T.C.

ESKİŞEHİR OSMANGAZİ UNİVERSITY

FACULTY OF SCIENCES

MATHEMATICS AND COMPUTER SCIENCES DEPARTMENT

COURSE INFORMATION FORM

Course Name	Course Code
Differential Equations with Mathematica 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	Elective

Prerequisite(s) if any	None
Objectives of the Course	Using a computer package program called Mathematica to obtain solutions of Partial Differential Equations (PDEs), producing package programs to solve some other PDEs.
Short Course Content	1. Power series solutions of PDEs 2.Laplace transforms and their application to initial value problems for PDEs. 3. Linear PDE system 4. Wave equation 5. Laplace equation

	Learning Outcomes of the Course	Contributed PO(s)	Teaching Methods *	Measuring Methods **
1	Defining PDEs in the Mathematica package program.	1,2	1,2,11	D,J
2	Applying the Laplace transform and series approximation to equations.	1,2,8	1,2,8	D,J
3	Obtaining solutions of the wave equation for different cases and being able to draw 3-dimensional and contour graphs.	1,3,6	1,10,11	D,J
4	Obtaining solutions of the Laplace equation for different cases and being able to draw 3-dimensional and contour graphs.	1,3,6	1,10,11	D,J
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	Abell, Martha L., and James P. Braselton. *Differential equations with Mathematica*. Academic Press, 2022.
Supporting References	Kythe, Prem K., Michael R. Schäferkotter, and Pratap Puri. *Partial differential equations and Mathematica*. Chapman and Hall/CRC, 2018. Ross, Clay C. *Differential equations: an introduction with Mathematica®*. Springer Science & Business Media, 2013.
Necessary Course Material	None

Course Schedule	
1	Introduction to power series, Variable coefficients of linear PDEs
2	Ordinary, singular and regular points, Power series solutions at ordinary points
3	Solutions of power series at regular singular points
4	Finding solutions of power series at ordinary points using Mathematica
5	Finding solutions to power series at regular singular points using Mathematica
6	Laplace transforms
7	Midterm Exam
8	Inverse Laplace transforms
9	Applying Laplace transforms to solve initial-value problems for PDEs
10	Solution of the wave equation
11	Drawing 3-dimensional and contour graphs of the wave equation
12	Solution of the Laplace equation
13	Drawing 3-dimensional and contour graphs of the Laplace equation
14	Homework and project presentations
15	Homework and project presentations
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	64
Classroom Studying Time (review, reinforcing, prestudy,….)	14	4	64
Homework	5	4	20
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)			
Mid-Term Exam	1	2	2
Studying for Mid-Term Exam	1	20	20
Final Exam	1	2	2
Studying for Final Exam	1	30	30
		Total workload	**202**
		Total workload / 30	**6,73**
		Course ECTS Credit	**6**

Evaluation	
Activity Type	**%**
Mid-term	40
Quiz	
Homework	10
Bir öğe seçin.	
Bir öğe seçin.	
Final Exam	50
Total	100

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,	5
6	The skill to use the modern techniques and computational tools needed for mathematical applications,	4
7	The skill to make team work 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,	4
10	The skill to have professional and ethical responsibility,	2
11	The skill to have consciousness for quality issues and scientific research,	3
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 algoritms via mathematical modeling and to write computer programs,	4
14	The skill to developed design of software systems at different complex levels,	1
15	The credence of necessity of life-long learning and ability to apply the formation long-life learning.	1

LECTUTER(S)				
Prepared by	Doç. Dr. Sait SAN			
Signature(s)				

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