Course No:	Course Name:	L-T-P-Credits	Year of Introduction
SB206	ANALYSIS OF STRUCTURES	2-1-0-3	2016

Prerequisites: -Nil

Course Objectives:

1. To familiarize and review the basic concepts of structural analysis with emphasis on analysis of elementary structures.
2. To equip the students with the force and displacement methods of structural analysis of beams and frames
3. To learn, understand and develop concepts regarding the comprehensive strain energy methods of structural analysis.
4. To impart a scientific approach and to familiarize the applications of plate structures in the field of ship technology.
5. To enable the students to have a comprehensive idea of matrix structural analysis with emphasis on the relative advantages of the flexibility method and the stiffness method.
6. To enable the students to visualize structural dynamics problems with a proper blend of structural analysis and vibration theory.

Syllabus:

Introduction to Structural Analysis -Determinate & Indeterminate Structures-Force Displacement Methods-Three Moment Equation-Moment Distribution Method- Strain Energy Method-Principle of Virtual Work- Castigliano's Theorem- Vibrations of Continuous Systems, Introduction to Plastic Theory, Matrix Methods of Analysis-Stiffness Method, Flexiblity Method, Transformation Matrices-Introduction to theory of plates- Pure Bending, Small Deflection.

Expected Outcome:

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

1. Demonstrate understanding of the basic concepts in structural analysis.
2. Solve simple structural analysis problems using the force/displacement method, moment distribution method & strain energy method.
3. Demonstrate an understanding of the theory of plates and be able to solve simple problems pertaining to analysis of laterally loaded plates and stiffened plates.
4. Solve simple structural analysis problems using the matrix methods.
5. Demonstrate basic understanding of the theory or vibration.

Text Books:

- Alan Williams; Structural Analysis –in theory and practice; International Code Council Inc.
- C. S. Reddy; Basic Structural Analysis; Tata McGraw-Hill.

Reference Books:

- Timoshenko, Theory of plates and shells, Tata Mcgraw Hill.
- V. P. Singh, Theory of vibrations, Dhanpat Rai and Co (P) Ltd.

Course Plan			
Module	**Content**	**Hours**	**Sem. Exam Marks**
I	**Introduction to Structural Analysis**: Concept of Determinate & Indeterminate Structures; Continuous Beams; Force/Displacement Method of Analysis; Clapeyron's Theorem of Three Moments; Support Settlement;	8	15%
II	**Moment Distribution Method:** Beams and Rigid Jointed Plane Frames (with and without sway); Effect of Support Settlement;	7	15%
FIRST INTERNAL EXAM			
III	**Strain Energy Methods:** Principle of Virtual Work; Strain Energy & Complementary Energy; Castigliano's Theorems.	6	15%
IV	**Vibrations of Continuous Systems**: Vibration of Strings and Rods; Vibration of Beams; Vibration of Shafts. **Introduction to Theory of Plasticity.**	6	15%
SECOND INTERNAL EXAM			
V	**Matrix Methods:** Stiffness Method (Continuous Beams; Rigid Jointed Frames); Flexibility Method (Continuous Beams; Rigid Jointed Frames); Transformation Matrices and its Applications.	9	20%
VI	**Introduction to Theory of Plates:** Pure Bending of Plates; Small Deflection Analysis of Laterally Loaded Plates; Boundary Conditions; Navier's Solution; Levy's Solution; Introduction to Stiffened Plates and Orthotropic Plate Model	6	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN:

Maximum marks : 100 Time : 3 hours

PART A

- Answer all 8 questions of 3 marks each.
- 1 question each from modules I to IV and 2 questions each from modules V & VI.

PART B

- Answer any 2 full questions out of 3 for each module.
- Each question from module I to IV carries 6 marks.
- Each question from module V & VI carries 7 marks.
- Each full question can have maximum of 4 sub questions, if needed.