ESOGÜ Electrical-Electronics Engineering Department

COURSE CODE: 15122XXXX   **COURSE TITLE:** Differential Equations

Semester	Weekly Hours		COURSE			
	Theoretical	**Practical**	**Credits**	**ECTS**	**Type**	**Language**
3	4	0	4	7	Compulsory (X) Elective ( )	Turkish ( ) English (X)

Write the credit (for non-credit courses weekly hours) below (If necessary distribute the credits.).				
Math and Basic Science	**Electrical Engineering** [mark (√) if there is high design content]		**General Education**	**Humanities**
4	0	( )	0	0

Assessment	THEORETICAL-PRACTICAL COURSES			LABORATORY COURSES		
	Type	**Number**	**%**	**Activity Type**	**Number**	**%**
Midterm	Midterm	1	40	Quiz		
	Quiz			Lab performance		
	Homework			Report		
	Project			Oral exam		
	Other (Laboratory)			Other (………)		
Final			60			
Makeup exam (Oral/Written)						

Prerequisites	-
Brief content of the course	Differential equations and their solutions. First-order differential equations. Higher-order differential equations. Systems of linear differential equations. Laplace transform in solving differential equations and systems of differential equations. Series solutions and the method of Frobenius.
Objectives of the course	Teaching fundamental methods to solve of differential equations and systems of differential equations.
Contribution of the course towards professional education	The purpose of the course is to provide an understanding on differential equations, ability to classify and solve differential equations and systems of differential equations.
Outcomes of the course	1. Defining differential equations and systems of differential equations. 2. Classifying differential equations. 3. Solving differential equations and systems of differential equations.
Textbook of the course	- Shepley L. Ross, Differential Equations, 3rd edition, John Wiley and Sons, 1984.
Other reference books	
Required material for the course	

WEEKLY PLAN OF THE COURSE

Week	Topics
1	Classification of differential equations. Their origin and applications. Existence of solutions.
2	First-order differential equations and integrating factors. Separable equations. Linear equations and Bernoulli equation. Special integrating factors and transformations.
3	Applications of first-order equations.
4	Basic theory of linear differential equations. Homogeneous equations with constant coefficients.
5	The method of undetermined coefficients for nonhomogeneous higher-order differential equations.
6	The method of variation of parameters for nonhomogeneous higher-order differential equations.
7	Applications of higher-order differential equations.
8	Midterm
9	Systems of linear differential equations.
10	Systems of linear differential equations. e^{Ax} fundamental matrix.
11	Laplace transform in solving differential equations.
12	Laplace transform in solving systems of differential equations.
13	Series solutions of linear differential equations.
14	Series solutions of linear differential equations.
15,16	Final

NO	OUTCOMES OF THE PROGRAMME	4	3	2	1
1	Adequate knowledge of mathematics, science and Electrical and Electronics Engineering; ability to practice theoretical and practical knowledge of these areas into modeling and solving complex problems of Electrical and Electronics Engineering.	X			
2	Ability to identify complex engineering problems in Electrical and Electronics Engineering and related fields, for this purpose having skills to formulate, select and apply appropriate methods.				X
3	Having skills to apply modern design methods to design a complex system, process, equipment or product that should work under realistic conditions and constraints and satisfy specific requirements concerning the Electrical and Electronics Engineering.				X
4	Having skills to develop, select and apply modern techniques and tools needed to analyze and solve complex applications in Electrical and Electronics Engineering, skills to use information technology effectively.				X
5	Skills to design and conduct tests, collect data, analyze results, and interpret data for the experimental investigation of complex problems in Electrical and Electronics Engineering.				X
6	Ability to function effectively as an individual and as a member of teams within the discipline and in multidiscipline areas.				X
7	Communicating effectively in oral and written form both in Turkish and English. Effective eport writing and understanding written reports, preparing design and manufacturing reports, making effective presentations, skills to give and receive clear and concise instructions.				X
8	Awareness of the necessity of lifelong learning, access to information, monitoring developments in science and technology and the ability to self-renewing.				X
9	Understanding of professional and ethical responsibility.				X
10	Information on project management, change management and risk management practices, awareness on entrepreneurship and innovation, knowledge on sustainable development.				X
11	Information about universal and societal effects of engineering applications on health, safety and environment; awareness of the legal consequences of engineering solutions.				X

Scale for assessing the contribution of the course to the program outcomes:

4: High　　　　**3: Medium**　　　　**2: Low**　　　　**1:None**

Name of Instructor(s):　Prof. Dr. Gökhan ÇINAR

Signature(s):　　　　　　　　　　　　　　　　　　　　**Date:**