هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

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Course Title:	**Differential Equation (1)**
Course Code:	**240MATH-3**
Program:	**B.Sc. of Mathematics**
Department:	**Mathematics**
College:	**Arts and Sciences**
Institution:	**Najran University**
Version:	**1**
Last Revision Date:	**07-05-2023**

Table of Contents:

A. General information about the course:

Course Identification					
1. Credit hours:	3				
2. Course type					
a.	University ☐	College ☐	Department☒	Track☐	Others☐
b.	Required ☒	Elective☐			
3. Level/year at which this course is offered:	**3/2**				
4. Course general Description					
This course is an introduction to the study of ordinary differential equations. In this course, the definition, classification and different methods of solution are presented. Some physical, engineering, chemical, biological and other applications are also studied.					
5. Pre-requirements for this course (if any): Integration Calculus (112Math -3)					
6. Co- requirements for this course (if any): **N/A**					
7. Course Main Objective(s)					
The main objectives of the course are to familiarize the students with the essential concepts and the solutions of ordinary differential equations.					

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	3	100%
2.	E-learning		
3.	Hybrid • Traditional classroom • E-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	45

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	List the solutions of the differential equations of different kinds.	K1	Lecture Cooperative learning Problem solving Brain storming Self-Learning	Assignments Midterm Final Exam
1.2	Describe how to formulate a differential equation corresponding to some physical and mathematical laws and engineering			
2.0	Skills			
2.1	Construct the differential equations	S1	Lecture Cooperative learning Problem solving Brain storming Self-Learning	Assignments Midterm Final Exam
2.2	Find the solutions of the differential equations	S3		
3.0	Values, autonomy, and responsibility			
3.1	Independence and continuous self-learning.	V1	Assigning each group of students to collect and write topic in the course and explain it to their classmates.	Oral Exam Rubrics

C. Course Content

No	List of Topics	Contact Hours
1.	Definitions, Elimination of Arbitrary constants	6
2.	Equation of Order One :Separation of variables, Equations with homogeneous coefficients, Exact equations, The linear equation of first order, the general solution of a linear equation	6
3.	Linear differential equations: general linear equation, linear independence, Wronskian, existence and uniqueness theorem, general solution to homogeneous and nonhomogeneous equations, differential operators, basic laws of operators.	13
4.	Linear equations with constant coefficients: characteristic equation	8

	(different and repeated real eigenvalues, complex eigenvalues)	
5.	Nonhomogeneous equations: the method of undetermined coefficients, the method of inverse differential operators.	6
6.	Laplace Transform and Inverse Laplace Transform: Basic Definitions and Concepts, Solving Differential Equations.	6
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm Exam	6-8 11-13	20 20
2.	Assignments & Quizzes	During classes	10
3.	Final Exam	16-18	50

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	- Hassan Mustafa Alauidy , Abdel Wahab Abbas Rajab and Sana Ali Zare (2006) , Library of Al-Roshd , Differential Equations - Part I
Supportive References	- Kent; Nagle; Saff; Snider, Fundamentals Of Differential Equations And Boundary Value Problems (Sixth Edition), Amazon - Earl D. Rainville, Phillip E. Bedient, Elementary Differential Equations (Seventh Edition) , Macmillan Publishing Company
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom with 30 seats.

Items	Resources
Technology equipment (projector, smart board, software)	- Blackboard Platform - Mathematica Program Projector
Other equipment (depending on the nature of the specialty)	**N/A**

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student	Student Questionnaire (Indirect)
Effectiveness of students assessment	Peer Reviewer	Rubrics (Indirect)
Quality of learning resources		
The extent to which CLOs have been achieved	Faculty	Direct
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Council of Mathematics Department
REFERENCE NO.	14441017-0208-00014
DATE	17-10-1444H