian, "Surveying and Levelling", Oxford University Press, New Delhi.

2030004 - PROBABILITY AND STATISTICS

B.Tech. II Year I Sem **L T P C**

Pre-requisites: Nil **3 1 0 4**

Common to CIVIL, CSE and IT branches

Course Objectives: To learn

- The ideas of probability and random variables and various discrete and continuous probability distributions and theirproperties.
- The basic ideas of statistics including measures of central tendency, correlation and regression.
- The statistical methods of studying datasamples.
- The sampling theory and testing of hypothesis and making inferences.

Course Outcomes: After learning the contents of this paper the student must be able to

- Formulate and solve problems involving random variables and apply statistical methods for analysing experimental data.
- Apply discrete and continuous probability distributions.
- Classify the concepts of data science and its importance.
- Infer the statistical inferential methods based on small and large sampling tests.
- Interpret the association of characteristics through correlation and regression tools.

UNIT-I: Probability and Random Variables

Probability: Sample Space, Events, Probability of an Event, Additive Rules, conditional probability, independent events, Product Rule and Bayes' theorem.

Random variables: Discrete and continuous random variables. Expectation, Mean and Variance of random variables. Chebyshev's inequality.

LEARNING OUTCOMES:

- Understand the concept of probability
- Explain the notion of random variable, distribution functions and expected value.
- Apply Baye's theorem to real time problems
- Analyse the mean and variance of random variables
- Evaluate the probability of event for more complex outcomes.

UNIT-II: Probability Distributions & Estimation

Probability distribution-Binomial, Poisson approximation to the binomial distribution, uniform,exponential and Normal distribution. Estimation.: Estimating the Mean, Standard

Error of a Point Estimate, Prediction Intervals, Tolerance Limits, Estimating the Variance, Estimating a Proportion for single mean, Difference between Two Means, between Two Proportions for Two Samples and Maximum Likelihood Estimation.

LEARNING OUTCOMES:

- Understand the concept of Probability distribution.
- Explain the statistical parameters
- Apply Binomial and Poisson distributions for real data
- Analyse the properties of Normal distribution and its applications.
- Evaluate probabilities, theoretical frequencies.

UNIT-III: Sampling theory and Small samples

Population and sample, parameters and statistics; sampling distribution of means (⌐ known)-central limit theorem, t-distribution, sampling distribution of means (⌐ unknown)-sampling distribution of variances-chi-square and F-distributions, point estimation, maximum error of estimation, interval estimation.

LEARNING OUTCOMES:

- Understand the concept of sampling and estimation.
- Explain the concept of estimation, interval estimation and confidence intervals
- Apply distribution problems in real world.
- Analyse the types of distributions
- Evaluate the maximum error of estimation, interval estimation

UNIT-IV: Testing of Hypothesis & Stochastic Processes and Markov Chains:

Large sample test for single proportion, difference of proportions, single mean, difference of means; Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, n- step transition probabilities, Markov chain, Steady state condition, Markov analysis.

LEARNING OUTCOMES:

- Understand the concept of testing of hypothesis
- Explain the single proportions and difference of proportions.
- Apply the concept of hypothesis testing for large samples.
- Analyse testing hypothesis for small samples to draw the inference.
- Evaluate single mean and difference of means for small samples.

UNIT-V: Curve Fitting For Statistical Data

Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves; Correlation and regression – Rank correlation.

LEARNING OUTCOMES:

- Understand the concept of curve fitting.
- Explain the Method of least squares.
- Apply the Correlation and regression to real data
- Analyse polynomial curve – fitting, general curve fitting and interpolation
- Evaluate Rank correlation.

TEXTBOOKS:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, keying Ye, Probability and statistics for engineers and scientists, 9th Edition, Pearson Publications.
2. Fundamentals of Mathematical Statistics, Khanna Publications, S C Guptas and V.K. Kapoor.

REFERENCES:

1. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations
2. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.

2030202 - BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Common for Civil & Mechanical)

B.Tech. II Year I Sem	**L T P C**
Pre-requisites: Nil	**3 0 0 3**

Course Objectives:

- To introduce the concepts of electrical circuits and its components.
- To understand magnetic circuits, DC circuits and AC single phase & three phase circuits.
- To study and understand the different types of DC/AC machines and Transformers.
- To import the knowledge of various electrical installations.
- To introduce the concept of power, power factor and its improvement.
- To introduce the concepts of diodes & transistors, and
- To impart the knowledge of various configurations, characteristics and applications.

Course Outcomes:

- To analyze and solve electrical circuits using network laws and theorems.
- To understand and analyze basic Electric and Magnetic circuits
- To study the working principles of Electrical Machines
- To introduce components of Low Voltage Electrical Installations
- To identify and characterize diodes and various types of transistors.

UNIT - I:D.C. CIRCUITS

Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation.

A.C. CIRCUITS

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits, Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT - II:ELECTRICAL INSTALLATIONS

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

UNIT - III:ELECTRICAL MACHINES

Working principle of Single-phase transformer, equivalent circuit, losses in transformers, efficiency, Three-phase transformer connections. Construction and working principle of DC generators, EMF equation, working principle of DC motors, Torque equations and Speed control of DC motors, Construction and working principle of Three-phase Induction motor, Torques equations and Speed controlofThree-phaseinductionmotor.Constructionandworkingprincipleofsynchronousgenerators.

UNIT - IV:PN JUNCTIONANDZENERDIODE:

PrincipleofOperationDiodeequation,Volt-Amperecharacteristics, Temperaturedependence,Idealversuspractical,Staticanddynamicresistances,Equivalentcircuit, Zener diode characteristics and applications.

