Course Specification
(Bachelor)

Course Title: Introduction to Calculus
Course Code: MTH1101
Program: BSc. in Mathematics
Department: Mathematics
College: Al-Qunfudah University College
Institution: Umm Al-Qura University
Version: 2
Last Revision Date: 17/07/2024

Table of Contents

A. General information about the course:

1. 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 introductory calculus course covers differentiation and integration of functions of one variable. It is the first in a three-course sequence of calculus. Key topics of the course include precalculus, limits and continuity, derivatives, integrals.

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

6. Pre-requirements for this course (if any)**:**

7. Course Main Objective(s):

The primary objective of the course is to introduce students to the concepts of calculus and to develop the student's confidence and skill in dealing with mathematical expressions. To achieve this goal, the course will help the student understand the following basic concepts: limits, continuity , derivatives and integration involving real-valued functions of one variable (including algebraic and trigonometric functions).

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	4	100 %
2	E-learning	0	0
3	Hybrid • Traditional classroom • E-learning	0	0
4	Distance learning	0	0

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	36
2.	**Laboratory/Studio**	0
3.	**Field**	0
4.	**Tutorial**	0
5.	**Others (***Exam, Quizzes, Activities...***)**	4
Total		**40**

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	Recognize the characteristics of a function expressed in symbolic or graphic form.	K1	**Lecture and Tutorials**	**Exams, quizzes**
1.2	Outline the definitions of limits and continuity of a single-variable Function and related theorems.	K1, K4	**Lecture and Tutorials**	**Exams, quizzes**
1.3	Define the basic concepts and techniques of integration of polynomial, rational, and trigonometric functions.	K1, K4	**Lecture and Tutorials**	**Exams, quizzes**
1.4	Define the basic concepts and techniques of integration of polynomial, rational, and trigonometric functions.	K3, K4	**Lecture and Tutorials**	**Exams, quizzes**
2.0	**Skills**			
2.1	Analyze functions represented in a variety of ways: graphical, numerical or analytical	S1, S8	**Lecture and Tutorials**	**Exams, quizzes**
2.2	Determine the limits of functions and their	S1, S3, S8	**Lecture and Tutorials**	**Exams, quizzes**

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	continuity at points or on intervals.			
2.3	Calculate the derivative of various type of functions using the rules and techniques of differentiation.	S1, S8, S9	Lecture and Tutorials	Exams, quizzes
2.4	Evaluate integrals of real functions using basic rules and techniques of integration.	S6, S8, S9	Lecture and Tutorials	Exams, quizzes
3.0	Values, autonomy, and responsibility			
3.1	Apply the computational and conceptual principles of calculus to the solutions of various mathematical problems.	V2, V3	Lecture/ Individual or group work	Exams, quizzes
3.2	Justify the choice of different steps in problem resolution procedure.	V2, V3	Lecture/ Individual or group work	Exams, quizzes
3.3	Solve problems using a range of formats and approaches in basic science.	V1, V2, V3	Lecture/ Individual or group work	Exams, quizzes
3.4	Show the ability to work independently and within groups.	V2	Lecture/ Individual or group work	Exams, quizzes

C. Course Content

No	List of Topics	Contact Hours
1.	**Pre-Calculus:** (I) Exponents and Radicals. (II) Solving Equations. (III) Inequalities and Absolute Values. (IV) Lines	8
2.	**Functions** (I) Functions: Definition, Graphs and Operations (II) Trigonometric Functions and Identities.	4
3	**Limits and Continuity:** (I) Introduction to Limits (II) Theorems on limits (III) Limit at infinity and infinite limits (IV) Continuity	8
4	**Differentiation** (I) Definition of Derivative (Using Limits) (II) Rules and Theorems for Finding Derivatives (III) Derivative of Trigonometric Function	10

	(IV) Chain Rule (V) Higher Order Derivatives	
5	**Integration** (I) Antiderivatives. (II) Fundamental Theorems of Calculus.	**6**
6	**Others** Quizzes, Activities …	**4**
Total		**40**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm exam	6th	30 %
2.	Quizzes and homework's	During semester	20 %
3.	Final exam	End of semester	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	*Calculus (9th Edition), Dale Varberg, Edwin Purcell and Steven Rigdon, Prentice Hall (2006).*
Supportive References	• *Thomas' Calculus (14th Edition), George B. Thomas* • *Precalculus: Mathematics for Calculus (6th Edition), James*
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (projector, smart board, software)	Data Show, Smart Board
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Courses Assessment survey
Effectiveness of Students assessment		
Quality of learning resources	Students	
The extent to which CLOs have been achieved	Faculty Member	
Periodically reviewing course effectiveness and planning for improvement	Course committee	

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Curriculum Committees
REFERENCE NO.	1
DATE	17/07/2024