Course Specification
(Bachelor)

Course Title:	**Differential Equations I**
Course Code:	**331MATH-3**
Program:	**B. Sc. in Mathematics**
Department:	**Mathematics**
College:	**Science**
Institution:	**Jazan University**
Version:	**2024**
Last Revision Date:	**9/2024**

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A. General information about the course:

1. 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:				Level7/Year3	

Level 5 / Year 3

4. Course general Description:

This course is designed to provide students with

- Some basic definitions.
- First-order differential equations and their applications.
- Higher-order differential equations with constant coefficients and their applications.
- Laplace transformations and their applications.

5. Pre-requirements for this course (if any): 212 Math.

6. Co- requirements for this course (if any): None.

7. Course Main Objective(s):

After finishing the course, the student is expected to be familiar with the following:

- Main concepts and definitions of differential equations.
- Solving 1st order of differential equations and their applications.
- Solving higher-order of DEs with constant coefficients and them applications.
- Laplace transform and application to Differential equations.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	45	100%
2.	E-learning		
3.	Hybrid • Traditional classroom • E-learning		
4.	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	42

2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	3
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	Distinguish mathematical concepts relevant to pure and applied mathematics of differential equations, first-order differential equations, higher-order differential equations with constant coefficients, and Laplace Transform and application to Differential equations.	K1	Lectures, Web based work, Classroom discussion.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments.
1.2	Identify background science, features and structure of mathematical problem in first-order differential equations, higher-order differential equations with constant coefficients, and Laplace Transform and application to Differential equations.	K2	Lectures, Web based work, Classroom discussion.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments.
1.3	Explain notations and concepts required for the solution of Mathematical problem of differential equations, first-order differential equations, higher-order differential equations with constant coefficients, and Laplace Transform and application to Differential equations.	K3	Lectures, Web based work, Classroom discussion.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments.
2.0	Skills			

2.1	Apply theoretical, computational or practical aspect relevant to course Content of differential equations, first-order differential equations, higher-order differential equations with constant coefficients, and Laplace Transform and application to Differential equations.	S1	Lectures, problem solving, web based work, Classroom discussion.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments.
2.2	Compute numerical quantities for various parameters to approximate the solution in first-order differential equations, higher-order differential equations with constant coefficients, and Laplace Transform and application to Differential equations.	S2	Lectures, problem solving, web based work, Classroom discussion.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments.
2.3	Apply various mathematical rules, techniques and theorems in Application in first-order differential equations, higher-order differential equations with constant coefficients, and Laplace Transform and application to Differential equations.	S3	Lectures, problem solving, web based work, Classroom discussion.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments.
2.4	Solve mathematical problem using critical thinking in first-order differential equations, higher-order differential equations with constant coefficients, and Laplace Transform and application to Differential equations.	S4	Lectures, problem solving, web based work, Classroom discussion.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments.
3.0	Values, autonomy, and responsibility			
3.1	Cultivate a mathematical attitude and nurture the interest.	V1	Group work, problem solving, web based work.	Assignments, Discussion.
3.2	Realize the importance of responsibilities through different	V2	Group work, problem	Assignments, Discussion.

	modes of practice, competition, and related activities.		solving, web-based work.	
3.3	Inculcating values and ethics in thought, expression and deed.	V3	Group work, problem solving, web based work.	Assignments, Discussion.

C. Course Content

No	List of Topics	Contact Hours
1.	concepts and definitions.	7
2.	first-order differential equations and their applications.	14
3.	higher-order differential equations with constant coefficients and their applications.	14
4.	Laplace Transform and application to Differential equations.	10
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework and Quiz	3	5
2.	First exam	6	20
3.	Homework and Quiz	10	5
4	Second exam	12	20
5	Final exam	15	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	Dennis G. Zill 2005, A First Course in Differential Equations, 8th edition. Copyright.
Supportive References	• Blanchard. P., R -2006-Differential Equations, 3rd ed. Boston University. • Arrowsmith C. M -1982-Ordinary Differential Equations (Chapman Hall/CRC Mathematics).
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom, Computer Lab.
Technology equipment (projector, smart board, software)	Data show; Smart Board, Mathematics software.
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Peer and program leader.	Indirect (Course Evaluation Survey)- Indirect peer evaluation.
Effectiveness of students assessment	Students, Program assessment committee.	Direct/Indirect.
Quality of learning resources	Instructor.	Direct/Indirect.
The extent to which CLOs have been achieved	Students, Faculty members.	Indirect.
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	**Board Of Mathematics Department**
REFERENCE NO.	**2417**
DATE	**29/03/1446 A. H.; 2/10/2024 A. D.**