

Module (Course Syllabus) Catalogue

2023-2024

College/ Institute	Erbil Technical Engineering College	
Department	Civil Engineering Department	
Module Name	Computer Aided Structural Analysis and Design	
Module Code		
Degree	Technical Diploma <input type="checkbox"/> Bachler <input type="checkbox"/> High Diploma <input type="checkbox"/> Master <input checked="" type="checkbox"/> PhD <input type="checkbox"/>	
Semester	Two	
Qualification	Master of Science (M.Sc.)	
Scientific Title	Executive Engineer	
ECTS (Credits)	6	
Module type	Prerequisite <input type="checkbox"/>	Core <input type="checkbox"/> Assist. <input type="checkbox"/>
Weekly hours		
Weekly hours (Theory)	(3)hr Class	(162)Total hrs Workload
Weekly hours (Practical)	()hr Class	()Total hrs Workload
Number of Weeks	15	
Lecturer (Theory)	Asst. Prof. Dr. Bahman Omar Taha	
E-Mail & Mobile NO.	Bahman.taha@epu.edu.iq	
Lecturer (Practical)		
E-Mail & Mobile NO.	07504499146	
Websites		

Course Book

Course Description	Introduction to ETABS, review to analyses and design by hand calculation, Modelling in ETABS, analyses and design of reinforced concrete elements in ETABS, comparative between hand and ETABS analyses and designs.					
Course objectives	<ul style="list-style-type: none"> • Developing skills in using Computer software in analysing and designing 3D building "ETABS". • Demonstrate the design of reinforced concrete structural elements. • Explain earthquake resistant design • Explain analysis of a building for wind loading. • Demonstrate the method of Analysis 					
Student's obligation	The students are required to: -Attend all the lectures and participate in the classwork and assignments; attend all practical parts by using a computer. -Participate in the exam.					
Required Learning Materials						
Evaluation	Task		Weight (Marks)	Due Week	Relevant Learning Outcome	
	Review Article		10%	1-15		
	Assignments	Homework				
		Class Activity				
		Report				
		Seminar		5%	7	
		Essay				
	Project					
	Quiz		10%	5-10		
	Attendance		5%	1-15		
	Midterm Exam		20%	8		
	Final Exam		50%	15		
	Total					
Specific learning outcome:	1- Create 3 rd Building Modelling using ETAB Software 2- Compare the analysis results of ETABS software with hand calculation. 3- Analyse and design the structural components like beams, slabs, columns, retaining wall and shear wall. 4- Analyse for earthquake loading & wind loading of framed buildings.					
Course References:	ASCE 7-16 ACI 318M-19" Building code requirements for structural concrete" Analyses and Design of high rise Buildings using ETAB Program, E. Maqar N., 2007 ."Design of Concrete Structure "14th edition, Arthur H. Nilson, David Darwin and Charles W. Dolan 2004. Analyses and Design of high rise Buildings using ETAB Program, E. Maqar N., 2007					

Reinforced Concrete Mechanics and Design, third edition, James G. Macgregor 1997.
 Reinforced Concrete Design of tall Buildings, Bungale S. Taranath, 2010.
 Reinforced Concrete a Fundamental approach, fifth edition, Edward G. Naway 2005.

Course topics (Theory)	Week	Learning Outcome
Introduction with analysis and design concept using ETAB software	1	1
ETAB Basics	2	1
Modelling in ETAB using GUI (wire frame modelling, surface modelling, solid modelling and 3D modelling)	3	1-2
Modelling in ETAB by exporting from AutoCAD	4	2
Applying different Load cases on the structure using ETAB	5-6	2
Analyses the structure by the ETAB and required checks (Accidental Torsion, Drift, Stability Index)	7-9	2
Comparative between hand analyses and the ETAB analyses results	10-11	2-3
Design the structural elements by using the ETAB	12	3-4
Extra Examples	13-15	3-4
Practical Topics	Week	Learning Outcome

Questions Example Design

(30 Marks)

-The SAFE AND ETAB FILES MUST BE ATTACHED WITH THE ANSWERS

Q1/ For the flat plate slab shown find long term deflection at mid-span for (corner, edge and interior panels) using SAFE 2016 program

Given:

Column dimension 400x400mm

Slab Thickness =255mm

Loads

- Self weight

- Additional dead load=2.4 kN/m²

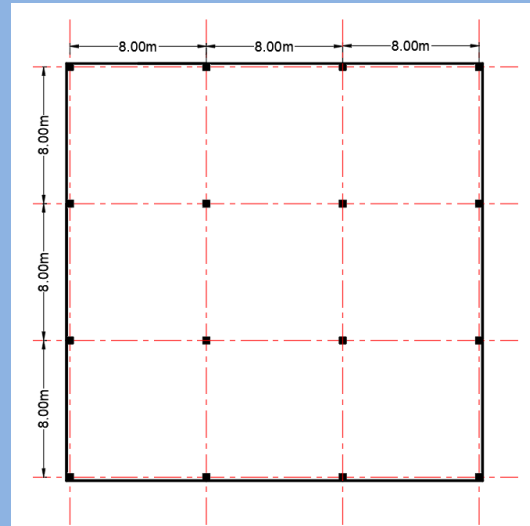
- Live load=3 kN/m²

Concrete Density =24 kN/m³

$f_r=0.62(f_c')^{0.5}$

$f_c'=25\text{MPa}$

Note: - Take mesh sizes 0.5x0.5m



Q2/The three story building calculate the following by hand calculation and ETAB 18 program.

