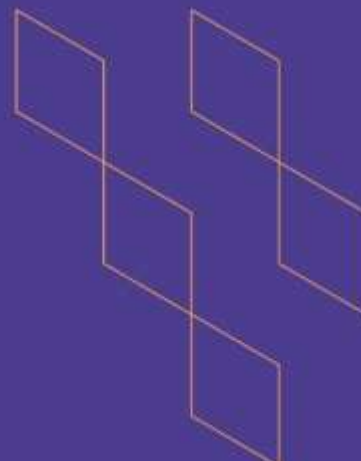




T-104
2022

Course Specification



Course Title: Differential Equations 1
Course Code: 1104241
Program: Bachelor of Mathematics
Department: Mathematics
College: College of Science
Institution: Northern Border University
Version: 3
Last Revision Date: 03-02-2024



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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:

The Fourth Level & the second year

4. Course general Description

The topics covered include ordinary differential equations and some methods to solve them.

5. Pre-requirements for this course (if any): Calculus II (1104202).

6. Co- requirements for this course (if any): No.

7. Course Main Objective(s)

By the end of this course the student will be able to classify, apply classical various methods to solve first and second order ordinary differential equations and deduce solutions of related real-world systems.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	3	100%
2.	E-learning		
3.	Hybrid <ul style="list-style-type: none"> • 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	Be aware of fundamental principles and basic concepts of ordinary differential equations.	K2	<ul style="list-style-type: none"> Self-learning Collaborative learning Class/Group discussion 	<ul style="list-style-type: none"> Written exams Discussion Assignment
2.0	Skills:			
2.1	Apply classical methods for solving ordinary differential equations.	S2	<ul style="list-style-type: none"> Class/Group discussion Problem-based learning Self-learning Collaborative learning 	<ul style="list-style-type: none"> Written exams Assignment
3.0	Values, autonomy, and responsibility			

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to ordinary differential equations: physical motivation, terminology, classification, explicit and implicit solution, initial value problem (IVP), existence and uniqueness of local solution	8
2.	First order differential equations: Separable, linear, exact and other reducible to them such as homogeneous, Bernoulli, integrating factor, maximal and global general & particular solutions	10
3.	Second order differential equations with constant coefficients: homogeneous case, particular solution to the inhomogeneous case by the undetermined coefficients method and the variation of parameter method	15
4.	Modeling real word problem by ordinary differential: Falling body problem from physics, mixture problem from chemistry and orthogonal trajectories from geometry	5
5.	Laplace transform and its inverse to solve linear ordinary differential equations	7
Total		45





D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework 1	3	5
2.	Quiz 1 (written test)	5	5
3.	Homework 2	7	5
4.	Midterm Exam (written test)	8 or 9	30
5.	Homework 3	11	5
6.	Quiz 2 (written test)	10	5
7.	Homework 4	14	5
8.	Final Exam (written test)	16-17	40
Total			100

*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	R.K. Nagle, E.B. Satt and A.D. Snider, Addison Wesley, Longman, 2000. Fundamentals of differential Equations & Boundary Value Problems.
Supportive References	W. E. Boyce and R. C. Di-Prima, 10th Edition International Student Version, Wiley, 2012. Elementary Differential Equations and Boundary Value Problems.
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms, 30 seats, demonstration rooms, labs, laboratories
Technology equipment (projector, smart board, software)	Smart Board, software and Data show
Other equipment (depending on the nature of the specialty)	-



F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student	Indirect
	Faculty	Direct / Indirect
	Program Leaders	Indirect
Effectiveness of students assessment	Faculty	Direct
	Peer Reviewer	Direct
	Program Leaders	Direct / Indirect
Quality of learning resources	Student	Indirect
	Faculty	Direct
	Faculty	Direct

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Mathematics Department council
REFERENCE NO.	9 th meeting of the academic year 1444-1445 H
DATE	01/08/1445 corresponding to 11/02/2024

