

	Course name: EE201 Engineering Mathematics I		Department: Electrical and Electronics Engineering		Semester 3	
	Methods of Education					Credit (ECTS)
	Lecture	Study Time	Homework	Exam (incl. Prep.)	Total	6
	56	90	20	14	180	
Language	English					
Compulsory/Elective	Compulsory					
Prerequisites	Math101 or Math102					
Course Contents	First Order Differential Equations, Second Order Linear Equations, Higher Order Linear Equations, Series Solutions of Second Order Linear Equations, The Laplace Transform, Systems of First Order Linear Equations					
Course Objective	1. To introduce the basic concepts required to understand, construct, solve and interpret differential equations. 2. To teach methods to solve differential equations of various types. 3. To give an ability to apply knowledge of mathematics on engineering problems					
Learning Outcomes and Competences	The students will be able to : 1. Classify differential equations according to certain features. 2. Solve first order linear equations and nonlinear equations of certain types and interpret the solutions. 3. Understand the conditions for the existence and uniqueness of solutions for linear differential equations 4. Solve second and higher order linear differential equations with constant coefficients and construct all solutions from the linearly independent solutions 5. Find series solutions about ordinary and regular singular points for second order linear differential equations. 6. Solve initial value problems using the Laplace transform. 7. Solve systems of linear differential equations with methods from linear algebra					
Textbook and /or References	Main textbooks: 1. Fundamentals of Differential Equations, 9th Ed., R. Kent Nagle, Edward B. Saff, Arthur David Snider, Pearson, 2017 2. Differential Equations and Linear Algebra: Pearson New International Edition, 4/E, C. Henry Edwards & David E. Penney, 2018. 3. Elementary Differential Equations and Boundary Value Problems, William E. Boyce, Richard C. Dippima, Douglas B. Meade, 2017, John Wiley & Sons					
Assessment Criteria				If any, mark as (X)	Percentage (%)	
	Midterm Exams			X	40	
	Quizzes					
	Homework					
	Projects					
	Laboratory work					
	Other					
Final Exam			X	60		
Instructors	Prof. Dr. Niyazi ŞAHİN, Prof. Dr. Gülnihal MERAL, Dr. Öğr. Üyesi Nuray ÖKTEM					
Weekly Schedule						
Week	Subject					
1	Introduction to Differential Equations					
2	First Order Differential Equations (Separable Equations, Linear Equations)					
3	First Order Differential Equations (Exact equations, Substitutions and Transformations)					
4	Mathematical Models Involving First-Order Equations					
5	Linear Second Order Differential Equations (Homogeneous and constant coefficient equations)					

6	Second Order Differential Equations (Nonhomogeneous equations and Method of Variation of parameters, Cauchy-Euler Equations)
7	Higher Order Differential Equations (Homogeneous and Nonhomogeneous equations)
8	Mathematical Models Involving Second-Order Equations
9	Mid-term Exam
10	The Laplace Transform (Definition and properties of Laplace transform)
11	The Laplace Transform (Inverse Laplace, Solving initial value problems, Convolution)
12	Introduction to First Order Linear Systems of Equations (Elimination Method)
13	Systems of First Order Linear Equations (The Eigenvalue Method for Linear Systems)
14	Systems of First Order Linear Equations (Matrix Exponential Methods)
15	Series Solutions of Differential Equations (Power series method about an ordinary point)