RECTIFIERS AND FILTERS:

P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L- section Filters, π- section Filters.

UNIT - V:BIPOLAR JUNCTION TRANSISTOR (BJT):

Construction, Principle of Operation, Amplifying Action, Common Emitter, Common Base and Common Collector configurations, Comparison of CE, CB and CC configurations.

FIELD EFFECT TRANSISTOR (FET):

Construction, Principle of Operation, Comparison of BJT and FET, Biasing FET.

TEXT BOOKS:

1. Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar Oxford University
2. Basic Electrical and electronics Engineering-D P Kothari. I J Nagarath, McGraw Hill Education

REFERENCES:

1. Electronic Devices and Circuits – R. L. Boylestad and Louis Nashelsky, PEI/PHI, 9^{th}Ed,2006.
2. Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabrata Jit, TMH, 2/e,1998.
3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6^{th} edition.
4. Linear circuit analysis (time domain phasor and Laplace transform approaches) - 2^{nd}edition by Raymond A. De Carlo and Pen-Min-Lin, Oxford UniversityPress-2004.
5. Network Theory by N. C. Jagan& C. Lakshminarayana, B.S.Publications.
6. Network Theory by Sudhakar, Shyam Mohan Palli,TMH.
7. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press,2011.

8. E. Hughes, “Electrical and Electronics Technology”, Pearson,2010.
9. V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India,1989.

2030502: DATA STRUCTURES

B.Tech. II Year I Sem **L T P C**

Pre-requisites: A course on "Programming for Problem Solving " **3 0 0 3**

Course Objectives

- Exploring basic data structures such as linked list, stacks and queues.
- Describes searching and sorting techniques.
- Introduces trees and graphs.

Course Outcomes

- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations or combinations.
- Implement and know the application of algorithms for searching and sorting.
- Design programs using a variety of data structures- lists, stacks, queues, trees and graphs.

UNIT - I

Introduction to Data Structures, Linear list – singly linked list, Doubly linked list, Circular linked list - operations and its applications

UNIT-II

Stacks- Introduction, Operations, array and linked representations of stacks, stack applications (Infix to postfix conversion and postfix evaluation), Queues-Introduction, operations, array and linked representations of queues and its applications.

UNIT - III

Searching: Linear Search and Binary Search and its applications.
Sorting: Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort and its applications.

UNIT-IV

Trees - Introduction, Types of trees, Binary tree, recursive and non- recursive Traversals of Binary Tree, Binary search tree- Operations and its applications.

UNIT - V

Graphs: Introduction, Types of graphs, Representation of graphs, Graph Traversal Methods, comparison between trees and graphs and its applications.

TEXT BOOKS:

1. Fundamentals of data structures in C, E.Horowitz, S.Sahni and Susan Anderson Freed, 2nd Edition, Universities Press.

2. Data structures using C, A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/pearson education.

REFERENCES:

1. Data structures: A Pseudocode Approach with C, R.F.Gilberg And B.A.Forouzan, 2nd Edition, Cengage Learning. 2. Introduction to data structures in C, Ashok Kamthane, 1st Edition, PEARSON.

2030171 - SURVEYING LABORATORY

B.Tech. II Year I Sem. **L T P C**

Pre-requisites: Surveying and Geomatics **0 0 3 1.5**

Course Objectives:

1. Know the principles and methods of surveying using different equipments & methods
2. Determination of distance, area using chain, compass and plane table surveying
3. Recording of observation accurately and Perform calculations based on the observation
4. Identification of source of errors and rectification methods
5. Apply surveying principles to determine areas and volumes and setting out curves
6. Understand the concept of advanced techniques and operation of modern equipment and perform various experiments by using that.

Course Outcomes:

1. Measure the distance, area of the field using the instruments chain, compass, plane table and plot the same.
2. Know the concepts of leveling, and perform & plot the cross & longitudinal sectioning.
3. Measurement of angles using theodolite, and calculate the distance and elevation of the given point using trigonometric leveling and tacheometric leveling.
4. Understand the concepts of EDM, and calculate the distance, area of the field
5. Perform the traverse and plot the contour map for the obtained data.
6. Locate the position of points using stake out method, perform the curve using modern equipment.

List of Experiments:

1. Surveying of an area by chain and compass survey (closed traverse) & plotting
2. Determine of distance between two inaccessible points with compass
3. Radiation method, intersection methods by plane table survey.
4. Leveling – Longitudinal and cross-section and plotting
5. Measurement of Horizontal and vertical angle by Theodolite
6. Trigonometric leveling using Theodolite
7. Height and distances using principles of tachometric surveying
8. Determination of height, remote elevation, distance between inaccessible points using total station
9. Determination of Area using total station and drawing map
10. Traversing using total station for drawing contour map
11. Stake out using total station
12. Setting out Curve using total station.

2030272 - BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB

(Common for Civil and Mechanical)

B.Tech. II Year I Sem. **L T P C**

Pre-requisites: Basic Electrical and Electronics Engineering **0 0 2 1**

Course Objectives:

- To introduce the concepts of electrical circuits and its components
- To understand magnetic circuits, DC circuits and AC single phase & three phasecircuits
- To study and understand the different types of DC/AC machines and Transformers.
- To import the knowledge of various electrical installations.
- To introduce the concept of power, power factor and its improvement.
- To introduce the concepts of diodes & transistors, and
- To impart the knowledge of various configurations, characteristics and applications.

