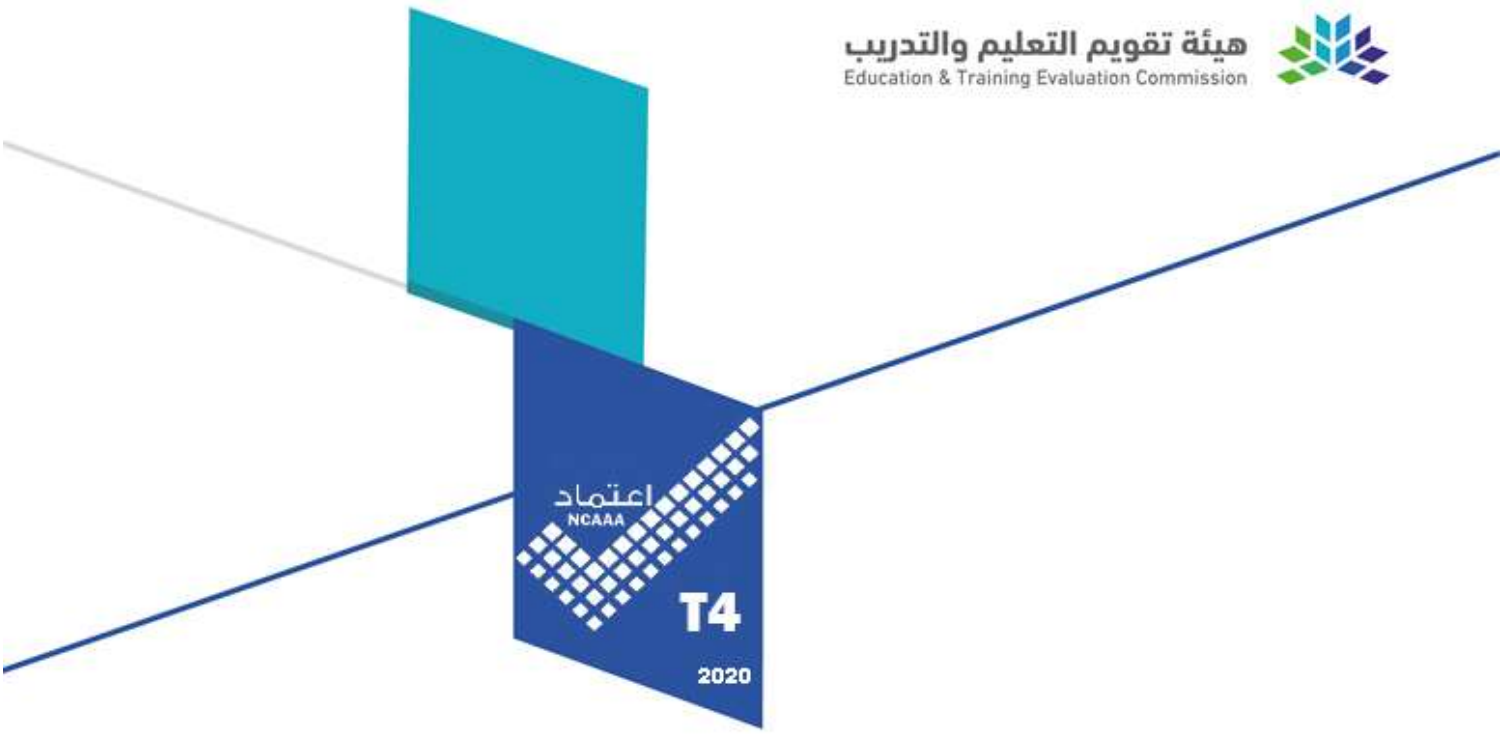
هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Differential Equations (1)
Course Code:	Math 204
Program:	Bachelor of Science in Mathematics
Department:	Mathematics
College:	Science
Institution:	University of Tabuk

Table of Contents

A. Course Identification

1. Credit hours: 03 Hours/Week
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: L4/Y2
4. Pre-requisites for this course (if any)**: Math 200**
5. Co-requisites for this course (if any)**:** **None**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	45	100
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	45
2	**Laboratory/Studio**	
3	**Tutorial**	
4	**Others** (specify)	
	Total	45

B. Course Objectives and Learning Outcomes

1. Course Description

The course will demonstrate the usefulness of ordinary differential equations for modeling physical and other phenomena. Complementary mathematical approaches for their solution will be presented, including analytical methods, graphical analysis and numerical techniques. The basic content of the course includes.

