



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

STRUCTURAL DESIGN LABORATORY								
II Semester: STE								
Course Code	Category	Hours/Week			Credits	Maximum Marks		
BSTE23	Core	L	T	P	C	CIA	SEE	Total
		0	0	4	2	40	60	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45				Total Classes: 45		
Prerequisite: Computer Aided Engineering Drawing								

I. COURSE OVERVIEW:

Structural Design Laboratory will summarize the key engineering, operational, safety, and sustainability considerations for the design of RC framed buildings. Introduces the design and behavior of large-scale structures and structural materials. This course emphasizes the development of structural form and the principles of structural design. This Laboratory used to solve structural problems by building and testing simple mathematical models. STAAD.Pro is one of the most widely used structural analysis and design software products worldwide. It can be used for analysis and design of all types of structural projects from buildings, bridges to towers, tunnels, metro stations, water/wastewater treatment plants and more.

II. COURSE OBJECTIVES:

The students will try to learn:

- I. The basic elements with different loading type and supports with the aid of STAAD Pro software.
- II. The Analysis and design of 2D Frame and multi-storey buildings with different load sets.
- III. The Modeling and analysis of steel structures like beams and columns.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

- CO 1 Explain the basic commands of STADD Pro software for analysis and design of structural elements.
- CO 2 Analyse the trusses subjected to various loading conditions in accordance with Indian Standard specifications.
- CO 3 Analyse the rigid jointed frames subjected to different loading conditions using Indian standard specifications.
- CO 4 Design of steel 2D and 3D trusses for industrial and bridge structures.
- CO 5 Design of reinforced concrete rigid frames for multistoried structures.
- CO 6 Make use of latest tools for analysis and design of sub-structures.

IV. COURSE CONTENT:

Week- I: INTRODUCTION TO STAAD SOFTWARE

Introduction to STAAD and its commands.

Week- II: STRUCTURAL SYSTEMS

General Description-Type of structure, Unit systems, structure geometry and Co-ordinate systems.

Week- III: COMMAND INPUTS

STAAD Pro –Commands- Using Edit Input-Command Formats-Text Input.

Week- IV: DEVELOPING GEOMETRY AND DIMENSIONING

Pre- Graphical Input Generation-Library- Geometry Generation – Dimensioning in STAAD Pro.

Week- V: 3D MODEL DEVELOPMENT

Post – Graphical Post Processing – Animation – Icons – Isometric View – Zooming-Results of Analysis & Design – Query reports in STAAD Pro.

Week- VI: ASSIGNING DIFFERENT LOAD PARAMETERS

LOAD – Member Load, Element Load, Joint Load, Floor Load, Self-weight Command, Load case no, Load Combination.

Week- VII: ANALYSIS CONTINUOUS BEAM

Analysis of continuous Beams using STAAD Pro.

Week- VIII: ANALYSIS OF TRUSS

Analysis of 2D Truss using STAAD Pro.

Week- IX: ANALYSIS OF RIGID FRAMES

Analysis of 2D and 3D rigid frames using STAAD Pro.

Week- X: DESIGN OF RC BEAMS AND COLUMNS

Design of RC framed structures (Beams, columns) using STAAD Pro.

Week- XI: DESIGN OF SLABS

Design of RC slabs using STAAD Pro.

Week- XII: DESIGN OF FOOTINGS

Design of RC footing STAAD Pro.

Week- XIII: DESIGN OF CIRCULAR WATER TANKS

Design of circular water tanks using STAAD Pro.

Week- XIV: ANALYSIS AND DESIGN OF STEEL STRUCTURES

Analysis and Design of steel structures (Beams, columns).

V. TEXTBOOKS:

1. T.S.Sarma, “*Staad.Pro v8i for beginners*” Notion press, 2014.
2. Siva kumar Naganathan, “*Learn Yourself Staad Pro V8i*”, Lap Lambert Academic Publishing GmbH KG, 2012.

VI. REFERENCE BOOKS:

1. Subramanian N, “*Design of Steel Structures*”, Oxford Publication, 4th edition, 2008.

VII. ELECTRONICS RESOURCES:

1. https://onlinecourses.nptel.ac.in/noc17_ce21/preview.
2. <https://civildigital.com/staad-pro-v8i-video-tutorials/>

VIII. MATERIAL ONLINE:

1. Course Outline Description
2. Lab Manual