Course Syllabus

1. **Course Title:** Information Technology in Construction Practice

2. **Course Code:** ITCP421417

3. **Credit Units:** 2 (0/2/4) (0 units of theory/ 2 unit of practice/ 4 units of self-study)

   Duration: 15 weeks (0 hours of theory + 2x3 hours of practice, and 4x3 hours of self-study per week)

4. **Course Instructors**

   1/ MSc. Nguyễn Ngọc Dương

   2/ MSc. Nguyễn Thế Trường Phong

   3/ MSc. Trịnh Công Luận

   4/ MSc. Lê Phương Bình

   5/ MSc. Đoàn Ngọc Tịnh Nghiêm

   6/ Dr. Phạm Đức Thiện

   7/ Dr. Ngô Việt Dũng

   8/ Dr. Châu Đình Thành

   9/ MSc. Lê Phương

   10/ MSc. Nguyễn Tổng

5. **Course Requirements**

   Prerequisite courses: Structural Mechanics (STME240517)

   Previous courses: Reinforced Concrete Structures (RCST240617), Steel Structures (STST240917)

   Parallel courses: None

6. **Course Description**

   This course provides the basic knowledge and skills in using specialized software such as ETABS, SAFE … for the student to model and analyze obtained results for type of simple and complex structural systems.

7. **Course Goals**

Goals	Goal Description	Programme ELOs
G1	The knowledge about specialized software such as ETABS, SAFE to model and analyze for buildings.	1.3
G2	Be able to model, analyze, solve structural models on specialized software and access analysis results such as force, displacement and another parameter… for structural design.	2.1, 2.2
G3	Be able to communicate and work in the group flexibly and efficiently.	3.1, 3.2

8. Course Learning Outcomes (CLOs)

CLOs		CLO Description	Programme ELOs
G1	**G1.1**	Explaining concepts, terminology and rules used in ETABS, SAFE software.	1.3
G2	**G2.1**	Modeling and analyzing type of simple and complex structural systems.	2.1, 2.2
	G2.2	Analyzing and determining the values of internal forces, displacements and other parameters for structural design.	2.2
G3	**G3.1**	Working in the group to solve the problems relates to using software ETABS, SAFE.	3.1
	G3.2	Choosing appreciable communication skills such as speech, text, images, graphics ... when expressing personal views.	3.2

9. Learning Resources

- Textbooks:

1. **Lê Đình Quốc** "ETABS manual" Ho Chi Minh City University of Technology. (In Vietnamese)

2. Faculty of civil engineering "SAFE software and its applications in building design" Ho Chi Minh City University of Technology and Education. (In Vietnamese)

- References:

1. **Ngô Minh Đức** "ETABS manual - Specialized software for high-rise building" construction Publisher. (In Vietnamese)

2. **Đào Tăng Khiêm, Trần Anh Bình, Dương Diệp Thúy** " Information Technology in Construction - ETABS and Microsoft Project Software" Publishers of scientific and technical. (In Vietnamese)

3. **TCVN 2737 : 1995** "Load Load and Effect". (in Vietnamese)

4. **TCXD 229 : 1999** "Guidance on calculating dynamic wind load according to TCVN 2737-1995"

5. **TCVN 9386 : 2012** "Design of structures for earthquake resistances (in Vietnamese)"

6. **TCVN 5574 : 2012** "Reinforced concrete structure (in Vietnamese)"

10. Student Assessment

- Grading scale: **10**

- Assessment plan:

Type	Content	Timeline	Assessment method	CLOs	Rate (%)
Assignments					**20**
BT#1	2D frames	Week 3	Individual assignment in class	G1.1, G2.1, G2.2	5

BT#2	Model 3D moment resisting frame system	Week 8	Individual assignment in class	G1.1, G2.1, G2.2	10
BT#3	Using SAFE to model and analysis for reinforce concrete slab.	Week 15	Individual assignment in class	G1.1, G2.1, G2.2	5
Projects					**30**
BL#1	Group-working: Modeling and analyzing for reinforce concrete plane frames.	Week 5	Group-working at home Presentation	G1.1, G2.1, G2.2, G3.1, G3.2	15
BL#2	Group-working: Modeling and analyzing for reinforce concrete plane frames.	Week 12	Group-working at home Presentation	G1.1, G2.1, G2.2, G3.1, G3.2	15
Final exam					**50**
	Contents includes all CLOs (ETABS) Duration: 90 minutes		Practicing on computer	G1.1, G2.1, G2.2	

