T.C.

ESKİŞEHİR OSMANGAZİ UNIVERSITY

FACULTY OF SCIENCES

MATHEMATICS AND COMPUTER SCIENCES DEPARTMENT

COURSE INFORMATION FORM

Course Name	Course Code
Applications of Numerical Solutions of the Partial Differential Equations II	

Semester	Number of Course Hours per Week		Credit	ECTS
	Theory	Practice		
8	2	2	-	6

Course Category (Credit)				
Basic Sciences	Engineering Sciences	Design	General Education	Social
x				

Course Language	Course Level	Course Type
Turkish	Undergraduate	Compulsory

Prerequisite(s) if any	
Objectives of the Course	Finding the numerical solutions of the partial differential equations using the finite element method
Short Course Content	Derivation of the finite element method, Parabolic, hyperbolic and elliptic equations

Learning Outcomes of the Course	Contributed PO(s)	Teaching Methods *	Measuring Methods **
1 Development of the finite element method and finding the numerical solutions of the partial differential equations existing the physical and social areas	1,2,3,4,5,6,7,8,9,10,11,13,14,15	1,2,6,10,11,15	D, G
2			
3			
4			
5			
6			
7			
8			

***Teaching Methods** **1:**Expression, **2:**Discussion, **3:**Experiment, **4:**Simulation, **5:**Question-Answer, **6:**Tutorial, **7:**Observation, **8:**Case Study, **9:**Technical Visit, **10:**Trouble/Problem Solving, **11:**Induvidual Work, **12:**Team/Group Work, **13:**Brain Storm, **14:**Project Design / Management, **15:**Report Preparation and/or Presentation

****Measuring Methods** **A:**Exam, **B:**Quiz, **C:**Oral Exam, **D:**Homework, **E:**Report, **F:**Article Examination, **G:**Presentation, **I:**Experimental Skill, **J:**Project Observation, **K:**Class Attendance; **L:**Jury Exam

Main Textbook	An introduction to finite element method, J. N. Reddy
Supporting References	Numerical solution of the partial differential equations by finite element method, Claes Johnson (Cambridge University Press) Finite Element Analysis and Applications, R Wait and A. R. Mitchell, (John Wiley and Sons Publication
Necessary Course Material	

Course Schedule	
1	Introduction of the finite element method
2	Variational methods
3	The derivation of the basis functions for the finite element method for the one dimensional problems
4	Finite element methods: Collocation Subdomain
5	Finite element methods: Galerkin, Least squares
6	The derivation of the basis functions for the finite element method for the two dimensional problems
7	Solving problem
8	Mid-term exam
9	Finite element method: Collocation and Subdomain collocation for two dimensional problems
10	Finite element method: Collocation and Subdomain collocation for two dimensional problems
11	Finite element method: Galerkin and Least square methods for two dimensional problems
12	Finite element method: Galerkin and Least square methods for two dimensional problems
13	Finite element method for time dependent problems
14	Finite element method for time dependent problems
15	Solving problems
16,17	Final Exam

Calculation of Course Workload			
Activities	**Number**	**Time (Hour)**	**Total Workload (Hour)**
Course Time (number of course hours per week)	14	4	56
Classroom Studying Time (review, reinforcing, prestudy,….)	14	4	56
Homework	1	28	28
Quiz Exam			
Studying for Quiz Exam			
Oral exam			
Studying for Oral Exam			
Report (Preparation and presentation time included)			
Project (Preparation and presentation time included)			
Presentation (Preparation time included)	1	40	40
Mid-Term Exam			
Studying for Mid-Term Exam			
Final Exam			
Studying for Final Exam			
		Total workload	**180**
		Total workload / 30	**180/30**
		Course ECTS Credit	**6**

Evaluation	
Activity Type	**%**
Homework	40
Presentation	60
Bir öğe seçin.	
Bir öğe seçin.	
Bir öğe seçin.	
Final Exam	100
Total	40

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (PO) (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)

NO	PROGRAM OUTCOME	Contribution
1	The ability to apply knowledges of Mathematics and Computer Sciences,	4
2	To have sufficient theoretical and practical knowledge of Mathematics at international level,	4
3	The ability of describing, modelling and solving of mathematical problems at Mathematics and related subjects,	5
4	The skill to solve and design a problem process in accordance with a defined target,	5
5	Skills to analyze data, interpret and apply to other datum and using these data on computer,	3
6	The skill to use the modern techniques and computational tools needed for mathematical applications,	4
7	The skill to make teamwork within the discipline and interdisciplinary,	3
8	The ability to improve oneself by following the developments on other modern, scientific and technological subjects as well as Mathematics and Computer Sciences,	3
9	The skill to communicate orally and in written way, in a clear and concise manner by having individual work skills and ability to independently decide and analytical thinking,	3
10	The skill to have professional and ethical responsibility,	2
11	The skill to have consciousness for quality issues and scientific research,	4
12	The skill to be sensitive to environmental issues related with problems and development of living area and consistent in the social relations,	1
13	Ability to solve problems in the working life faced to find an appropriate algorithms via mathematical modeling and to write computer programs,	4
14	The skill to developed design of software systems at different complex levels,	2
15	The credence of necessity of life-long learning and ability to apply the formation long-life learning.	4

LECTUTER(S)				
Prepared by	Assoc. Prof. Melis Zorşahin			
Signature(s)				

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