Course Outcomes:

- To analyze and solve electrical circuits using network laws and theorems.
- To understand and analyze basic Electric and Magnetic circuits
- To study the working principles of Electrical Machines
- To introduce components of Low Voltage Electrical Installations
- To identify and characterize diodes and various types of transistors.

List of experiments/demonstrations:

PART A: ELECTRICAL

1. Verification of KVL and KCL
2. i) Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer

   ii) Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta- star, Star-Star) in a Three Phase Transformer
3. Measurement of Active and Reactive Power in a balanced Three-phase circuit
4. Performance Characteristics of a Separately Excited DC Shunt Motor
5. Performance Characteristics of a Three-phase Induction Motor
6. No-Load Characteristics of a Three-phase Alternator

PART B: ELECTRONICS

1. Study and operation of

(i) Multi-meters (ii) Function Generator (iii) Regulated Power Supplies (iv)CRO.

2. PN Junction diode characteristics.
3. Zener diode characteristics and Zener as voltage Regulator.
4. Input & Output characteristics of Transistor in CB / CE configuration.
5. Full Wave Rectifier with & without filters.
6. Input and Output characteristics of FET in CS configuration.

2030572: DATA STRUCTURES LABORATORY

B.Tech. II Year I Sem. **L T P C**

Pre-requisites: A course on "Programming for Problem Solving "**0 0 2 1**

Course Objectives

- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

Course Outcomes

- Ability to develop C programs for computing and real life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
- Ability to Implement searching and sorting algorithms

List of Experiments

1. Write a program that uses functions to perform the following operations on singly linked list.: i) Creation ii) Insertion iii) Deletion iv) Traversal
2. Write a program that uses functions to perform the following operations on doubly linked list.: i) Creation ii) Insertion iii) Deletion
3. Write a program that uses functions to perform the following operations on circular linked list: i) Creation ii) Insertion iii) Deletion
4. Write a program that implement stack operations using i) Arrays ii) Pointers
5. Write a c program to implement infix to postfix conversion using stack.
6. Write a c program to implement postfix evaluation.
7. Write a program that implement Queue operations using i) Arrays ii) Pointers
8. Write a program that implements the following sorting methods to sort a given list of integers in ascending order i) Bubble sort ii) Selection sort iii) Insertion sort
9. Write a program that implements the following sorting methods to sort a given list of integers in ascending order i) Merge sort ii) Quick sort
10. Write a program that use both recursive and non-recursive functions to perform the following searching operations for a Key value in a given list of integers: i) Linear search ii) Binary search
11. Write a program to implement the tree traversal methods using both recursive and non-recursive.
12. Write a program to implement the graph traversal methods.

TEXT BOOKS:

1. Fundamentals of data structures in C, E.Horowitz, S.Sahni and Susan Anderson Freed, 2nd Edition, Universities Press.

2. Data structures using C, A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/pearson education.

REFERENCES:

1. Data structures: A Pseudocode Approach with C, R.F.Gilberg And B.A.Forouzan, 2nd Edition, Cengage Learning.

2. Introduction to data structures in C, Ashok Kamthane, 1st Edition, PEARSON.

2030022 - GENDER SENSITIZATION

B.Tech. II YearISem. **L T P C**

Pre-requisites: Nil 2 **0 00**

Course Objectives:

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Course Outcomes:

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.

UNIT – I

UNDERST AND INGGENDER

Gender: Why Should We Study It? (*Towards a World of Equals:* Unit -1)
Socialization: Making Women, Making Men (*Towards a World of Equals:* Unit -2) Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

UNIT - II

GENDERANDBIOLOGY

Missing Women: Sex Selection and Its Consequences (*Towards a World of Equals:* Unit -4) Declining Sex Ratio. Demographic Consequences.
Gender Spectrum: Beyond the Binary (*Towards a World of Equals:* Unit -10) Two or Many? Struggles with Discrimination.

UNIT - III

GENDER AND LABOUR

Housework: the Invisible Labour (*Towards a World of Equals:* Unit -3) "My Mother doesn't Work." "Share the Load."

Women's Work: Its Politics and Economics (*Towards a World of Equals:* Unit -7) Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

UNIT - IV

ISSUES OF VIOLENCE

Sexual Harassment: Say No! (*Towards a World of Equals:* Unit -6) Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "Chupulu".

Domestic Violence: Speaking Out (*Towards a World of Equals:* Unit -8) Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New Forums for Justice.

Thinking about Sexual Violence (*Towards a World of Equals:* Unit -11) Blaming the Victim-"I Fought for my Life…." - Additional Reading: The Caste Face of Violence.

UNIT – V

GENDER: CO – EXISTENCE

Just Relationships: Being Together as Equals (*Towards a World of Equals:* Unit -12) Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Additional Reading: Rosa Parks-The Brave Heart.

TEXTBOOKS:

All the five Units in the Textbook, **"*Towards a World of Equals: A Bilingual Textbook on Gender*"** written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by **Telugu Akademi, Hyderabad**,Telangana State in the year **2015**.

