

The Hashemite University
Faculty of Science
Course Description

Department : Mathematics	
Year : 2021– 2022	Semester : Summer

Course Information		
Course Title	Differential Equations (2)	
Course Number	110101302	
Course Credits	3 Hours	
Course Time		
Course Duration	One Semester	
Prerequisite(s)	110101203	
Instructor		
Office Location		
Office Hours		
Text Book		
Title	Elementary differential Equations and Boundary value problems	
Author(s)	W. E. Boyce and Richrd C.Diprima	
Publisher	John - Wiley and sons	
Year	1991	
Edition	Fifth edition.	
References(s)	1. Introduction to Ordinary Differential Equations with mathematica. By A. Gary, M. Mezzino and M.A. Pinsky. 2. Differential Equations with Applications and Historical Notes. By G.F.Simons.	
Evaluation Policy		
Assessment Type	Expected Date	Weight
First Exam	3rd week	30 %
Second Exam	6th week	30 %
Final Exam	8th week	60 %

Course Objectives
1. Discussing the theory and the solution of first order linear differential systems. 2. Introducing the concept of stability and discussing the stability of linear and nonlinear equations. 3 Introducing Sturm-Liouville theorem and solving boundary value problems.

Teaching and Learning Methods
1. Introducing new definitions and using examples to illustrate new concepts. 2. Introducing theorems, and corollaries. 3. Proving the results that constitute the core of the course. 4. Giving examples and applications for some theorems and corollaries. 5. Giving a sample assignment for each section and Discussing some of them . 6. Making a discussion of the problems of each exam.

		Course Contents
Week	Section in text	Topics
<i>1</i>	7.1	Introduction
	7.2	Review of matrices
	7.3	Systems of linear algebraic equations; Linear Independence, Eigenvalues, Eigenvectors
<i>2</i>	7.4	Basic theory of systems of first order linear differential equations
	7.5	Homogeneous linear systems with constant coefficients
	7.6	Complex eigenvalues
	7.7	Repeated eigenvalues
<i>3</i>	7.8	Fundamental matrices
	7.9	Nonhomogeneous linear systems
<i>4</i>	9.1	The phase plane; linear systems
	9.2	Autonomous systems and stability
<i>5</i>	9.3	Almost linear systems
	9.4	Competing Species
	9.5	Predator-Prey equations
<i>6</i>	9.6	Liapunov's second method
	9.7	Periodic solutions and limit cycles
<i>7</i>	11.1	The occurrence of two point boundary value problems
	11.2	Linear homogeneous boundary value problems; eigenvalues and eigenfunctions
	11.3	Sturm-Liouville boundary value problems
	11.4	Non homogeneous boundary value problems