COLLEGE OF ENGINEERING ROORKEE

SYLLABUS FOR

VALUE ADDED PROGRAM (VAP)

DEPARTMENT OF CIVIL ENGINEERING

Approved by:

HOD **Dean Academics**

Table of Contents

VAP/CE/ODD SEM/I	1st SEM
Traditional and Recent Trends in Civil Engineering	

This VAP is designed to give students the insight of civil engineering.

SN		Topic Covered	Contact Hours
1.	Theory	What is engineering? Engineering disciplines with brief classification, Applications of engineering in real world.	**9 Hrs**
2.		Civil Engineering scope, Interdisciplinary applications, role of civil engineering for country's economic development	**9 Hrs**
3.		Civil Engineering Materials-conventional and advanced, research and development-modern concepts of materials and methods used.	**6 Hrs**
4.		Emerging trends in Civil Engineering, Green building concepts, Disaster management and mitigation issues, case studies with reference to Uttarakhand	**6 Hrs**
		Total Contact Hours	**30 Hrs**

S.No	**List of projects for evaluation on which certificate will be provided and is required for the completion of this VAP**
1	Case study: Role of Civil Engineer on economic development of the country.
2	Case study: Comparison between Modern building material and Traditional material in hilly regions.
3	Case study: Green building concept in India.
4	Case study: Disaster Management 1991 Uttarkashi earthquake & 1999 Chamoli earthquake
5	Case study: Disaster Management Flash Flood in Uttarakhand 2013

VAP/CE/EVEN SEM/II	2nd SEM
Computer H/W, S/W & Network Troubleshooting	

S No	List of Experiments
1.	Identifying Computer Hardware Devices
2.	Identifying Computer Hardware Devices
3.	Identifying Computer Assembly
4.	Identifying external ports and interfacing
5.	PC Identifying Problems & Troubleshooting
6.	Operating System Installation
7.	Printer – Installation / Troubleshooting
8.	Introduction to LAPTOPS
9.	Introduction to LAN
10.	Hands on Training on PC Trainer KIT
11.	Hands on Training on LAN Trainer KIT
12.	Hands on Training on UPS Trainer KIT
13.	Hands on Training on Monitor Trainer KIT
14.	Preventive maintenance of a PC
15.	Understanding CMOS
16.	Working with Backups and Archival utilities.

VAP/CE/ODD SEM/III	3rd SEM
Building Information Modeling using Autodesk REVIT Software / AutoCAD 3D	

S N	Topic Covered	Contact Hours
1.	CAD Hardware and configuration, Using the main menu, Screen Menus, Setting up a drawing; Units/Limits, Altering Options, Save, Quit and End commands	**6Hrs**
2.	Basic drawing commands: Line/Point/Circle/Arc/Trace/Text/Dtext/Redraw/Zoom Pan/Ortho/Coordinates/Grid/Snap/Ellipse/Polygon	**6Hrs**
3.	Editing Drawings: Select/Erase/Oops/Move/Copy/Break/Fillet/Measure Divide/Explode/Undo/Redo/Trim/Extend/Rotate/Scale Offset/Mirror/Stretch/Chamfer/Array	**6Hrs**
4.	Inquiry Commands: ID/List/DBlist/Status/Time/Color/Area/Files Intermediate Drawing Commands: Layers/Change/Rege/Fill/Solid/Hatch/Block/Insert /WBlock	**4Hrs**
5.	Dimensioning: Associative, Base-line, Linear, Angular, Center Mark, Diameter, Leader, Radius Setting Dimensioning Variables Text Fonts and Styles Advanced Drafting Commands: Pline/Pedit/Spline/Fit/Osnap	**4Hrs**
6.	3-Dimensioning Drafting Iso commands, 3D Shapes, User Coordinate System, Elevation, Thickness, Viewpoint, Viewports, 3D Polylines, 3D Face, 3D Surfaces of Revolution, World Coordinate System, X/Y/Z Filters Plotter Hardware and Plotting Exercises Advanced Display Modes: AutoCAD Rendering and Material Attachment	**4Hrs**
	Total Contact Hours	**30 Hrs**

S.No	List of projects for evaluation on which certificate will be provided and is required for the completion of this VAP
1	Draw various types of footing, open foundation, raft, grillage, pile and well foundation.
2	Draw various types of doors and windows.
3	Draw various types of lintels and arches used in construction.
4	Draw plan layout of one/two bed room residential building.
5	Draw various types of stairs and staircase