REFERENCES:

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
2. Abdulali Sohaila. "I Fought For My Life…and Won."Available online at: http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/

II-II

STRENGTH OF MATERIALS - II

B.Tech. II YearIISem. **L T P C**
Pre-requisites: Strength of Materials – I **3 0 0 3**

Course Objectives:

1. To understand the concepts of torsion and deflection of springs
2. To understand the behavior of columns and struts for various loading conditions
3. To calculate the direct and bending stresses of members subjected to various loads
4. To analyze the members for stability under sliding and overturning
5. To evaluate the hoop and radial stresses for thick and thin cylinders
6. To evaluate the stresses due to unsymmetrical bending and location of shear center

Course Outcomes:

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

1. Apply the torsion theory for analysis of circular shafts and springs
2. Analyze columns and struts
3. Understand the concept of direct and bending stresses.
4. Analyze the structures under the conditions of sliding, overturning
5. Analyze the stress in Thin and thick cylinders.
6. Understand the concept of stresses & shear center for symmetrical and unsymmetrical sections

UNIT - I

Torsion of circular shafts: Theory of pure torsion – Derivation of Torsion equation - – Polar section modulus – Power transmitted by shafts – Combined bending and torsion – Design of shafts according to theories of failure

Springs: Types of springs – deflection of close and open coil helical springs under axial pull and axial couple – springs in series and parallel

Learning Outcomes:

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

1. Understand the behaviour of shafts subjected to torsion
2. Design shafts for pure torsion and Combined action of bending with torsion.
3. Analyze and design open and closed coil helical springs.

UNIT – II

Columns and struts: Types of columns – Crushing load – Euler's theory – Equivalent length of a column – slenderness ratio – core of a section - Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Rankine Gordon formula- Straight line formula – Prof. Perry's formula.

Beam columns: Laterally loaded struts subjected to uniformly distributed and concentrated loads

Learning Outcomes:

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

1. Understand the types of column
2. Analyze short and long columns subjected to axial load by various theories
3. Analyze columns subjected to both axial load and lateral load

UNIT – III

Direct and bending stresses: Stresses under the combined action of direct loading and bending moment – determination of stresses in the case of retaining walls, chimneys and dams – conditions for stability – Overturning and sliding – stresses due to direct loading and bending moment about both axis.

Learning Outcomes:

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

1. Understand the behaviour of structures subjected to direct and bending stresses
2. Evaluate the failure load for retaining walls, dams and chimneys.

UNIT – IV

Thin cylinders: Thin seamless cylindrical shells – hoop, longitudinal and volumetric stress and strains – changes in diameter and volume of thin cylinders – Thin spherical shells.

Thick cylinders: Lame's theory for thick cylinders – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders.

Learning Outcomes:

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

1. Analyse and design thin and thick cylinders.
2. Sketch the stress distribution across the section of thick cylinder

UNIT – V

Unsymmetrical bending: Centroidal principal axes of section – Moments of inertia referred to any set of rectangular axes – Principal axes - Stresses in beams subjected to unsymmetrical bending

Shear centre: Shear centre for symmetrical and unsymmetrical (channel, I, T and L) sections

Learning Outcomes:

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

1. Evaluate bending stresses in members subjected to unsymmetrical bending
2. Locate shear centre for a section.

TEXT BOOKS:

1. Strength of Materials by R. S. Khurmi, S. Chand Publications
2. Mechanics of Materials by Dr. B.C Punmia, Dr.Ashok Kumar Jain and Dr.Arun KumarJain
3. Strength of Materials by R. Subramanian, Oxford University Press
4. Strength of Materials by R.K. Bansal, Lakshmi Publications House Pvt. Ltd.
5. Strength of Materials by R. K Rajput, S. Chand & Company Ltd.

REFERENCES:

1. Strength of materials by S.S. Rattan, Tata McGrawhill publications
2. Strength of materials by S.S. Bhavikatti
3. Strength of Materials by T.D.Gunneswara Rao and M.Andal, CambridgePublishers
4. Strength of Materials (Part 1) by S. Timoshenko
5. Strength of Materials by B.S.Basavarajaiah and P. Mahadevappa, 3rdEdition, Universities Press

2040115 - BUILDING MATERIALS, CONSTRUCTION AND PLANNING

B.Tech II Year II Sem **L T P C**
Prerequisites: Nil **3 0 0 3**

Course Objectives: To give the students a basic idea about the construction materials, building components and to introduce various.

1. Stones, bricks its production, Types of masonry using bricks and other materials for constructing a building.
2. Process involved to manufacture of cement, tests on cement, grades of concrete, tests on concrete, NDT, admixtures used for concrete
3. Different building components
4. Plumbing services using different materials
5. Types of form work, utilisation, preparation of mortars for finishing work.
6. Bye laws to construct a building

Course Outcomes: At the end of the course, the student will be able to identify various building materials required for construction & planning.

1. General knowledge on stones, bricks and its production and masonry. And other type of modern material for construction
2. Understand the process involved in the manufacturing of cement, their test, grades of concrete, tests on concrete, NDT, different admixtures used for concrete
3. Identify the different building components, and their materials.
4. To do the plumbing services using materials
5. To know the types of form work and where to be utilised, preparation of mortars for finishing work.
6. Able to know the bye laws to construct a building

UNIT I

Stones and Bricks, Tiles: Building stones – classifications and quarrying – properties – structural requirements – dressing. Stone masonry – types; Bricks – Composition of Brick earth – manufacture and structural requirements, Fly ash, Ceramics. Brick masonry – types – bonds.

Timber and Other modern materials: Wood - structure – types and properties – seasoning – defects; alternate materials for Timber – GI / fibre – reinforced glass bricks, steel & aluminum, Plastics. Geomembranes and Geotextiles for earth reinforcement

UNIT - II

Cement, Concrete & Admixtures: Cements – Grade of cements - Ingredients of cement – manufacture – Chemical composition – Hydration - field & lab tests.
Admixtures – mineral & chemical admixtures – uses.