11. Course Content

Week	Content	CLOs
1	**Introduction**	
	A/ Content and pedagogical methods in class: (6)	G1.1
	Content:	
	1.1. Overview of FEM	
	1.2. Introduction to the steps to model, caculate and design structures.	
	1.3. Overview of ETABS and SAFE software	
	1.4. Some example about simply structures. Compare results of from ETABS software with direct solutions.	
	1.5. Introduction to the interface of ETABS software.	
	Pedagogical methods:	
	+ Computer-aided instruction	
	+ Students practice	
	+ Group working	
	B/ Self-study content: (12)	G1.1
	1.6. Review the knowledge of the strength of materials, Structural Mechanics, and Finite element method.	
	1.7. Introduction to the interface of ETABS, SAFE software.	
2	**Modeling of 2D frame systems**	

		A/ **Content and pedagogical methods in class**: (6)	G1.1;
		Content:	G2.1;
		1.1. Local coordinate system – Global coordinate system	G2.2;
		1.2. Rules of objects such as frame element, shell element in ETABS software.	
		1.3. Define and assign materials and sections	
		1.4. Examples.	
		1.5. Assignment in group working: define load for 2D frame from architectural drawings.	
		Pedagogical methods:	
		+ Computer-aided instruction.	
		B/ Self-study content: (12)	G1.1;
		1.6. Overview of finite element method	G2.1;
		1.7. Rules of objects such as frame element, shell element in ETABS software.	G2.2;
		1.8. Modeling 2D frame systems by using ETABS software	
3		**Modeling of 2D frame systems** (cont.)	
		A/ **Content and pedagogical methods in class**: (6)	G1.1;
		Content:	G2.1;
		1.9. Define and assign load case, load combination	G2.2
		1.10. Modeling 2D frame systems carried about the horizontal and vertical load (uniform load, trapezoidal load)	
		1.11. Analyze simply 2D frame by finite element method. After comparing with result analysis from ETABS software.	
		1.12. Using analysis results such as internal force, reaction for structural design.	
		1.13. **Pedagogical methods:**	
		+ Computer-aided instruction.	
		+ Students practice	
		B/ Self-study content: (12)	G1.1;
		Model 2D frame system by using ETABS software	G2.1;
			G2.2
		Group assignment – Determine load, internal force of 2D frame system from architectural drawings	

4	**A/ Content and pedagogical methods in class**: (6) **Content:** 1.1. Group homework: Define load, internal force of 2D frame system. 1.2. Determine load transfer for applied load on 2D frame. 1.3. Preliminary choose dimension of sections. 1.4. General instruction **Pedagogical methods:** + Presenting the basic contents using PowerPoint and computer-aided instruction. + Group working in class + Guide soft skill: teamwork. + Presentation.	G1.1; G2.1; G2.2; G3.1; G3.2
	B/ Self-study content: (12) 1.5. Determine load transfer for applied load on 2D frame from architectural drawings 1.6. Assign applied vertical and horizontal load for 2D frame. 1.7. Review the knowledge of Reinforced Concrete Structures 1.8. Design procedure of the structural members from analysis results.	G1.1; G2.1; G2.2; G3.1; G3.2
5	**Group assignment – Determine load, internal force of 2D frame system from architectural drawings** (cont.)	
	A/ Content and pedagogical methods in class: (6) **Content:** 1.9. Presentation of group students. **Pedagogical methods:** + Reviews result from presentation of group students.	G1.1; G2.1; G2.2; G3.1; G3.2
	B/ Self-study content: (12) 1.10. Determine load transfer of 2D frame system from architectural drawings 1.11. Assign applied vertical and horizontal load for 2D frame. 1.12. Review the knowledge of Reinforced Concrete Structures 1.13. Process design of the structural system base on frame force	G1.1; G2.1; G2.2; G3.1; G3.2
6	**Model 3D moment resisting frame system**	

		A/ **Content and pedagogical methods in class**: (6) **Content:** 1.1.　Mesh and automesh for area objects 1.2.　Examples 1.3.　The methods assign horizontal load 1.4.　Model 3D frame system – Without Shear wall system 1.5.　Using analysis result such as internal force, reaction for structural design. **Pedagogical methods:** 　+　Presenting the basic contents using PowerPoint and computer-aided instruction. 　+　Students practice	G1.1; G2.1; G2.2
		B/ **Self-study content**: (12) 1.6.　Model 3D frame system by using ETABS software	G1.1; G2.1; G2.2; G3.1
7		**Model 3D moment resisting frame system** (cont.)	
		A/ **Content and pedagogical methods in class**: (6) **Content:** 1.7.　Examples **Pedagogical methods:** 　+　Presenting the basic contents using powerpoint and computer-aided instruction. 　+　Students practice	G1.1; G2.1; G2.2;
		B/ **Self-study content**: (12) 1.8.　Model 3D frame systems by using ETABS software	G1.1; G2.1; G2.2; G3.1
8		**Model 3D moment resisting frame system** (cont.)	
		A/ **Content and pedagogical methods in class**: (6) **Content:** 1.9.　Examples **Pedagogical methods:** 　+　Presenting the basic contents using PowerPoint and computer-aided instruction. 　+　Students practice	G1.1; G2.1; G2.2

