



**IFS Academy Career Program in Structural Design & Analysis
using Bentley STAAD.Pro
Course Curriculum (Duration: 120 Hrs.)**

Chapter 1: Before you start using Bentley STAAD.Pro

- a. Understanding Unit Conversion Tables
- b. Overview of Structural Design & Analysis
- c. Stresses and Strains
- d. Shear Force & Bending Moment Diagrams
- e. Introduction to Types of Structures
- f. Overview of Steel, Concrete and Foundation Design
- g. Introduction to Finite Element Analysis

Chapter 2: Introduction to STAAD.Pro

- a. About Bentley STAAD.Pro
- b. Starting STAAD.Pro
- c. Graphical User Interface
- d. Starting a New Project
- e. Working with User Interface:
 - Menu Bars
 - Tool Bars
 - Tabs
 - Snap Node / Beam Window
 - Data Area
 - Main Window
- f. Opening and Existing Project
- g. Saving a Project
- h. Configuring Units
- i. Keyboard Shortcuts
- j. Importing Model in STAAD.Pro
- k. Coordinate Systemes

Chapter 3: Structural Modeling

- a. Adding Beams using Tools
- b. Creating Beams (Colinear, Along Axes)
- c. Creating Plates
- d. Creating Surfaces
- e. Creating Solid Elements
- f. Creating Structure
- g. Stretching and Intersecting Members
- h. Merging Members and Nodes
- i. Renumbering Nodes, Members and Elements
- j. Splitting and Breaking Beams
- k. Cutting Sections

Chapter 4: Material Constants and Section Properties

- a. Material Constants
- b. Creating and Editing Material Properties
- c. Assigning Materials to the Structure

- d. Orthotropic Materials
- e. Section Properties
 - Prismatic Sections
 - Tapered Sections
 - Steel Sections
 - Steel Joist and Joist Girders
 - Plate/Surface Thickness



Chapter 5: Member Specifications and Supports

- a. Node Specification
- b. Member Specifications
 - Release
 - Offset
 - Property Reduction factors
 - Cable
 - Truss
 - Compression
 - Tension
 - Inactive
- c. Plate Specifications
 - Release
 - Ignore Inplane Rotation
 - Plane Stress
- d. Supports:
 - Fixed
 - Pinned
 - Fixed But
 - Enforced
 - Enforced But
 - Multilinear Spring
 - Foundation
 - Inclined
 - Tension/Compression Only Springs

Chapter 6: Loads

- a. Types of Loads: Self Weight, Nodal, Member, Area, Floor, Plate, Surface and Solid,
- b. Load Generation
- c. Load Combinations

Chapter 7: Performing Analysis

- a. Pre Analysis
 - Problem Statistics
 - Joint Coordinates
 - Member Information
 - Material Properties
 - Support Information
 - Element & Solid Information
- b. Performing Analysis

Chapter 8: Post Processing & Report Creation

- a. Post Analysis Print
 - Load Lists
 - Joint Displacement
 - Member Forces
 - Support Reactions
 - CG

- Mode Shapes
 - Section Displacement
 - Analysis Results
 - Member Stresses
 - Element Forces/Stresses
- b. Viewing Results
 - c. Output File
 - d. Post Processing Mode

Chapter 9: RCC Design

- a. General overview of Concrete Design As per IS 456:2000
- b. RCC Design Parameters in STAAD.Pro
- c. Design of Beams
- d. Design for Flexure
- e. Design for Shear
- f. Design of Columns
- g. Concrete Design Command
- h. Concrete Design Parameter Specification
- i. Concrete Take off Command
- j. Analysis and Design of G+3 RCC Framed Building using STAAD.Pro

Chapter 10: Steel Design

- a. General Overview of Steel Design as per IS 800
- b. Working / Allowable Stresses Design
- c. WSD Parameter Specifications
- d. Limit State Design
- e. LSD Parameter Specifications
- f. Member Selection Specifications
- g. Tabulated Results of Steel Design
- h. Analysis and Design of Structural Steel Framed Building using STAAD.Pro
- i. Analysis and Design of Structural Steel Truss Building using STAAD.Pro
- j. Analysis of Crane Girder using Moving Load Method

Chapter 11: Seismic Analysis

- a. Introduction to Seismic Analysis
- b. Earthquake Loading in Structures / Buildings
- c. Earthquake Load Generation using Static Method as per IS 1893
- d. Earthquake Load Generation using Response Spectrum Method as per IS 1893

Chapter 12: Wind Load Analysis

- a. Introduction to Wind Loads
- b. Introduction to Wind Loads as per IS 875 Part III
- c. Application of Wind Loading in STAAD.Pro

Chapter 13: Introduction to Finite Element Analysis

- a. Use of Finite Element Analysis in Structural Analysis
- b. Plate Analysis

Chapter 14: Analysis of Water Tank

- a. Introduction to Various Types of Loadings in Water Tanks
- b. Analysis of Underground Circular and Rectangular Water Tank
- c. Analysis of Circular and Rectangular Water Tank Resting on Ground
- d. Analysis of Circular and Rectangular Overhead Water tank
- e. Analysis of Cantilever Retaining Wall

- f. Analysis of each of above type of structure using STAAD FEM and design using IS: 3370.

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