UNIT - III

Building Components: Lintels, Arches, walls, vaults – stair cases – types of floors, types of roofs – flat, curved, trussed ; foundations – types ; Damp Proof Course ; Joinery – doors – windows – materials – types.

Building Services: Plumbing Services: Water Distribution, Sanitary – Lines & Fittings; Ventilations: Functional requirements systems of ventilations. Air-conditioning - Essentials and Types; Acoustics – characteristic – absorption – Acoustic design; Fire protection – Fire Harzards – Classification of fire resistant materials and constructions

UNIT – IV

Structural Systems: Load Bearing Structure - Framed Structure - Load transfer mechanism.

Form work: Types: Requirements – Standards – Scaffolding – Design; Shoring, Underpinning.

Mortars: Lime and Cement Mortars - Preparation of mortar

Finishers: Plastering, Pointing, Painting, Claddings – Types – Tiles – ACP.

UNIT – V

Building Planning: Principles of Building Planning, Classification of buildings and Building by laws.

TEXT BOOKS:

1. Building Materials and Construction – Arora & Bindra, Dhanpat Roy Publications.
2. Building Construction by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi.

REFERENCES:

1. Building Materials and Construction by G C Sahu, Joygopal Jena McGraw hill Pvt Ltd 2015.
2. Building Materials by Duggal, New Age International.
3. Building Materials by P. C. Varghese, PHI.
4. Building Construction by PC Varghese PHI.
5. Construction Technology – Vol – I & II by R. Chubby, Longman UK.
6. Alternate Building Materials and Technology, Jagadish, Venkatarama Reddy and others; New Age Publications.

2040116 - FLUID MECHANICS

B.Tech. II Year II Sem.	**L**	**T**	**P**	**C**
Prerequisites: Nil	**3**	**0**	**0**	**3**

Course Objectives: The objectives of the course are to

1. Introduce the concepts of fluid mechanics useful in Civil Engineering applications
2. Provide a first level exposure to the students to fluid statics, kinematics and dynamics.
3. Learn about the application of mass, energy and momentum conservation laws for fluid flows
4. Train and analyse engineering problems involving fluids with a mechanistic perspective is essential for the civil engineering students
5. To obtain the velocity and pressure variations in various types of simple flows
6. To prepare a student to build a good fundamental background useful in the application intensive courses covering hydraulics, hydraulic machinery and hydrology

Course Outcomes: Upon completion of this course, students should be able to:

1. Understand the broad principles of fluid statics, kinematics and dynamics
2. Understand definitions of the basic terms used in fluid mechanics and characteristics of fluids and its flow
3. Understand classifications of fluid flow
4. Be able to apply the continuity, momentum and energy principles

UNIT – I

Properties of Fluid

Basic concepts: Density, Specific weight, Specific volume, Specific gravity, Kinematic and dynamic viscosity - variation of viscosity with temperature - Newton law of viscosity - vapour pressure - boiling point - surface tension and capillarity

Fluid Statics

Fluid Pressure at a point, variation of pressure in a fluid, Pascal's law, measurement of pressure - simple and differential manometers - Hydrostatic pressure and force: horizontal, vertical and inclined surfaces - Buoyancy

Learning Outcomes:

At the end of the unit, student should able to,

1. Understand the properties of fluids
2. Measure the pressure of fluid

UNIT - II

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.

Fluid Dynamics

Euler's and Bernoulli's equation - Impulse-momentum equation and its applications – Bernoulli's equation to real fluid flows.

Learning Outcomes:

At the end of the unit, student should able to,

1. Understand the concepts of fluid kinematics
2. Understand the concepts of fluid dynamics

UNIT - III

Flow Measurement in Pipes

Practical applications of Bernoulli's equation: venturimeter, orifice meter and pitot tube - Momentum principle - Forces exerted by fluid flow on pipe bend

Flow Over Notches & Weirs

Flow through rectangular; triangular and trapezoidal notches and weirs - Velocity of approach - Broad crested weir.

Learning Outcomes:

At the end of the unit, student should able to,

1. Measure the flow in pipes through venture and orifice meter
2. Measure the flow in pipes through notches and weir

UNIT – IV

Flow through Pipes

Reynolds experiment - Loss of head through pipes – Darcy-Weisbach equation - minor losses - total energy line - hydraulic grade line - pipes in series - equivalent pipes - pipes in parallel – syphon - power transmission through pipes - water hammer in pipes and control measures.

Learning Outcomes:

At the end of the unit, student should able to,

1. Able to measure the minor and major losses in pipes
2. Analyse the pipe networks using different methods

UNIT - V

Boundary Layer Concepts

Boundary layer: Definition, laminar and turbulent boundary layers - boundary layer thickness - displacement thickness - momentum thickness and energy thickness - Laminar sub-layer, smooth and rough boundaries - Boundary layer separation and Control - Definition of Drag and Lift and types drag - magnus effect.

Learning Outcomes:

At the end of the unit, student should able to,

1. Understand the laminar and turbulent flow
2. Understand the concepts of boundary layer

TEXT BOOKS:

1. Fluid Mechanics by Modi and Seth, Standard Book House.
2. Fluid Mechanics and Hydraulic machines by Manish Kumar Goyal, PHI learning Private Limited, 2015.