	B/ Self-study content: (12)	G1.1;
	1.10. Model 3D frame systems by using ETABS software	G2.1;
		G2.2;
		G3.1
9	**Model 3D shear wall and frame**	
	A/ Content and pedagogical methods in class: (6)	G1.1;
	Content:	G2.1;
	1.1. Mesh and automesh for wall objects	G2.2
	1.2. Dynamical analysis of Structures	
	1.3. Model 3D shear wall and frame.	
	1.4. Wind load and Earthquake load.	
	1.5. Using analysis results such as internal force, reaction to calculate and design	
	1.6. Group homework: 3D shear wall and frame	
	Pedagogical methods:	
	+ Presenting the basic contents using PowerPoint and computer-aided instruction	
	+ Students practice	
	B/ Self-study content: (12)	G1.1;
	1.7. Model 3D frame systems by using ETABS software	G2.1;
	1.8. Dynamical analysis of Structures	G2.2;
	1.9. Wind load and Earthquake load	G3.1
10	**Model 3D shear wall and frame** (cont.)	
	A/ Content and pedagogical methods in class: (6)	G1.1;
	Content:	G2.1;
	1.10. Examples	G2.2
	Pedagogical methods:	
	+ Presenting the basic contents using PowerPoint and computer-aided instruction	
	+ Students practice	
	B/ Self-study content: (12)	G1.1;
	1.11. Model 3D frame systems by using ETABS software	G2.1;
		G2.2;
		G3.1
11	**Model 3D shear wall and frame** (cont.)	

	A/ Content and pedagogical methods in class: (6)	G1.1;
	Content:	G2.1;
	1.12. Examples	G2.2
	Pedagogical methods:	
	+ Presenting the basic contents using PowerPoint and computer-aided instruction	
	+ Discussion	
	B/ Self-study content: (12)	G1.1;
	1.13. Model 3D frame systems by using ETABS software	G2.1;
		G2.2;
		G3.1
12	**Presentation of group students : 3D frame system**	
	A/ Content and pedagogical methods in class: (6)	G1.1;
	Content:	G2.1;
	1.1. Lecturer analyzes and comment on the report of the group	G2.2;
	Pedagogical methods:	G3.1;
	+ Discuss	G3.2
	+ Review knowledge	
	B/ Self-study content: (12)	G1.1;
	1.2. Model 3D frame system by using ETABS software	G2.1;
	1.3. Prepare contents to presentation	G2.2;
		G3.1;
		G3.2
13	**Using SAFE to model and design slabs.**	
	A/ Content and pedagogical methods in class: (6)	G1.1;
	Content:	G2.1;
	1.1. Introduction to the interface software SAFE	G2.2
	1.2. Using SAFE to import obtained results from ETABS software.	
	Pedagogical methods:	
	+ Presenting the basic contents using powerpoint and computer-aided instruction	
	+ Students practice	
	B/ Self-study content: (12)	G1.1;
	1.3. Using SAFE to import obtained results from ETABS software	G2.1;
		G2.2;
		G3.1

	Using SAFE to model and design foundations	
14	**A/ Content and pedagogical methods in class**: (6) **Content:** 1.4. Using SAFE to model and design trip foundation, raft foundation **Pedagogical methods:** + Presenting the basic contents using PowerPoint and computer-aided instruction + Discuss	G1.1; G2.1; G2.2
	B/ Self-study content: (12) 1.5. Using SAFE to model and design trip foundation, raft foundation	G1.1; G2.1; G2.2; G3.1
15	Using SAFE to model and design foundations (cont.)	
	A/ Content and pedagogical methods in class: (6) **Content:** 1.6. Using SAFE to design pile foundation **Pedagogical methods:** + Presenting the basic contents using PowerPoint and computer-aided instruction + Discuss	G1.1; G2.1; G2.2
	B/ Self-study content: (12) 1.7. Using SAFE to model and design pile foundation	G1.1; G2.1; G2.2; G3.1

12. Learning Ethics:

− Home assignments and projects must be done by the students themselves. Plagiarism found in the assessments will get zero point.

− Students must do their own test. If not, students will be disciplined according to the university regulations.

13. Date of first approval: August 1st, 2012

14. Approved by:

<table>
<tr><th>Dean</th><th>Head of Department</th><th>Instructor</th></tr>
<tr><td>A/Prof. Dr. Nguyễn Trung Kiên</td><td>MSc. Nguyễn Văn Hậu</td><td>MSc. Đoàn Ngọc Tịnh Nghiêm</td></tr>
</table>

15. Date and Up-to-date content

1st **time:** Date:	Instructor:
-	Head of Department: