هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

Course Title:	**Differential Calculus**
Course Code:	**101Math-4**
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:	4				
2. Course type					
a.	University ☐	College ☒	Department☒	Track☐	Others☐
b.	Required ☒	Elective☐			
3. Level/year at which this course is offered:	**1/1**				
4. Course general Description This course is designed to cover topics in Pre-calculus (the real numbers, factoring, rational expressions, exponents and radicals, solving equations and inequalities (including linear, quadratic, fractional, radical, and absolute value), functions (including linear, polynomial, rational, root, absolute value, exponential, logarithmic, trigonometric, composition), and graphing.), and the Differential Calculus. It includes limits and continuity, derivatives, and applications of derivatives. The types of functions studied include algebraic, trigonometric, exponential and logarithmic.					
5. Pre-requirements for this course (if any): **None**					
6. Co- requirements for this course (if any): **None**					
7. Course Main Objective(s) Students are expected to have strong and sound understanding of the differentiation calculus in term of its concepts, techniques and theorems. Students are expected to apply them on studying the behavior of a function.					

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	5	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	30
5.	Others (specify)	
	Total	75

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	Define the basic concepts of inequalities and functions, and their rules	K1	• Lecture • Cooperative learning • Problem solving • Brain storming • Self-Learning	• Assignments • Quizzes • Midterm • Final Exam
1.2	Define the limit and the continuity of functions, and its derivatives on the real numbers system			
2.0	Skills			
2.1	Solve equations and inequalities	S1	Lecture Cooperative learning Problem solving Brain storming Self-Learning	• Assignments • Quizzes • Midterm • Final Exam
2.2	Find the limit of a function and its continuity.			
2.3	Derive the functions.			
2.4	Apply the derivative of functions for studying the behavior of functions			
3.0	Values, autonomy, and responsibility			
3.1				

B. Course Content

No	List of Topics	Contact Hours
1.	**Pre-calculus: The real numbers system, equations and inequalities.**	15
2.	**Limits and Continuity**	
2.1	Definition of Limits	2
2.2	Limits Laws	5
2.3	Limits Involving Infinity	3
2.4	Continuity of Functions	3
3.	**Derivatives**	
3.1	The Limit definition of derivative & the Tangent Line Problem	3
3.2	Differentiation Rules	3
3.3	Derivative of Trigonometric Functions	3
3.4	The Chain Rule	3
3.5	Derivative of Logarithmic and Exponential Functions	3
3.6	Implicit Differentiation	3
3.7	Higher Order Derivatives	3
3.8	The Derivative of Inverse Functions	5
4.	**Application of Derivatives**	
4.1	Indeterminate Form and L'Hoptail Rule	3
4.2	The Mean Value Theorem	2
4.3	Extreme Values of Functions	3
4.4	Monotonic Behavior of Functions	4
4.5	Concavity and the Inflection Points	3
4.6	Sketching Curve of Functions	6
Total		75

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm Exams	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	صالح السنوسي ، معروف عبد الرحمن ، كمال الهادي عبد الرحمن ، يوسف الخميس : مبادئ التفاضل والتكامل (الجزء الثاني) ، مكتبة الملك فهد الوطنية أثناء النشر ردمك 5 – 30 – 38 – 9960 لعام 1421 هـ
Supportive References	رمضان جهيمة و احمد عبدالعالي هب الريح، التفاضل والتكامل الجزء الاول ، 2002، الطبعة الثالثة، دار الكتاب الجديد المتحدة - George Thomas, Joel Hass, Maurice D. Weir, Thomas' Calculus, 2014, 13th edition, Pearson Education. - Howard Anton, Calculus, 2009, 9th edition, JOHN WILEY & SONS, INC. - Salas, Calculus: One and Several Variables, 2007, 10th edition, JOHN WILEY & SONS, INC.
Electronic Materials	https://www.youtube.com/watch?v=CkpHcB5HYSE&list=PLpSIRgI7BcxPQ4UppBd2-PsgbwSKv6-rj
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
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