

Semester V

Software Applications			
Course Code	21CV582	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0::2:0	SEE Marks	50
Total Hours of Pedagogy	15	Total Marks	100
Credits	01	Exam Hours	1 hr

Course objectives:

- To understand the types of trusses
- Modelling and analysis of trusses adopting codal provisions
- Analysis and design of multi-storied structures

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. Video tube, NPTEL materials
2. Quiz/Assignments/Open book test to develop skills

Module-1

Categorization of structures based on number of dimensions, types of member connectivity, type of elements (1D truss/beam element, 2D plane stress/plane strain, and plate elements, 3D solid elements), structure degrees of freedom, boundary conditions, stiffness matrix, load vector, displacements, stiffness equation, degree of freedom numbering for a structure.

Global or structure coordinate system, Local or element coordinate system, element degrees of freedom, Element forces and Material properties for different types of elements.

Teaching-Learning Process

Chalk and talk, PPT, You Tube video lectures

Module-2

Modeling 2D and 3D skeletal structures (truss and frame) in software: Node coordinates, member connectivity, supports. Representing slabs using rigid diaphragms and/or master and slave nodes.

Nodal loads and element loads, Independent load cases, Load combinations, self weight of structural elements, calculation and verification of gravity loads including self weight

Teaching-Learning Process

Chalk and talk, PPT, You Tube video lectures.

Module-3

Analysis and interpretation of results by studying support reactions, bending moment and shear force diagrams of elements.

Identifying critical cross-sections for design of beam and column elements, Grouping of elements based on structural behaviour and similarity of geometry and member design forces

Teaching-Learning Process

Chalk and talk, PPT, You Tube video lectures

Module-4

Modelling 2D plane trusses with Indian Standard steel sections, analysis for gravity and wind loads as per Indian Standard codes, design check for selected cross-section as per IS 800:2007, identifying failed elements and revising cross-section to make element safe.

Modelling simple 3D frame structures up to 4 storeys with reinforced concrete cross-sections, analysis for gravity and wind loads as per Indian Standard codes, verification of weight of building by

hand calculation with reactions obtained from analysis, load combinations, interpretation of results, grouping of elements, design of typical elements and foundation as per IS 456:2000.

Teaching-Learning Process	Chalk and talk, PPT, You Tube video lectures
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Module-5

Modelling steel gabled frames for industrial structures with Indian Standard steel sections, analysis for gravity and wind loads as per Indian Standard codes, design check for selected cross-section as per IS 800:2007, identifying failed elements and revising cross-section to make element safe.

Teaching-Learning Process	Chalk and talk, PPT, You Tube video lectures
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Course outcome (Course Skill Set)

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

1. Determine the forces in the truss members
2. Analyse and design the truss
3. Analyse and design industrial structures

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

Continuous internal Examination (CIE)

Three Tests (preferably in MCQ pattern with 20 questions) each of **20 Marks (duration 01 hour)**

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

1. First assignment at the end of 4th week of the semester
2. Second assignment at the end of 9th week of the semester

Quiz/Group discussion/Seminar, any two of three suitably planned to attain the COs and POs for **20 Marks (duration 01 hours)**

The sum of total marks of three tests, two assignments, and quiz /seminar/ group discussion will be out of 100 marks and shall be **scaled down to 50 marks**

Semester End Examinations (SEE)

SEE paper shall be set for 50 questions, each of 01 mark. The pattern of the question paper is

MCQ (multiple choice questions). The time allotted for SEE is **01 hour**. The student has to secure minimum of 35% of the maximum marks meant for SEE.

Suggested Learning Resources:

Books

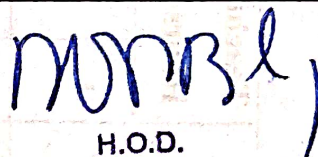
1. IS 875 Parts 1, 2 and 3: 1987
2. IS 456:2000
3. IS 800:2007
4. STAAD Pro v8i user manual
5. SAP2000 user manual

Web links and Video Lectures (e-Resources):

- Online study material
- NPTEL video lectures.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Assignment to students to design an industrial roof truss



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