Jordan University of Science and Technology
Faculty of Science & Arts
Mathematics Department

MATH350 Mathematical Models
Second Semester 2022-2023

Course Catalog
3 Credit Hours. Steps for mathematical modeling, population growth/logistic/harvesting, Modeling using first order systems of differential (and difference) equations. Dimensional analysis and Pi-theorem. Use dimensional analysis to treat some physical models. Use perturbation techniques to solve some physical (mass spring) models.

Text Book	
Title	Modeling with ordinary differential equation
Author(s)	T.P. Dreyer.
Edition	1st Edition
Short Name	Text Book
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref 1	Modeling Life: The Mathematics of Biological Systems	Alan Garfinkel, Jane Shevtsov and Yina Guo.	1st Edition	

Instructor	
Name	**Prof. Kamel Al-Khaled**
Office Location	PH2, level 1, Ext. 23454
Office Hours	Sun : 09:00 - 11:00 Mon : 09:00 - 10:30 Tue : 09:00 - 11:00 Wed : 11:00 - 12:00 Thu : 11:00 - 12:00
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Class Schedule & Room
Section 1: Lecture Time: Mon : 14:30 - 16:00 Room: NG56

Prerequisites		
Line Number	**Course Name**	**Prerequisite Type**
902520	MATH252 Mathematical Methods 1	Prerequisite / Pass

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Week 1	Overview of mathematical modeling procedures.	From **Text Book**
Weeks 2, 3	Population growth and logistic models. Harvesting	From **Text Book**
Weeks 4, 5	Harvesting (Construction and analysis). Newton's Law for. Cooling, Mass-spring system (Derivation and validations).	From **Text Book**
Week 6	Modeling using systems of first order differential equations: Salmon, Segregation	From **Text Book**
Week 7	Modeling using systems of first order differential equations: William and Zelda and projectile trajectories	From **Text Book**
Weeks 8, 9	Modeling using Difference equations with some examples like, Car rentals, US Elections model	From **Text Book**
Week 10	Dimensional analysis and Pi-theorem	From **Text Book**
Week 11	Dimensional analysis and Pi-theorem-2	From **Text Book**
Week 12	Use dimensional analysis to treat some physical models	From **Text Book**
Week 13	Perturbation techniques	From **Text Book**
Weeks 14, 15	Use perturbation techniques to solve some physical (mass spring) models	

Mapping of Course Outcomes to Program Student Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Build a mathematical model that represents a real life problem [1SLO1]	50%	Final exam, First Exam, Project, Second Exam

the ability to solve certain type of mathematical models [1SLO2]	40%	Final exam, First Exam, Project, Second Exam
Interpretations of the results [1SLO6]	10%	Final exam, Project

Relationship to Program Student Outcomes (Out of 100%)					
SLO1	SLO2	SLO3	SLO4	SLO5	SLO6
50	40				10

Evaluation	
Assessment Tool	Weight
Final exam	40%
First Exam	25%
Project	10%
Second Exam	25%

Date Printed: 2023-06-14