Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
ECON210	Differential Equations	4	0	0	3	3	4

Prerequisites	
Admission Requirements	

Language of Instruction	Turkish
Course Type	Compulsory
Course Level	Bachelor Degree
Objective	This course introduces undergraduate students to the theory and solution methods of ordinary differential equations (ODEs), a central tool for modeling continuously evolving phenomena in physics, engineering, biology, and economics. Master the vocabulary and classification of ODEs (order, linearity, homogeneity) Solve first-order equations and higher-order linear equations with constant coefficients analytically Understand and apply existence and uniqueness theorems for solutions Use power series, the Laplace transform, and matrix methods to solve ODEs and systems of ODEs Develop qualitative intuition (direction fields, stability) alongside analytical computation Prepare students for later courses in physics, mechanics, control theory, and dynamic economics that rely on ODEs
Content	13 different types of differential equations of first and higher order degrees. Master the vocabulary and classification of ODEs (order, linearity, homogeneity) Solve first-order equations and higher-order linear equations with constant coefficients analytically Understand and apply existence and uniqueness theorems for solutions Use power series, the Laplace transform, and matrix methods to solve ODEs and systems of ODEs Develop qualitative intuition (direction fields, stability) alongside analytical computation Prepare students for later courses in physics, mechanics, control theory, and dynamic economics that rely on ODEs
References	Boyce, W. E., DiPrima, R. C. — Elementary Differential Equations and Boundary Value Problems, Wiley Zill, D. G. — A First Course in Differential Equations with Modeling Applications, Cengage Edwards, C. H., Penney, D. E. — Differential Equations and Boundary Value Problems: Computing and Modeling, Pearson Simmons, G. F. — Differential Equations with Applications and Historical Notes, McGraw-Hill Tenenbaum, M., Pollard, H. — Ordinary Differential Equations, Dover

Theory Topics

Week	Weekly Contents
1	First-order differential equations
2	The type that can be divided into variables
3	The type that can be divided into variables
4	Differential equations in the homogeneous type
5	Differential equations in the Exact type
6	Differential equations in the Linear type
7	Differential equations in the Bernoulli type
8	Differential equations in the Riccatti type
9	Differential equations in the Clairout type
10	Theorem of being and singularity with Picard's iteration method
11	The type that can be resolved according to the variable described
12	High-order differential equations

Week	Weekly Contents
13	General solution methods characteristic according to the type of polynomial and the roots
14	Wronksien