VAP/CE/EVEN SEM/IV	4th SEM
Modeling and Simulation of Structural Elements using STAAD.PRO (I)	

S N	Topic Covered	Contact Hours
1.	Basics for beginners	**2 Hrs**
2.	Analysis of beams	**2 Hrs**
3.	Analysis of continuous beam with various loading	**2 Hrs**
4.	Analysis of frame	**2 Hrs**
5.	Analysis of multistory frame	**2 Hrs**
6.	Analysis of frame with various load combinations	**2 Hrs**
7.	Moving load analysis	**2 Hrs**
8.	Design of beams	**2 Hrs**
9.	Design of columns	**2 Hrs**
10.	Design of single storey building	**2 Hrs**
11.	Design of multistory frame	**2 Hrs**
12.	Design of RCC building	**2 Hrs**
13.	Wind load analysis on RCC building	**2 Hrs**
14.	Earthquake load analysis	**2 Hrs**
15.	Design and analysis of steel truss	**2 Hrs**
	Total Contact Hours	**30 Hrs**

S.No	List of projects for evaluation on which certificate will be provided and is required for the completion of this VAP
1	Analysis and design of multistorey commercial building
2	Seismic load analysis in staad pro
3	Design of multistorey including staircase building
4	Wind load analysis in staad pro using Indian code and American code.
5	Apartment building design in staad pro software

VAP/CE/ODD SEM/V	5th SEM
Modeling and Simulation of Structural Elements using STAAD.PRO (II)	

S N	Topic Covered	Contact Hours
1.	Moving load analysis	**2 Hrs**
2.	Wind load analysis on RCC building	**2 Hrs**
3.	Earthquake load analysis	**2 Hrs**
4	Design and analysis of steel truss type I	**2 Hrs**
5	Design and analysis of steel truss type II	**2 Hrs**
6	Analysis of continuous beam and verification by slope deflection method	**2 Hrs**
7	Analysis of frame and verification by slope deflection method	**2 Hrs**
8	Analysis of continuous beam and verification by moment distribution method	**2 Hrs**
9	Analysis of frame and verification by moment distribution method	**2 Hrs**
10	Analysis and design of one way slab	**2 Hrs**
11	Analysis and design of two way slab	**2 Hrs**
12	Analysis and design of steel beam	**2 Hrs**
13	Analysis and design of steel column	**2 Hrs**
14	Analysis and design of steel single storey building	**2 Hrs**
15	Analysis and design of G+4 commercial building	**2 Hrs**
	Total Contact Hours	**30 Hrs**

S.No	List of projects for evaluation on which certificate will be provided and is required for the completion of this VAP
1	Analyze and verify multistorey frame by moment distribution method. Take any example of (G+3)
2	Analyze and verify multistorey frame by slope deflection. Take any example of (G+3)
3	Building design (G+1) In STAAD Pro software
4	Industrial steel warehouse design and modelling in staad software
5	Electrical transmission tower modelling in staad pro

VAP/CE/EVEN SEM/VI	6h SEM
Seismic Analysis & Design of RC Frame Building using SAP 2000	

S N	Topic Covered	Contact Hours
1	**SAP: Introduction,** History & Current Capabilities	**2 Hrs**
2	SAP 2000,Mathematical Modeling Overview	**2 Hrs**
3	Types of Load used in SAP 2000	**2 Hrs**
4	Step by Step Procedure for seismic Analysis as per IS 1893 (Part1): 2002	**2 Hrs**
5	Analysis: Linear, Non-linear	**2 Hrs**
6	Modeling of Floor Diaphragms, Soil-Foundation, Staircase, Infill	**2 Hrs**
7	Model Formation of G+5 Building: (Frame, Grid, Truss, Wall)	**2 Hrs**
8	Define Material & Frame Sections, Define Rigid Diaphragms	**2 Hrs**
9	Define Frame Object & Restraint used, Define Replicate Objects	**2 Hrs**
10	Define Load Patterns: Dead, Live, Analysis of Model	**2 Hrs**
11	Define Response Spectrum Function, Mass Source, Analysis of Model	**2 Hrs**
12	Define Load Combination & Design Parameters	**2 Hrs**
13	**Tutorial 1: Analysis of 2D & 3D four Storey RC Buildings**	**2 Hrs**
14	**Tutorial 2: Analysis & Design of 2D Model of four Storey RC Buildings**	**2 Hrs**
15	**Tutorial 3: Analysis & Design of four Storey RC Buildings**	**2 Hrs**
	Total Contact Hours	**30 Hours**

