



## ESOGÜ Mathematics and Computer Science Department COURSE INFORMATION FORM

<b>SEMESTER</b>	Spring
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<b>COURSE CODE</b>	821618016	<b>COURSE NAME</b>	Applications of Numerical Solutions of the Partial Differential Equations II
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SEMESTER	WEEKLY COURSE PERIOD			COURSE OF			
	Theory	Practice	Labratory	Credit	ECTS	TYPE	LANGUAGE
7	2	2	0	3	5	COMPULSORY (x) ELECTIVE ( )	Turkish

COURSE CATAGORY			
<b>Mathematics</b>	<b>Computer</b>	[if it contains considerable design, mark with (√) ]	
√			

ASSESSMENT CRITERIA			
	Evaluation Type	Quantity	%
<b>MID-TERM</b>	1st Mid-Term		
	2nd Mid-Term		
	Quiz		
	Homework	1	40
	Project		
	Report		
	Others (.....)		
<b>FINAL EXAM</b>		1	60
<b>PREREQUIEITE(S)</b>	None.		
<b>COURSE DESCRIPTION</b>	Derivation of the finite element method, Parabolic, hyperbolic and elliptic equations		
<b>COURSE OBJECTIVES</b>	Finding the numerical solutions of the partial differential equations using the finite element method.		
<b>ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION</b>	Faining the knowledge to find numerical solutions of the partial differential equations		
<b>COURSE OUTCOMES</b>	Development of the finite element method and finding the numerical solutions of the partial differential equations existing the physical and social areas		
<b>TEXTBOOK</b>	An introduction to finite element method, J. N. Reddy		
<b>OTHER REFERENCES</b>	1.Numerical solution of the partial differential equations by finite element method, Claes Johnson(Cambridge University Press) 2.Finite Element Analysis and Applications, R Wait and A. R. Mitchell, (John Wiley and Sons Publication)		
<b>TOOLS AND EQUIPMENTS REQUIRED</b>	None.		

## COURSE SYLLABUS

WEEK	TOPICS
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	Midterm
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

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

1:None. 2:Partially contribution. 3: Completely contribution.

**Instructor(s):** Öğr.Gör.Dr. Melis Zorşahin Görgülü

**Signature:**

**Date:**