2. Course Main Objective

-Students will be able to recall the basic concepts and theories of ordinary differential equations.
-Students will demonstrate proficiency in applying various techniques to solve ordinary differential equations.
-Students will be able to recognize the importance of ordinary differential equations in modeling physical problems.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	students will be able to recall theories and concepts of differential equations.	K1
1.2	students will be able to demonstrate knowledge of analytical procedures for solving differential equations of first and second order.	K2
2	**Skills :**	
2.1	students will be able to analyze the correct formulas and the analytical procedures to find the right solution.	S1
2.2	students to be able to apply theories and techniques to solve problems.	S3
2.3	Students will be able to communicate with Peers and Lectures	S4
3	**Values:**	
3.1	Students will be able to work within a group.	V1
3.2	Students will take responsibility for solving the given assignments on their own and submit the solution on time.	V2

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to differential equations and solutions of differential equations.	3 HRS
2	Classification of Differential Equations.	3 HRS
3	Method for solving first-Order Differential Equations, Separable equations.	3 HRS
4	Method for solving first-Order Differential Equations s, Exact equations.	3 HRS
5	Method for solving first-Order Differential Equations, Homogeneous equations.	3 HRS
6	**Mid-Exam#1**	
6	Method for solving first-Order Differential Equations Linear equations and.	3 HRS
7	Application, Bernoulli equation	3 HRS
8	Second- and Higher-Order Equations.	3 HRS
9	Linear equations with constant coefficients, the auxiliary equation; Complex roots, Repeated roots, Method.	3 HRS
10	Linear independence and Wronskian, Differential operators, some properties of differential operators.	3 HRS
11	**Mid-Exam#2**	
11	Non homogeneous Second-Order Linear Equations with Constant Coefficients, The operator $1/f(D)$; evaluation of $[1/f(D)]\ eax$	3 HRS
12	Higher-Order Linear Equations with Constant Coefficients	3 HRS
13	Flux and Divergence Complex roots, Repeated roots, Method of Undetermined coefficients, Power series, Series solutions at ordinary points, Regular point.	3 HRS
14+15	**Revision & Final Exam**	6 HRS
Total		**45 Hrs**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	students will be able to recall theories and concepts of differential equations.	Introducing new ideas through case study Lectures Class Discussions	Quizzes I II Midterm Exams Final Exams Homework assignments.
1.2	students will be able to demonstrate knowledge of analytical procedures for solving differential equations of first and second order.		
2.0	**Skills**		
2.1	students will be able to analyze the correct formulas and the analytical procedures to find the right solution.	Lectures Class Discussions	Quizzes I II Midterm Exams Final Exams Homework assignments.
2.2	students to be able to apply theories and techniques to solve problems.		
2.3	Students will be able to communicate with Peers and Lectures		
3.0	**Values**		
3.1	Students will be able to work within a group.	Lectures Assign tasks	Quizzes Homework assignments.
3.2	Students will take responsibility for solving the given assignments on their own and submit the solution on time.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Activities	Weekly basis	5%
2	Homework	Weekly basis	5%
3	Quizzes	Weekly basis	10%
4	Mid Exam1	6th week	20%
5	Mid Exam2	11th week	20%
6	Final Exam	At end of the Semester	40%

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Six office hours per week in the lecturer schedule.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Elementary Differential Equations 6th ed. (1981) Author; Earl D. Rainsville and Phillipe E. Bedient

Essential References Materials	Courant, Richard, and Fritz John. Introduction to calculus and analysis I. Springer Science & Business Media, 2012
Electronic Materials	None
Other Learning Materials	None

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	- Lecture Room with maximum capacity of 30 students and equipped with White Board, Overhead projector and internet connection. - Library
Technology Resources (AV, data show, Smart Board, software, etc.)	Projectors
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	Direct and Indirect
Extent of achievement of course learning outcomes	Teachers	Direct
Quality of learning resources	Students	Indirect

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	The Curriculum committee
Reference No.	
Date	25/08/2021