S.No	**List of projects for evaluation on which certificate will be provided and is required for the completion of this VAP**
1	Modal Analysis of multi-storey commercial building.
2	Seismic load analysis as IS 1893:2016.
3	Seismic analysis of multi-storey building including infill walls.
4	Comparison between the analysis using SAP 2000 and STAAD Software.
5	Comparison/Verification between Manual Calculation and Software Estimation.

VAP/CE/ODD SEM/VII	7h SEM
Analysis and Design of Structures using ETABS	

S N	Topic Covered	Contact Hours
1	**Introduction** History and Advantages of ETABS, What ETABS Can Do!, An Integrated Approach, Modeling Features, Analysis Features, Design Features, Detailing Features	**6 Hrs**
2	**The ETABS System** Overview of the Modeling Process, Physical Modeling Terminology, Story Definition, Towers, Units, Coordinate Systems and Grids, Structural Objects, Groups, Properties, Nonlinear Hinges, Load Patterns, Vertical Loads, Temperature Loads, Automated Lateral Loads, Functions P-Delta, Modal Cases, Load Cases, Load Combinations, Design Settings, Detailing ,Output and Display Options	**9 Hrs**
3	**ETABS Modeling Techniques** Begin a New Model, Select the Base Units and Design Codes, Set up Grid Lines, Draw Grids, Define and edit Story Levels, Draw Dimension Lines, Draw Joint Objects, Save the Model Editing Properties Replicate, Extrude Joints to Frames, Extrude Frame to Shells, Merge Joints Align, Joints/Frames/Edges Move, Joints/Frames/Shells Edit Frames, Edit Shells, Edit the Model Geometry, View the Model Defining Properties Material Properties, Section Properties, Load Patterns, Mass source, Load Cases, Load Combinations, Draw Structural Objects Draw Beam/Column Objects, Draw Floor/Wall Objects, Assigning Properties- Assign Joint, Frame, Shell, Joint, Assign Loads to Frame Shell, Checking the model for any errors and eliminating if any	**9 Hrs**
4	**ETABS Analysis Techniques** Linear Static Analysis, P-Delta Analysis, Nonlinear Static Analysis, Modal Analysis, Mass Source, Response Spectrum Analysis, Linear Time History Analysis, Nonlinear Time History Analysis	**6 Hrs**
	Total Contact Hours	**30 Hours**

S.No	List of projects for evaluation on which certificate will be provided and is required for the completion of this VAP
1	Analysis and design of different types beams of given boundary conditions.
2	Response Spectrum Analysis for different soil condition and given seismic zone.
3	Comparison between the analysis using ETABS/SAP 2000/STAAD Software.
4	Modal Analysis of multi-storey commercial building.
5	Comparison/Verification between Manual Calculation and Software Estimation.

VAP/CE/EVEN SEM/VIII	8h SEM
Advance Surveying Techniques (GNSS and Advance Surveying using DGPS)	

S N	Topic Covered	Contact Hours
1.	Aerial mapping and basics of plane table surveying.	**6 Hrs**
2.	Leveling through auto level for fixing center line of foundation.	**6 Hrs**
3.	Comprehensive use of total station for solving real time field problems.	**6 Hrs**
4.	Introduction to GNSS and application of DGPS on static mode.	**6 Hrs**
5.	Demarcation of land in RTK mode through DGPS and processing of data in TBC software.	**6 Hrs**
	Total Contact Hours	**30 Hours**

S.No	**List of projects for evaluation on which certificate will be provided and is required for the completion of this VAP**
1	To prepare L section of road and nearby objects of highway including their slope with total station.
2	To read slope distances from the total station to a particular point.
3	To develop the map of Solani Park using total station, GPS, GIS.
4	Compare different conventional surveying techniques with Total Station (TS) and Global Positioning System (GPS).
5	To estimate the total area of the College of Engineering Roorkee (COER) using DGPS.