3. Fluid Mechanics by R.C. Hibbeler, Pearson India Education Services Pvt. Ltd.

REFERENCES:

1. Theory and Applications of Fluid Mechanics, K. Subramanya, Tata McGraw Hill
2. Introduction to Fluid Mechanics and Fluid Machines by SK Som, Gautam Biswas, Suman Chakraborthy, Mc Graw Hill Education (India) Private Limited
3. Fluid Mechanics and Machinery, C.S.P. Ojha, R. Berndtsson and P. N. Chadramouli, Oxford University Press, 2010
4. Fluid mechanics & Hydraulic Machines, Domkundwar & Domkundwar Dhanpat Rai &Co
5. Fluid Mechanics and Hydraulic Machines, R. K. Bansal, Laxmi Publication Pvt Ltd.

2040117 - STRUCTURAL ANALYSIS - I

B.Tech. II YearIISem. **L T P C**

Pre-requisites: Strength of Materials I & II **3 0 0 3**

Course Objectives:

1. Differentiate the statically determinate and indeterminate structures, analyse the propped cantilever and fixed beams
2. Understand the energy methods used to derive the equations to solve engineering problems
3. To understand the nature of stresses developed in perfect frames and three hinged arches for various types of simple loads
4. Analyse the statically indeterminate members such as continuous beams and for various types of loading by slope deflection, moment distribution method and theorem of three moments method.
5. Analyse the pin jointed plane frames under different loading positions.
6. Evaluate the Influence on a beam for different static & moving loading positions

Course Outcomes:

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

1. Understand determinate and indeterminate structure
2. Analyse the statically indeterminate beams and frames
3. Evaluate the normal thrust, radial shear, bending moment of three hinged arch.
4. Analyse the beams and frames using slope and deflection, moment distribution and theorem of three moments method
5. Analyse the pin jointed plane frames
6. Evaluate the structure under moving loads and draw the SFD

UNIT - I PROPPED CANTILEVER AND FIXED BEAMS

Static and kinematic indeterminacies for beams - Analysis of Propped cantilever and fixed beams subjected to different types of loads - Deflection of Propped cantilever and fixed beams - effect of sinking of support.

Learning Outcomes:

At the end of the unit, students should able to

1. Understand the difference between static and kinematic indeterminacy, slope and deflection for various support conditions corresponding to different types of loads.
2. Analyse the propped cantilever beam for different loading condition and draw the SFD and BMD. Also to find the maximum deflection of beam.
3. Analyse the fixed beam for different loading condition and draw the SFD and BMD. Also to find the maximum deflection of beam.

UNIT - II ENERGY THEOREMS AND THREE HINGED ARCHES

Energy Theorems: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces - Castigliano's theorem-Unit Load Method - Deflections of simple beams and pin- jointed plane frames - Deflections of statically determinate bent frames.

Three Hinged Arches: Introduction – Types of Arches – Comparison between Three hinged and Two hinged Arches - Linear Arch - Eddy's theorem - Analysis of Three hinged arches - Normal Thrust and radial shear and bending moment - Geometrical properties of parabolic and circular arches - Three hinged parabolic circular arches having supports at different levels.

Learning Outcomes:

At the end of the unit, students should able to

1. Know the different types of arches, determinate and indeterminate arches, cables and its behaviour for different loading condition and can able to draw the BMD.
2. Perform the calculation to analyse the three hinged arches for various loading condition and find the maximum bending moment, radial shear and horizontal thrust.

UNIT - III SLOPE DEFLECTION AND MOMENT DISTRIBUTION METHOD

Derivation of slope-deflection equation, application to continuous beams with and without settlement of supports. Shear force and bending moment diagrams and Elastic curve.

Moment Distribution Method and its application to continuous beams with and without settlement of supports. Shear force and bending moment diagrams and Elastic curve.

Learning Outcomes:

At the end of the unit, students should able to

1. Understand the concepts behind the analysis of beam using slope deflection and moment distribution method.
2. Analyse the continuous beam for different loading condition and draw the SFD and BMD using slope deflection method.
3. Analyse the continuous beam for different loading condition and draw the SFD and BMD using moment distribution method.

UNIT - IV THEOREM OF THREE MOMENTS AND ANALYSIS OF TRUSSES

Theorem of three moments – analysis of continuous beams – shear force and bending moment diagrams.

Types of trusses - Perfect, Imperfect and Redundant pin jointed plane frames - Method of joints, method of sections and tension coefficient method for vertical loads, horizontal loads and inclined loads.

Learning Outcomes:

At the end of the unit, students should able to

1. Know the theorem of three moments to solve continuous beams and know the types of trusses and its behaviour for different loading position.
2. Analyse the continuous beam and draw the SFD and BMD for the continuous beam for different loading, end conditions.
3. Analyse the trusses using the method of joints, section and tension coefficient for different loading positions.

UNIT – V MOVING LOADS AND INFLUENCE LINES

Introduction - maximum SF and BM at a given section and absolute maximum shear force and bending moment due to single concentrated load, uniformly distributed load longer than

the span, uniformly distributed load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load.

Definition of influence line for shear force and bending moment - load position for maximum shear force and maximum bending moment at a section - Point loads, uniformly distributed load longer than the span, uniformly distributed load shorter than the span.

Learning Outcomes:

At the end of the unit, students should able to

1. Know the concepts and application of influence lines and its different classification.
2. Perform the calculation for moving loads using influence lines and draw the SFD and BMD
3. Analyse the beam for different conditions of moving loads.

