Proposed Modified Syllabus **w.e.f Sept 2023 onwards**

CIVIL ENGINEERING AND APPLIED MECHANICS DEPARTMENT

B. Tech. I YEAR (4YDC)

CE: 10013:

FUNDAMENTALS OF CIVIL ENGINEERING ANDAPPLIED MECHANICS

CREDITS:

PERIOD PER WEEK			CREDITS			MAXIMUM MARKS				
T	P	Tu	T	P	Tu	THEORY		PRACTICAL		TOTAL MARKS
						CW	END SEM	SW	END SEM	
2+1	00	01	3	00	00	30	70	00	00	100

PRE-REQUISITE: XII standard (HSSC)

COURSE OBJECTIVES:

1. To study various force systems, equilibrium of force system, frictional forces, concept of trusses
2. To learn the concepts of centroids, centers of gravity and moments of inertia of simpleand complex geometrical shape. Transmission of power through belt & ropes.
3. To learn the behavior of beams, frames and trusses under different loading conditions and to determine the shear force and bending moment diagram for beams subjected to simple point loads.
4. To study methods and equipments for chaining, linear & angular measurements.
5. To understand the fundamental concepts of leveling.

COURSE OUTCOMES:

The students shall be able to

1. Identify and analyze system of forces, calculate support reactions for beam subjected to various types of loading and determine forces in members of trusses.
2. Determine the Center of Gravity and moment of Inertia of a given Plane Lamina & Solid Bodies.
3. Determine and analyze the Shear force, Bending moment of beams and analyze the trusses andproblems related to frictions
4. Understand the working principles of basic equipments used in surveying and measuring distance, perpendicular and oblique offsets from the given reference line.
5. Apply the knowledge of surveying and leveling for computation of area and volume in different operations in civil engineering projects.

COURSE CONTENTS:

THEORY

PART - A: (60% Weightage)

APPLIED MECHANICS

UNIT-1

Forces and Equilibrium: Graphical and Analytical Treatment of Concurrent and non-concurrent Co-planer forces, free body Diagram, Force Diagram and Bow's notations, Application of Equilibrium Concepts: Analysis of plane Trusses: Method of joints, Method of Sections. Frictional force in equilibrium problems.

UNIT-2

Centre of Gravity and Moment of Inertia: Centroid and Centre of Gravity, Moment of Inertia of Area and Mass, Radius of Gyration, Introduction to Product of Inertia and Principle Axes.

Power Transmission and its applications.

UNIT-3

Support Reaction and analysis of Beams: Types of Beams: Simply Supported Beam, Overhanging

Beam, and Cantilever Beam. Typesof Supports of a Beam or Frame: Roller, Hinged and Fixed Supports. Load on the Beam andFrame: Different Types of Loading. Support Reaction of a Beam or Frame. Introductions to shear force and Bending Moment for Cantilever & simply supported beam with concentrated, distributed load and Couple.

PART - B: (40% Weightage)

SURVEYING

UNIT-4

Surveying & Positioning: Introduction to surveying Instruments –Levels, Thedolites, Plane tables and related devices. Linear & Angular Measurements. Electronic surveying instruments etc. Measurement of distances – conventional and EDM methods, Measurement of directions by different methods.

UNIT-5

Leveling, Mapping & Sensing: Types of Levels Measurement of elevations by different methods. Reciprocal leveling, Mapping details and contouring, Profile Cross sectioning and measurement of areas, volumes, application of measurements in quantity computations, Survey stations, Introduction of remote sensing and its applications.

DEMONSTRATIONS (Surveying Equipments):

OBJECTIVES:

1. To acquire practical knowledge on handling basic survey equipment's.
2. To possess knowledge about chain, compass surveying and open traverse survey.
3. To have the ability to understand leveling and area of irregular figures.

OUTCOMES:-

After demonstrating different instruments and experiments, students shall be able to

1. Understand the working principles of chaining instruments and measuring distance, perpendicular and oblique offsets from the given reference line.
2. Understand the principle of prismatic compass, open traverse survey.
3. Compute the RL of different points on the ground by spot leveling and alsocompute the area and volume of irregular figure.

List of Demonstration/Experiments:

1. To demonstrate the color/sign conventions and various instruments used in chaining.
2. To demonstrate how to determine the horizontal distance between two points by doing ranging and chaining.
3. To demonstrate measure perpendicular and oblique offsets from a given reference line.
4. To demonstrate prismatic compass and perform open traverse survey.
5. To demonstrate traversing of any regular figure with the help of compass and eliminate local attraction.
6. To demonstrate how to determine RL of different points on the ground by fly differential leveling and compute RL's byheight of instrument (HI) method and rise and fall method
7. To demonstrate how to determine planimeter constants and area of an irregular figure with the help of a planimeter

ASSESSMENT:

Continuous:

1. Class work will be based on following

- Submission of assignments based on syllabus of Engineering Mechanics and Surveying.
- Two midterm tests in a semester and a makeup test if required, Evaluation of Practical calculations & drawing sheets, internal submission and Viva Voice examination by internal examiner during the semester end.

2. Semester-end: Theory examination of 3 Hours duration

RECOMMENDED TEXT BOOKS:

1. Rajput .R.K., *Engineering Mechanics, Dhanpat Rai and Sons New Delhi.*
2. Prasad I. B., *Applied Mechanics, Khanna Publication New Delhi*
3. R. S. Khurmi, *Engineering Mechanics,* , S.Chand Publishing
4. D.S. Bedi, *Engineering Mechanics,* , Khanna Book Publishing Co. (P) Ltd., Delhi
5. R.K. Bansal, *A Textbook of Engineering Mechanics,* , Laxmi Publications
6. Rammamurtham S., *Applied Mechanics, Dhanpat Rai and SonsNew Delhi*
7. Punmia, B.C., *Surveying, Laxmi Publications, New Delhi.*
8. Duggal S.K., Surveying *Vol. 1, Tata McGraw- Hill Education New Delhi*

REFERENCE BOOKS:

1. Kumar KL, *Engineering Mechanics, Tata McGraw- Hill Education New Delhi*
2. Ferdinand.P. Beer. E, Russell, Jr Johnston., David Mazurek, Philip J Cornwell, *"Vector Mechanics for Engineers: Statics and Dynamics", McGraw – Hill Education New Delhi*
3. Timoshenko, and Young D.H., "*Engineering Mechanics", Tata Mc-Graw Hill Education New Delhi.*
4. Chanchandramouli P.N., *Engineering Mechanics, PHI Learning Private Limited NewDelhi*
5. Palanichamy *Basic Civil Engineering,* , McGraw Hill
6. Satheesh *Gopi Basic Civil Engineering,* Pearson Publishers