هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

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Course Specification

Course Title:	**Differential Equations (2)**
Course Code:	**242Math-3**
Program:	**B.Sc. of Mathematics Sciences**
Department:	**Mathematical Sciences**
College:	**Art 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:	**4/2**				
4. Course general Description					
This course covers: the different methods of solution of second differential equation and system of equations are presented. Like variation of parameters, transformation to standard form, decompose the operator etc. Series Solutions of second order differential equations are also studied.					
5. Pre-requirements for this course (if any): Differential Equations (1) (240Math-3)					
6. Co- requirements for this course (if any):					
7. Course Main Objective(s)					
The main objective of the course is to study of the existence and uniqueness of the solutions for differential ordinary equations and methods of solving them.					

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	Memorize the basic concepts about differential equations effectively.	K1	Lecture Cooperative learning Problem solving Brain storming Self-Learning	Assignments Midterm Final Exam
1.2	List the solutions of differential equations in a sequential way.			
2.0	Skills			
2.1	Determine the appropriate method for solving the differential equations	S2	Lecture Cooperative learning Problem solving Brain storming Self-Learning	Assignments Midterm Final Exam
2.2	Formulating mathematical proofs clearly and explicitly.	S3		
3.0	Values, autonomy, and responsibility			
3.1	Independence and continuous self-learning.	V2	Assigning each group of students to collect and write topic in this course and explain it to their classmates.	Oral Exam Rubrics

C. Course Content

No	List of Topics	Contact Hours
1.	Picard Method for successive approximation, Lipschitz condition	4
2.	The existence and uniqueness of the solution, Gronwall's inequality, Dependence the solution of the initial value problem on the initial condition	7
3.	Linear systems with constant coefficients: Homogeneous, Non Homogeneous	8
5	Linear differential equations of second order with variable coefficients :variation of parameters, transformation to standard form, decompose the operator, Abel's method, replacement of the independent variable, exact equation, adjoint equation, reduction of order, Series .	26
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 II
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	http://www.nu.edu.sa/gui/SubDefault.aspx?PageId=696 http://lib.nu.edu.sa/digitalLibbrary.aspx?PageId=1494 http://lib.nu.edu.sa/SubLibbrary.aspx?PageId=1491 https://twitter.com/math1427?lang=ar
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom with 30 seats.
Technology equipment (projector, smart board, software)	- Blackboard Platform - Mathematica Program Projector

Items	Resources
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

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