TEXT BOOKS:

1. Basic Structural Analysis by KU Muthu et al., I.K. International Publishing House Pvt. Ltd.
2. Indeterminate Structural Analysis by KU Muthu et al., I.K. International Publishing House Pvt. Ltd.
3. Analysis of Structures, Vol & II, Vazirani.V.N and Ratwani, M.M, Khanna Publishers, 2015.
4. Structural Analysis Vol I & II by G.S.Pandit and S.P. Gupta, Tata McGraw Hill Education Pvt. Ltd. 2008
5. Punmia. B.C, Ashok Kumar Jain & Arun Kumar Jain, Theory of structures, Laxmi Publications, New Delhi, 2004.
6. R. Vaidyanathan & P. Perumal, Structural Analysis Vol I & II, (Fourth Edition), Laxmi Publications, New Delhi, 2016.

REFERENCES:

1. William Weaver, J and James M.Gere, Matrix analysis of framed structures, CBS Publishers & Distributors, Delhi,1995
2. Hibbeler, R.C.,Structural Analysis, VII Edition, Prentice Hall, 2012.
3. Reddy.C.S, "Basic Structural Analysis",Tata McGraw Hill Publishing Company,2005.
4. Rajasekaran. S, & G. Sankarasubramanian., "Computational Structural Mechanics", PHI Learning Pvt. Ltd, 2015
5. Negi L.S.and Jangid R.S.,Structural Analysis, Tata McGraw Hill Publishing Co.Ltd.2004.
6. Structural analysis T. S Thandavamoorthy, Oxford university Press, 2011

2040118 - ENGINEERING GEOLOGY

B.Tech. II Year IISem. **L T P C**

Prerequisites: Nil **2 0 0 2**

Course Objective:

1. Understand the role of Geological concepts in Civil Engineering.
2. Understand weathering process and mass movement rocks
3. Evaluate different types of minerals and rock compositions.
4. Understand different geological structures and its suitability for groundwater and building construction
5. Evaluate subsurface information through geophysical investigations
6. Apply geological principles in selecting sites for tunnels, dams and reservoirs

Course Outcomes:

1. Understand the role of Geological concepts in Civil Engineering.
2. Understand weathering process and mass movement rocks
3. Evaluate different types of minerals and rock compositions.
4. Understand different geological structures and its suitability for groundwater and building construction
5. Evaluate subsurface information through geophysical investigations
6. Apply geological principles in selecting sites for tunnels, dams and reservoirs

UNIT-I

Introduction: Importance of geology from Civil Engineering point of view, Case histories of failure of some Civil Engineering constructions, Importance of Physical geology, Petrology and Structural geology.

Weathering of Rocks: Its effect over the properties of rocks importance of weathering.

Learning Outcomes:

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

1. Understand the importance of various geological aspects in the field of Civil Engineering
2. Acquire the knowledge of weathering on various types of Rocks

UNIT-II

Mineralogy: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals.

Petrology: Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills.

Learning Outcomes:

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

1. Analyze the various minerals by using the physical identification
2. Acquire the knowledge of various types of Rocks and their utilization in constructions

UNIT – III

Structural Geology: Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults, unconformities, and joints.

Ground water: Ground water, Water table, common types of ground water, springs, cone of depression, zone of saturation, cone of depression, ground water exploration.

Learning Outcomes:

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

1. Analyze the secondary structures present in the rocks
2. Understand the formation and various stages of groundwater

UNIT – IV

Earth Quakes: Causes and effects, shield areas and seismic belts. Seismic waves. Landslides, their causes and effect;

Importance of Geophysical Studies: Principles of geophysical study by Gravity methods, Magnetic methods, Electrical methods, Seismic methods, Radio metric methods and geothermal method.

Learning Outcomes:

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

1. Analyze the effects and causes of earthquakes and landslides in selecting the site for construction
2. Study the various sub structures present below the surface without effecting the surface features by using geophysical investigations.

UNIT – V

Geology of Dams, Reservoirs, and Tunnels: Types of dams and Geological Considerations in the selection of a dam site. Geological factors influencing water Tightness and life of reservoirs. Tunnels - Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (i.e. Lithological, structural and ground water).

Learning Outcomes:

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

1. Apply the knowledge in selecting the location of site for the dams and reservoirs constructions.
2. Analyze the role of groundwater, lithology and secondary structures in tunneling

TEXT BOOKS:

1. Engineering Geology by N. Chennakesavulu, McMillan, India Ltd. 2005

2. Engineering Methods by D. Venkat Reddy; Vikas Publishers 2015.
3. Engineering Geology by S K Duggal, H K Pandey Mc Graw Hill Education Pvt Ltd 2014
4. Principles of Engineering Geology by K.V.G.K. Gokhale – B.S publications
5. Engineering Geology by Vasudev Kanithi, University Press.

REFERENCES:

1. Fundamental of Engineering by F.G. Bell, B.S. Publications, 2005.
2. Principles of Engineering Geology & Geotechnics by Krynine & Judd, CBS Publishers
3. Engineering Geology by Subinoy Gangopadhyay, Oxford university press.
4. Engineering Geology for Civil Engineers by P.C. Varghese , PHI

2040504 - PYTHON

B.Tech. II Year IISem. **L T P C**
Prerequisites: Nil **2 0 0 2**

Course Objectives:

1. Handle Strings and Files in Python.
2. Understand Lists, Dictionaries and Regular expressions in Python.
3. Understand FILES, Multithread programming in Python.

Course Outcomes:

1. Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
2. Demonstrate proficiency in handling Strings and File Systems.
3. Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.

UNIT - I

Python Introduction, History & Installing of Python, Python basics, Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types Numbers - Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions.