1-Total loads due to DL+LL by hand calculation and by ETAB 18

2- the applied load on the columns C1, C2 and C3 due to load factor 1.2DL+1.6L.L

iven:

Story heights 4.0m

Column dimension 400x400mm

Slab Thickness =200mm

Loads

- Self weight

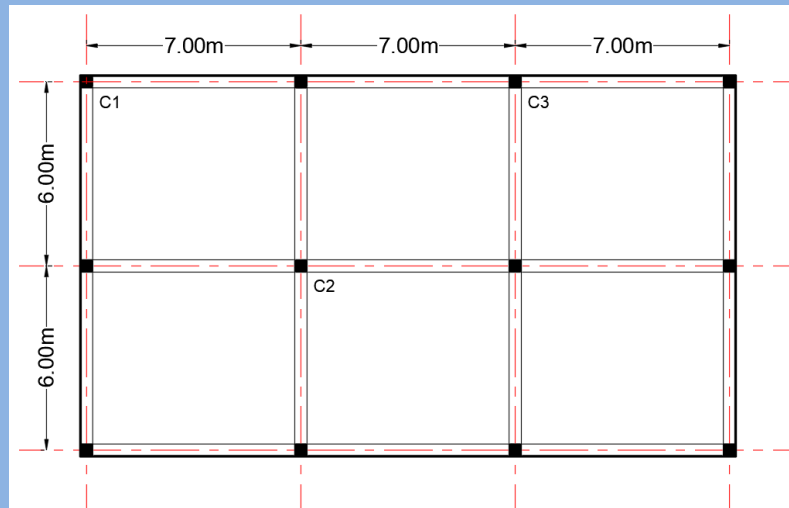
- Additional dead load=3.5 kN/m²

- Live load=2.5 kN/m²

Concrete Density =24 kN/m³

$f_c'=28\text{MPa}$

-Take fixed supports for the base reactions



Q3/For the 10 story building shown below by using ETAB18 program calculate

The amplification accidental torsional factor for load case E(x+0.05y) and E(y+0.05x)

Story Drift for load case SPCX and Ex

Given:

Story heights 3.5m

Column dimension 600x600mm all stories

Beam Dimensions 600x600mm

Slab Thickness =150mm

$f_c = 30\text{MPa}$

Loads

- Self weight

- Additional dead load=3.5 kN/m²

- Live load=2.5 kN/m²

- Seismic Load according to ASCE 7-16

The Building in Erbil Governorate.

Soil site Class: C

Intermediate reinforced concrete moment frame used for Seismic force resisting system

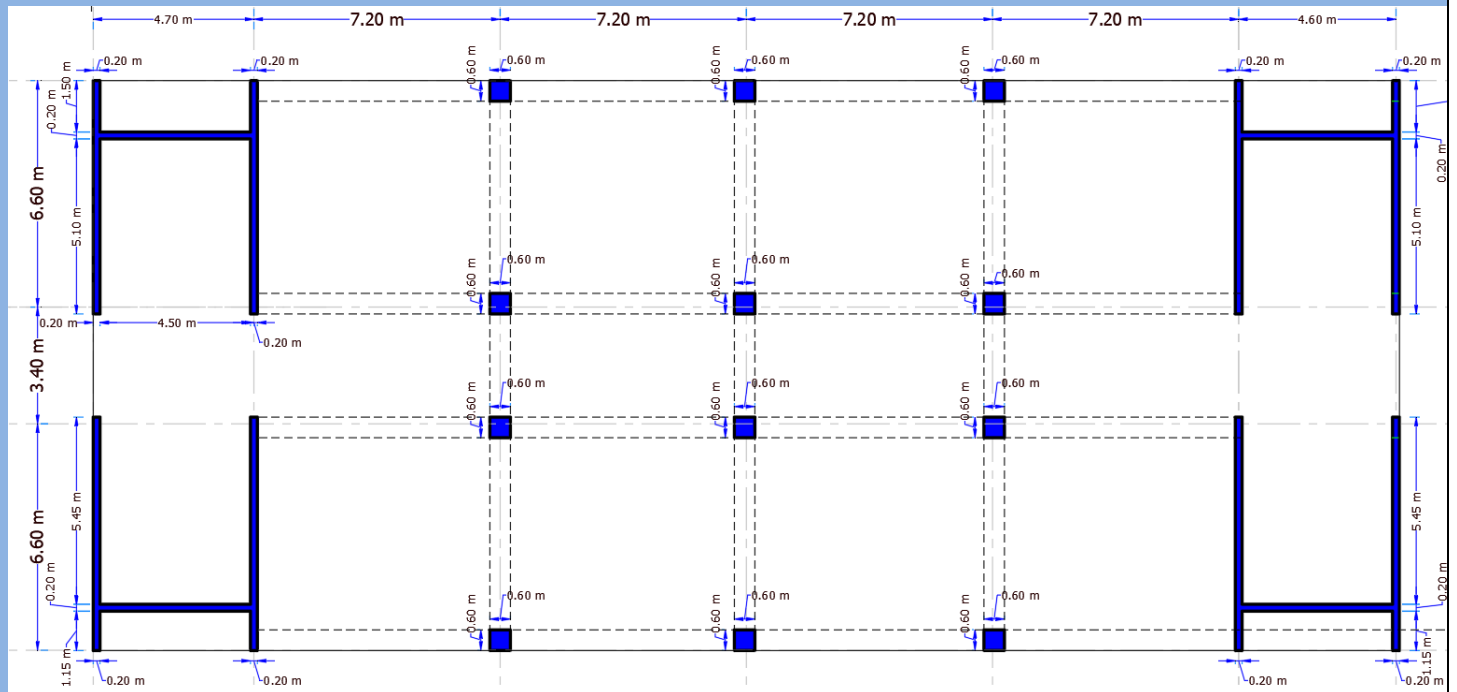
Risk Category =II

Note: -

-Take P-Delta for analysis

- Assume the concrete walls are untracked

- Take fixed supports for the base reactions



Extra notes:

External Evaluator