



## Course Specifications

<b>Course Title:</b>	Calculus
<b>Course Code:</b>	MTH1104
<b>Program:</b>	Physics
<b>Department:</b>	Mathematical sciences
<b>College:</b>	Applied sciences
<b>Institution:</b>	Umm Al-Qura University

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## A. Course Identification

1. Credit hours: <b>4</b>
2. Course type a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input type="checkbox"/> Others <input type="checkbox"/> b. Required <input type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: <b>Second level/First year</b>
4. Pre-requisites for this course (if any): <b>Introduction to Calculus</b>
5. Co-requisites for this course (if any): <b>Not applicable</b>

### 6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	<b>Four hours/week</b>	%100
2	Blended	0	0
3	E-learning	0	0
4	Distance learning	0	0
5	Other	0	0

### 7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	<b>40</b>
2	Laboratory/Studio	0
3	Tutorial	0
4	Others (Exam, Quizzes, Activities, ...)	0
	<b>Total</b>	<b>40</b>

## B. Course Objectives and Learning Outcomes

<b>1. Course Description</b> This course provides an introduction to differential calculus and their application, as well as the definite integral and their applications.
<b>2. Course Main Objective</b> After studying this course, the student will be able to: <ul style="list-style-type: none"> <li>• Find the inverse function and their derivatives.</li> <li>• Calculate the derivative of various type of functions using some techniques of differentiation.</li> <li>• Calculate integrals over infinite intervals</li> <li>• Apply the definite integral in geometry and engineering</li> </ul>

### 3. Course Learning Outcomes

CLOs		Aligned PLOs
1	<b>Knowledge and Understanding: by the end of this course, the student is expected to be able to</b>	
1.1	List formulas and theorems of differentiation of some real valued functions.	K1
1.2	Recall the relation between the derivative of a function and the derivative of its inverse	K1, K2
1.3	Defined the principles of integral evaluation	K1, K2
1.4		
2	<b>Skills: by the end of this course, the student is expected to be able to</b>	
2.1	Calculate the derivative of various type of functions using some techniques of differentiation.	S1
2.2	Calculate integrals over infinite intervals	S1
2.3	Apply the definite integral in geometry and engineering	S2
3	<b>Values: by the end of this course, the student is expected to be able to</b>	
3.1	Show the ability to work independently and within groups.	V2
3.2		
3.3		
3.4		

### C. Course Content

No	List of Topics	Contact Hours
1	Implicit Differentiation and Related Rates	4
2	Differentials and Approximations	2
3	Inverse Functions and their Derivatives	4
4	Applications of the derivative	10
5	The Definite Integral	10
6	Applications of the Integral	10
Total		40

### 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	<b>Knowledge and Understanding</b>		
1.1	List formulas and theorems of differentiation of some real valued functions.	Lecture and Tutorials	Exams, quizzes



Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.2	Recall the relation between the derivative of a function and the derivative of its inverse	Lecture and Tutorials	Exams, quizzes
1.3	Defined the principles of integral evaluation	Lecture and Tutorials	Exams, quizzes
1.4		Lecture and Tutorials	Exams, quizzes
<b>2.0</b>	<b>Skills</b>		
2.1	Calculate the derivative of various type of functions using some techniques of differentiation.	Lecture/Individual or group work	Exams, quizzes
2.2	Calculate integrals over infinite intervals	Lecture/Individual or group work	Exams, quizzes
2.3	Apply the definite integral in geometry and engineering	Lecture/Individual or group work	Exams, quizzes
<b>3.0</b>	<b>Values</b>		
3.1	Show the ability to work independently and within groups.	Lecture/Individual or group work	Exams, quizzes
3.2			
3.3			
3.4			

## 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm exam	Sixth week	30%
2	Quizzes and homeworks	During semester	20%
3	Final exam	End of semester	50%

\*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 :

All faculty members are required to be in their offices outside teaching hours. Each member allocates at least 4 hours per week to give academic advice to students and to better explain the concepts seen during the lectures.

Students are required to complete the homework problems. Students are welcome to work together on homework. However, each student must turn in his or her own assignments, and no copying from another student's work is permitted. Deadline extensions for homework will not be given. Students are encouraged to discuss with professor about homework problems.

## F. Learning Resources and Facilities

### 1. Learning Resources

Required Textbooks	<ul style="list-style-type: none"> <li>Calculus (9th Edition), Dale Varberg, Edwin Purcell and Steven Rigdon, Prentice Hall (2006).</li> </ul>
Essential References Materials	<ul style="list-style-type: none"> <li>Thomas' Calculus (14<sup>th</sup> Edition), George B. Thomas</li> <li>Precalculus: Mathematics for Calculus (6<sup>th</sup> Edition), James Stewart</li> </ul>

Electronic Materials	None
Other Learning Materials	None

## 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	Data Show, Smart Board
<b>Other Resources</b> (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 <sup>[1]</sup>	Students	Direct
Quality of learning resources	Students	Direct
Extent of achievement of course learning outcomes	Faculty Member	Direct

**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	
Reference No.	
Date	