3. Course Specifications:

3-1 Basic science courses

Course Specification

Course Title:	Differentiation and Integration -1
Course Code:	MATH 1311-3
Program:	Bachelor in Engineering
Department:	Engineering
College:	Science
Institution:	King Khalid University
Version:	2
Last Revision Date:	25/03/2023

Table of Contents:

A. General information about the course:

Course Identification					
1. Credit hours:	5				
2. Course type					
a.	University ☐	College ☒	Department☐	Track☐	Others☐
b.	Required ☐	Elective☐			
3. Level/year at which this course is offered:					1st level / 1st year
4. Course general Description					
This course is focus on **Solution of Equations:** The equations of first, second and third degrees, solution by factorization and quadratic formula, solution of inequalities, domain of a function and trigonometric functions. **Limits**: To study different kinds of limits, left hand limit and right-hand limit. **Continuity**: Different kinds of discontinuity. Derivatives: Definition of derivative, different rules of derivatives. The slope and the tangent line, Derivative of the sine and cosine, The product and quotient and power rules. **Applications of the Derivative**: Linear approximation, maximum and minimum problems. **The Chain Rule**: Derivatives by the chain rule, implicit differentiation.					
5. Pre-requirements for this course (if any):					
NA					
6. Co- requirements for this course (if any):					
None					
7. Course Main Objective(s)					
On successful completion of this course, students should be able to: ○ **Acquired knowledge and skills about the basis and theories of the basic fundamentals of Mathematics.** ○ **Apply the basic fundamentals of differential calculus in solving problems.** ○ **Apply the basic fundamentals of differential calculus in application calculus.** ○ **Apply the basic fudamentals to solve different kind of equations and inequalities.**					

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	--	--
2.	E-learning	--	--
3.	Hybrid	5	100

No	Mode of Instruction	Contact Hours	Percentage
	• Traditional classroom • E-learning		
4.	Distance learning	--	--

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	60
2.	Laboratory/Studio	--
3.	Field	--
4.	Tutorial	
5.	Others (specify)	--
	Total	**60**

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	Understand and know the scientific background of Differential Calculus.	K1		
1.2	Know the processes and methods to solve different kinds of equations and inequalities	K2		
1.3	Understand depth of the theoretical basis of Differential Calculus	K3		
1.4	Demonstrate knowledge of different approaches that can be used for Differential Calculus.	K4		
1.5	Familiar to quantities methods appropriate Differential Calculus	K5		

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.0	Skills			
2.1	Understand and know the scientific background of Differential Calculus	S1		
2.2	Understand in depth the theoretical basis of Differential Calculus	S2		
2.3	Demonstrate knowledge of different approaches that can be used for Differential Calculus.	S3		
2.4	Familiar to quantities methods appropriate to Differential Calculus	S4		
3.0	Values, autonomy, and responsibility			
3.1	Adhere to ethical values and excellence in professional practices.	V1	Feedback, experiential learning, structured experiences in groups, self-assessment, profiling.	Critical assessment, self-assessment, Rubrics
3.2	Able to articulate awareness of and demonstrate personal characteristics and critical thinking that positively impact the learning process.	V2		
3.3	Take full responsibility for initiating, identifying, amending, and achieving aims.	V3		

C. Course Content

No	List of Topics	Contact Hours
1.	***Equations, Inequalities, factorization and quadratic formula and revision of some basic skills of mathematics.***	**10**
2.	***Equations, Inequalities, factorization and quadratic formula and revision of some basic skills of mathematics.***	**10**
3	***Trigonometric functions and some properties and identities.***	**5**
4	***Definition of limits, techniques of finding limits and sandwich theorem.***	**10**
5	***Continuity, discontinuity and intermediate value theorem.***	**5**

6	*Definition of derivatives, basic rules of differentiation, techniques of derivatives, limits and derivatives of trigonometric functions, the chain rules, implicit differentiation and applications of derivation in finding the equation of tangent lines.*	10
7	*Rolle's theorem, mean value theorem, extremum, first and second derivative tests, asymptotes and graph of functions.*	5
8	*General review*	5
Total		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Practical applications (solutions exercises), quizzes, and homework	Weekly	35
2.	Partial exam (midterm exam)	7	25
3.	Final exam	13	40

*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	E. W. Swokowski, M. Olinick, D. Pence & J. A. Cole, *Calculus*, 6thEdition, PWS Publishing Company, Boston. 1994.
Supportive References	
Electronic Materials	• Websites on the internet that are relevant to the topics of the course. • E-learning lms.kku.edu.sa
Other Learning Materials	NA.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for 50 students
Technology equipment (Projector, smart board, software)	• Data show device, Video Conference system and Smart boards • Computers loaded with modern software and connected to Internet service
Other equipment (Depending on the nature of the specialty)	Not Applicable

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer Reviewer + Students	Direct
Effectiveness of students' assessment	Peer Reviewer + Q&D Committee	Direct
Quality of learning resources	Programs & Curricula Committee + Q&D Committee	Direct
The extent to which CLOs have been achieved	Quality and Development Committee	Indirect
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	25-3-2023