

## Tamkang University Academic Year 102, 1st Semester Course Syllabus

Course Title	FINITE ELEMENT METHOD IN ENGINEERING-DEVELOPMENTS AND APPLICATIONS	Instructor	JOSE MANUEL ROESSET
Course Class	TGEXM0A ELECTIVES COURSES BY COLLEGE OF ENGINEERING-MASTER, 0A	Details	<ul style="list-style-type: none"> <li>◆ Selective</li> <li>◆ One Semester</li> <li>◆ 1 Credits</li> </ul>
D e p a r t m e n t a l   t e a c h i n g   o b j e c t i v e s			
Educate our graduate students to be professional engineers or academic scholars who have specialized knowledge, expertise and competencies for innovative research.			
D e p a r t m e n t a l   c o r e   c o m p e t e n c e s			
<p>A. The ability to use knowledge of mathematics, science and engineering to formulate and solve problems.</p> <p>B. The ability to conduct independent research projects and report the research results for publication.</p>			
Course Introduction	<p>The course intends to introduce the historic developments of Finite Element Method and its applications to general Engineering problems. Fundamentals of the numerical methods used in the FEM technique will be discussed. Applications of the FEM will be mainly focusing on the solid mechanics related to structural dynamics, soil-structure interactions and fluid-soil-structure-interactions. Grade report will be evaluated based upon written exam and take-home assignment.</p>		

**The Relevance among Teaching Objectives, Objective Levels and Departmental core competences**

I.Objective Levels (select applicable ones) :

- (i) Cognitive Domain : C1-Remembering, C2-Understanding, C3-Applying,  
C4-Analyzing, C5-Evaluating, C6-Creating
- (ii) Psychomotor Domain : P1-Imitation, P2-Mechanism, P3-Independent Operation,  
P4-Linked Operation, P5-Automation, P6-Origination
- (iii) Affective Domain : A1-Receiving, A2-Responding, A3-Valuing,  
A4-Organizing, A5-Charaterizing, A6-Implementing

II.The Relevance among Teaching Objectives, Objective Levels and Departmental core competences :

- (i) Determine the objective level(s) in any one of the three learning domains (cognitive, psychomotor, and affective) corresponding to the teaching objective. Each objective should correspond to the objective level(s) of ONLY ONE of the three domains.
- (ii) If more than one objective levels are applicable for each learning domain, select the highest one only. (For example, if the objective levels for Cognitive Domain include C3,C5,and C6, select C6 only and fill it in the boxes below. The same rule applies to Psychomotor Domain and Affective Domain.)
- (iii) Determine the Departmental core competences that correspond to each teaching objective. Each objective may correspond to one or more Departmental core competences at a time. (For example, if one objective corresponds to three Departmental core competences: A,AD, and BEF, list all of the three in the box.)

No.	Teaching Objectives	Relevance	
		Objective Levels	Departmental core competences
1	Overview discussions on FEM developments and applications. Let engineering major students to have a more generalized concept about this technique and its advanced features.	C2	A

**Teaching Objectives, Teaching Methods and Assessment**

No.	Teaching Objectives	Teaching Methods	Assessment
1	Overview discussions on FEM developments and applications. Let engineering major students to have a more generalized concept about this technique and its advanced features.	Lecture, Discussion	Written test

This course has been designed to cultivate the following essential qualities in TKU students

Essential Qualities of TKU Students	Description
◆ A global perspective	Helping students develop a broader perspective from which to understand international affairs and global development.
◆ Information literacy	Becoming adept at using information technology and learning the proper way to process information.
◆ A vision for the future	Understanding self-growth, social change, and technological development so as to gain the skills necessary to bring about one's future vision.
◆ Moral integrity	Learning how to interact with others, practicing empathy and caring for others, and constructing moral principles with which to solve ethical problems.
◆ Independent thinking	Encouraging students to keenly observe and seek out the source of their problems, and to think logically and critically.
◇ A cheerful attitude and healthy lifestyle	Raising an awareness of the fine balance between one's body and soul and the environment; helping students live a meaningful life.
◇ A spirit of teamwork and dedication	Improving one's ability to communicate and cooperate so as to integrate resources, collaborate with others, and solve problems.
◆ A sense of aesthetic appreciation	Equipping students with the ability to sense and appreciate aesthetic beauty, to express themselves clearly, and to enjoy the creative process.

#### Course Schedule

Week	Date	Subject/Topics	Note
1	102/09/16 ~ 102/09/22		
2	102/09/23 ~ 102/09/29		
3	102/09/30 ~ 102/10/06		
4	102/10/07 ~ 102/10/13	Introduction and overview, Fundamentals of the FEM method, Concerns on boundary modeling and static/dynamic problems	each one- 3 hours, 10/07, 10/08 and 10/09
5	102/10/14 ~ 102/10/20	Mesh discretization and geometry concerns; Linear and nonlinear applications on structural dynamics and EQ engr. problems; Applications on offshore engineering problems	each one- 3 hours, 10/14, 10/15 and 10/16
6	102/10/21 ~ 102/10/27		
7	102/10/28 ~ 102/11/03		
8	102/11/04 ~ 102/11/10		
9	102/11/11 ~ 102/11/17		
10	102/11/18 ~ 102/11/24		

11	102/11/25 ~ 102/12/01		
12	102/12/02 ~ 102/12/08		
13	102/12/09 ~ 102/12/15		
14	102/12/16 ~ 102/12/22		
15	102/12/23 ~ 102/12/29		
16	102/12/30 ~ 103/01/05		
17	103/01/06 ~ 103/01/12		
18	103/01/13 ~ 103/01/19		
Requirement			
Teaching Facility	Projector		
Textbook(s)	None		
Reference(s)	none		
Number of Assignment(s)	2 (Filled in by assignment instructor only)		
Grading Policy	◆ Attendance : 30.0 %   ◆ Mark of Usual :   %   ◆ Midterm Exam :   % ◆ Final Exam : 40.0 % ◆ Other (homework assignment) : 30.0 %		
Note	This syllabus may be uploaded at the website of Course Syllabus Management System at <a href="http://info.ais.tku.edu.tw/csp">http://info.ais.tku.edu.tw/csp</a> or through the link of Course Syllabus Upload posted on the home page of TKU Office of Academic Affairs at <a href="http://www.acad.tku.edu.tw/CS/main.php">http://www.acad.tku.edu.tw/CS/main.php</a> . <b>※ Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.</b>		