

Course Profile

Course Name:-	Differential Equation
Course Code:-	MATH 205
Academic Year:-	1436-1437
Semester:-	2nd

Course Overview

This course is introducing the following topics - Introduction to differential Equations. First order Differential Equations: Separable differential Equations, Linear differential equations, Exact differential Equations, Bernoulli and Riccati Differential Equations. Higher order differential Equations: Principle of superposition, the Wronskian, Homogeneous differential equations with constant coefficients. Reduction of order method, Undetermined coefficients method, Variation of parameters method. Mathematical Modeling- Population Growth and decay, radioactive isotope and carbon dating, Chemical mixtures. RL- electrical series circuits, Newton's law of cooling and computing time of death, Drug distribution in human body, Banking loans and money investment, Vibrating springs and pendulum, Damped vibration motion, LRC- electrical series circuits, Motion of particles in space.

Course Details

Level:-	5
Credit:-	3 (3, 0, 1)
Pre-Requisites:-	Math-126
Co- Requisites:-	N/A

Learning Outcomes of Course

After successful completion of this course, student will be able to-

1. Discriminate differential equation and its order.
2. Solve first order differential equations.
3. Solve higher order differential equations.
4. Use mathematical modelling to solve some applicable problems by differential equations methods.

Course Assessment

Name of Assessment Task	Weight of Assessment	Week Due
1. Midterm Exam-1	20%	Week 6
2. Midterm Exam-2	20%	Week 12
3. Quizzes	10%	
4. Assignments/Report/Seminar	10%	
5. Final Exam	40%	Week 16

Assessment Task and Learning Outcomes Alignment

Assessment Task Name	Course Learning Outcomes				
	1	2	3	4	
1. Midterm Exam-1	√	√		√	
2. Midterm Exam-2			√	√	
3. Quizzes	√	√	√	√	
4. Assignments/Report/Seminar	√	√	√	√	
5. Final Exam	√	√	√	√	

Teaching Contact Details

Name of Course Coordinator:-	Dr. Neeraj Bhardwaj
Email of Course Coordinator:-	n.bhardwaj@mu.edu.sa
Lab/Tutorial Instructor:-	N/A
Email of Lab/Tutorial Instructor:-	N/A
Office Hours:-	Wednesday 10:00-12:00 am Tuesday 12:00 - 02:00 am
Office Number:-	N/A
Office Phone Number:-	6719

Details of Required Text Book

Book Name	Authors Name	Publisher	Year	Edition
Differential Equations with Boundary Value Problems ISBN:1111827060	Dennis G.ZILL and Warren S. Wright	Brooks/ Cole Cengage learning USA	2013	8

Details of Required Reference Books

Book Name	Authors Name	Publisher	Year	Edition
1. A First Course in Differential Equations with Modeling Applications ISBN: 1111827052	Dennis G. Zill	Brook/ Cole Cengage Learning USA	2012	10
2. Elementary Differential Equations ISBN 978-0470039403	William E. Boyce And Richard C. Diprima	Wiley	2008	9

IT Resources

The following IT Resources will require to access-

1. M U University Student Email
2. Internet
3. Course Website

Course Schedule

Course Topics	Book's Chapter	Event Name	Week Due
Introduction to differential Equations	Chapter1	Homework/ Quiz 1/Mid 1	Week-1
First order differential equations Separable differential equations Linear differential equations Exact differential equations Bernoulli and Riccati differential equations	Chapter2	Homework Quiz1/Mid 1	Week-1,2,3
- Mathematical modelling with First order differential equations. - Population growth and decay. - Radioactive Isotope and Carbon dating. - Chemical mixtures.	Chapter3	Homework/ Quiz2/Mid 1/ Mid 2	Week-4,5, 6, 7,8

- RL-electrical series circuits. -Newton's law of cooling and computing time of death - Drug distribution in human body. - Banking loans and money investment			
- Higher order differential equations. - Principle of superposition. - The Wronskian, Homogeneous differential equations with Constant coefficients (distinct real roots, repeated real roots, complex roots), Non-homogeneous differential equations with constant coefficients, Reduction of order method. - Undetermined coefficients method. - Variation of parameters method	Chapter4	Homework/ Quiz2/Mid 2	Week-9, 10, 11, 12
-Mathematical modelling with second order differential equations-Vibrating, Springs and Pendulum,Damped vibration motion LRC- electrical series circuits. -Motion of particles in space.	Chapter5		Week-13, 14, 15
		Final Exam	Week-16

Referencing Style

The **American Psychological Association (APA)** referencing style must be use for all submissions of this course.

Course Assessment Task

Assessment Name:-	Midterm Exam-1
Description of Task Assessment:-	This assignment is aligned to learning outcomes 1, 2. In that regard, the assignment contains questions that assess: <ol style="list-style-type: none"> 1.Discriminate differential equation and its order. 2.Solve first order differential equations. 4.Use mathematical modelling to solve some applicable problems by differential equations methods
Task Assessment Due Week/Date:-	Week 6
Return Week/Date to Students:-	Week 7
Weight of Task Assessment:-	20%
List of Learning Outcomes Assessed:-	<ol style="list-style-type: none"> 1. Discriminate differential equation and its order. 2. Solve first order differential equations. 3. Use mathematical modelling to solve some applicable problems by differential equations.

Assessment Name:-	Midterm Exam-2
Description of Task Assessment:-	This assignment is aligned to learning outcomes 3,4. In that regard, the assignment contains questions that assess:

	<p>3. Solve higher order differential equations.</p> <p>4. Use mathematical modelling to solve some applicable problems by differential equations methods.</p>
Task Assessment Due Week/Date:-	Week 12
Return Week/Date to Students:-	Week 13
Weight of Task Assessment:-	20%
List of Learning Outcomes Assessed:-	<p>1. Solve higher order differential equations.</p> <p>2. Use mathematical modelling to solve some applicable problems by differential equations methods</p>

Assessment Name:-	Final Exam
Weight of Task Assessment:-	40%
Duration:-	180 Minutes
Warning:-	<p>Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments)</p> <p>Calculator Permitted</p>
List of Learning Outcomes Assessed:-	<p>1. Discriminate differential equation and its order.</p> <p>2. Solve first order differential equations.</p> <p>3. Solve higher order differential equations.</p> <p>4. Use mathematical modelling to solve some applicable problems by differential equations methods.</p>