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**
1	**7.1**	**Introduction**
	7.2	**Review of matrices**
	7.3	**Systems of linear algebraic equations; Linear Independence, Eigenvalues, Eigenvectors**
2	**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**
3	**7.8**	**Fundamental matrices**
	7.9	**Nonhomogeneous linear systems**
4	**9.1**	**The phase plane; linear systems**
	9.2	**Autonomous systems and stability**
5	**9.3**	**Almost linear systems**
	9.4	**Competing Species**
	9.5	**Predator-Prey equations**
6	**9.6**	**Liapunov's second method**
	9.7	**Periodic solutions and limit cycles**
7	**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**