Structural Analysis Diploma

(SAP2000, ETABS, SAFE, CSI Column, AutoCAD Basics)

Training details

DESCRIPTION

This courseware covers the structural analysis and design for slabs and foundation systems using CSI programs include:

- **SAP2000:** This program include analysis and design (Beams - Frames - Trusses - Slabs - Tanks - Foundation)
- **ETABS:** This program include analysis the High Rises Buildings and design (Cores & Shear Walls) and Seismic checks (Drift Story - Displacements - Torsional Moment - Overturning Moments)
- **SAFE:** This program include analysis and design (Slabs - Foundation - Beams)
- **CSI Column:** This program include design (Cores and Shear Walls)
- **AutoCAD Basics:** This program include how to create project drawing DWG and PDF files by using AutoCAD program

OBJECTIVES:

- The primary objective of this courseware is to teach students how to effectively model and analysis all types of slab systems including solid slab, flat slab, paneled beams, raft foundation, tanks and high rise buildings systems.
- How to design all cases of column (Axial - Uniaxial - Biaxial) and design?
- Students will make a complete high rise building include drawings and calculation sheets and how to make excel sheets.

TRAINING STRUCTURE:

Structural Analysis Diploma	23 class x 2.5 hours = 57.5 hours

COURSE TEXTBOOKS AND OTHER READING MATERIALS

Web Resources:

- International Design Codes
- CSI Knowledge Base

PREREQUISITES:

- Basic knowledge and skills about using computers.
- Structure background is a must

COURSE GRADING:

Attendance 40% Assignments (workshop + 2 projects)
60% to pass the course and receive both Autodesk certificate & CAD MASTERS certificate you should:

- Attend at least 80% of course hours.
- Score more than 70% as a total score.

CSI DIPLOMA – COURSE OUTLINE

This course including the following:

Design beams (Steel & Concrete)

- How to draw (simple – continuous – Cantilever) Beams and how to make intermediate hinge.
- How to Assign loads (Distributed load – Triangle load – Trapezoidal load – Concentrated load – Concentrated moment – Distributed moment).
- How to Define Sections (Steel & Concrete)?
- Straining action output (Normal Force – Shear Force – Bending Moment – Torsion).
- Check Deflection (Short Term – Long Term).

Design frames (Steel & Concrete)

- How to Define Sections (Steel & Concrete)?
- Straining action output (Normal Force – Shear Force – Bending Moment – Torsion).
- Check Deflection (Short Term – Long Term).

Design trusses (Steel & Concrete)

- Make Structural system for concrete and steel truss.
- Diff. Between Concrete and steel truss members.
- How to define (single angle & Double angle).
- Output Results (Axial Forces).

Design solid slabs

- How to make Structural system from Arch plan.
- How to get Concrete Dimensions (Slabs & Beams).
- Wall Loads Calculations.
- Design Reinforcement for (Beams-Columns-Slabs).

Design Flat Slabs

- How to make Structural system from Arch plan.
- How to get Concrete Dimensions (Slabs & Beams).
- Equivalent Wall Loads Calculations.
- Design Reinforcement for (Beams-Columns-Slab).

Design panelled beams

- Choose Limitation for Panelled beams Length.
- How to Determine panelled beams dimensions.
- Design Beams.
- Example (Panelled beams – Panelled Frames – Skew Panelled beams)

Design raft foundation

- Foundations Types.
- How to Choose Foundation Type.
- Design Raft under Gravity load and Seismic loads.
- How to Import Raft from AutoCAD (Raft DXF File).
- Raft Reinforcement.
- Design Raft on (SAP-Safe) Program.

Design of tanks

- Circular Tanks (Underground – Rested on Soil – Elevated).
- Rectangular Tanks (Underground – Rested on Soil – Elevated).
- Design Reinforcement.

How to make DXF file to (SAP2000 & Etabs)

- Draw on AutoCAD DXF File.
- Import to SAP and Etabs Programs.
- Define Sections.
- Define Loads.
- Assign Loads.
- Design Model.

Seismic Lecture

- How to Calculate Seismic Forces by using (Time History, Response Spectrum, Equivalent static load) .
- How to Calculate Center of Rigidity.
- Check Story Drift.
- Seismic Combinations Equations.
- Seismic Design Techniques.

Design High Rise Building and assign Seismic Loads on Structure on SAP Program

Design High Rise Building and assign seismic loads on structure on Etabs program

How to design column

- How to Design (Axial, Uniaxial, Biaxial) Columns by using Charts.
- Check Braced and Un-braced Structures.
- Check Buckling.

Design shear walls

Design Cores (Symmetric and Unsymmetrical)

Calculate torsional moment due to lateral loads and get center of mass & center of rigidity.

How to make calculation sheet, final drawing and Excel sheets for your project

Design cores and shear walls regular and irregular shapes by using CSI Columns

AutoCAD Basics to draw reinforcement detailing by using

- Line Circle rectangle
- 3D Face
- Text
- Dimensions
- Convert DWG to PDF Offset
- Trim
- Array
- Copy Move Erase Rotate Hatch Region
- Mass Properties to calculate moment of inertia
- Layers

Complete Project
(Tower20Floor) Design All Elements (Slabs, Beams, Columns, Cores, Shear walls) and Design the Foundations for this building and Make Calculation Sheet.

Note: Design Codes we will using are:
(ECP–Egyptian Code) (ACI – American Code) (Euro Code).