Control structures

UNIT - II

Related Modules Sequences - Strings, Lists, and Tuples, Mapping and Set Types.
Iterators, List comprehensions, Generator Expressions

UNIT-III

FILES: File Objects, File Built-in Functions, File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related Modules

UNIT-IV

Exceptions: Exceptions in Python, Detecting and Handling Exceptions, Context Management, Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions,

Creating Exceptions, Exceptions and the sys Module, Modules and Files, Namespaces, Importing Modules, Importing Module Attributes,

Multithreaded Programming: Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module, Related Modules

UNIT – V

GUI Programming: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs

Regular Expressions: Introduction, Special Symbols and Characters, Res and Python

TEXT BOOKS:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.

REFERENCES:

1. Think Python, Allen Downey, Green Tea Press
2. Introduction to Python, Kenneth A. Lambert, Cengage
3. Python Programming: A Modern Approach, VamsiKurama, Pearson

2040172 - STRENGTH OF MATERIALS LABORATORY

B.Tech. II Year IISem. **L T P C**

Pre-requisites: Strength of Materials -I **0 0 3 1.5**

Course Objectives:

1. Make measurements of different strains, stress and elastic properties of materials used in Civil Engineering.
2. Provide physical observations to complement concepts learnt
3. Introduce experimental procedures and common measurement instruments, equipment, devices.
4. Exposure to a variety of established material testing procedures and techniques
5. Different methods of evaluation and inferences drawn from observations

Course Outcomes:

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

1. Configure & Operate a data acquisition system using various testing machines of solid materials
2. Compute and Analyze engineering values (e.g. stress or strain) from laboratory measurements.
3. Write a technical laboratory report

List of Experiments:

1. Tension test
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete or bricks
8. Impact test
9. Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of electrical resistance strain gauges
12. Continuous beam – deflection test.

REFERENCES:

1. Strength of Materials by R. K Rajput, S. Chand & Company Ltd.
2. Strength of Materials by R.K. Bansal, Lakshmi Publications Pvt. Ltd.

2040173 – COMPUTER AIDED CIVIL ENGINEERING DRAWING LABORATORY

B.Tech. II Year II Sem.	**L**	**T**	**P**	**C**
Pre-requisites: Engineering Drawing Practice	**0**	**0**	**2**	**1**

Course Objectives:

1. The objective of this lab is to teach the student usage of Auto cad, basic drawing fundamentals in various civil engineering applications, especially in building drawing.
2. The objective of this course is to teach students the basic commands and tools necessary for professional 2D drawing, 3D drawing and drafting using AutoCAD
3. Students able to learn to sketch and take field dimensions.
4. Students able to learn to take data and transform it into graphic drawings.
5. Students able to learn basic engineering drawing formats

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

1. Understand CAD software and basic functions
2. Evaluate plans of Single storied building & multi-storeyed buildings
3. Develop different sections at different elevations
4. Detailing of building components like doors, windows roof trusses
5. Develop section and elevation for single and multi-storeyed buildings using CAD software.
6. Understand development concepts in detailing

List of Experiments

1. Introduction to computer aided drafting & coordinate system.
2. Exercise on Draw & Modify tool bars.
3. Exercise on Layer, Dimension, Texting & Block etc.
4. Drawing a plan of Building and dimensioning using layers.
5. Single storied buildings b) Multi storied buildings.
6. Developing sections and elevations for given
7. a) Single storied buildings b) Multi storied buildings.
8. Drawing of building components like walls, lintels, Doors, and Windows.
9. Introduction to 3 – D view.
10. Exercise on 3 – D.
11. Developing a 3-D plan from a given 2-D plan.
12. Developing section and elevation of a residential building.

TEXT BOOKS:

1. Computer Aided Design Laboratory by M. N. Sesha Praksh & Dr. G. S. Servesh – Laxmi Publications.
2. Engineering Graphics by P. J. Sha – S. Chand & Co.

2040573 - PYTHON LABORATORY

B.Tech. II Year II Sem. **L T P C**

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Exercise 1 - Basics

a) Running instructions in Interactive interpreter and a Python Script
b) Write a program to purposefully raise Indentation Error and Correct it

Exercise 2 -Operations

a) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)
b) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

Exercise - 3 Control Flow

a) Write a Program for checking whether the given number is a even number or not.
b) Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . , 1/10
c) Write a program using a for loop that loops over a sequence. What is sequence?
d) Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.

Exercise 4 - Control Flow -Continued

a) Find the sum of all the primes below two million.
Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be:
1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...

b) By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.

Exercise - 5 Files

a) Write a program to print each line of a file in reverse order.
b) Write a program to compute the number of characters, words and lines in a file.

Exercise - 6 Functions

a) Write a function ball_collide that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding.
Hint: Represent a ball on a plane as a tuple of (x, y, r), r being the radius
If (distance between two balls centers) <= (sum of their radii) then (they are colliding)
b) Find mean, median, mode for the given set of numbers in a list.

Exercise - 7 Functions - Continued

a) Write a function nearly_equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on b.

b) Write a function dups to find all duplicates in the list.

c) Write a function unique to find all the unique elements of a list.

Exercise - 8 - Functions - Problem Solving

a) Write a function cumulative_ product to compute cumulative product of a list of numbers.

b) Write a function reverse to reverse a list. Without using the reverse function.

c) Write function to compute gcd, lcm of two numbers. Each function shouldn't exceed one line.

Exercise 9 - Multi-D Lists

a) Write a program that defines a matrix and prints

b) Write a program to perform addition of two square matrices

c) Write a program to perform multiplication of two square matrices

Exercise - 10 GUI, Graphics

1. Write a GUI for an Expression Calculator usingtk
2. Write a program to implement the following figures using turtle