



Course Specifications

Course Title:	Calculus 1
Course Code:	MTH 101
Program:	BS-Mathematics
Department:	Mathematics
College:	College of Sciences, AlZulfi
Institution:	Majmaah University, Saudi Arabia

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A. Course Identification

1. Credit hours: 4(3+1)
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 1 st Semester /1 st year
4. Pre-requisites for this course (if any):
5. Co-requisites for this course (if any):

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	67	90%
2	Blended	0	0%
3	E-learning	8	10%
4	Distance learning	0	0%
5	Other		0%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	45
2	Laboratory/Studio	0
3	Tutorial	30
4	Others (specify)	0
	Total	75

B. Course Objectives and Learning Outcomes

1. Course Description :

This course covers the following subjects:

Real numbers and real line – Inequalities – Functions – The graph of a functions – Even and Odd Functions – Composite of Functions – Trigonometric Functions – Inverse Functions – Inverse Trigonometric Functions – Limits – Properties of Limits – Techniques for evaluating Limits – Infinite Limits – Continuity – Properties of Continuity – Differentiation – The Relationship between Differentiation and Continuity – Differentiation Laws – Derivative of Trigonometric and Inverse Trigonometric Functions – Derivative of Hyperbolic and Inverse Hyperbolic Functions –Logarithmic and Exponential Functions and their derivatives – Using the first derivative to studying an increasing and decreasing functions – Chain Rule's Implicit Differentiation – Lohospital's Role - Rolle's Role and the Mean Value Theorems - Using Differentiation to studying concavity of functions and studying some applications of Differentiation.

2. Course Main Objective

- Students are expected to
- 1- To enable the students to understand the concepts calculus
- 2- The course aims at providing the student with the proper knowledge, cognitive skills, interpersonal skills, responsibility, communication skills, use of information technology skills and self – kinetics skills.
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- Have a knowledge of line of real numbers and how solving an inequalities.
- Have the knowledge of the function of one variable and studying its properties and also how to draw the curve of the function.
- Have knowledge of how to limit of the function and studying its continuous.
- From this course students can find the derivative of the function and studying the relationship between differentiation and continuity.
- Have knowledge of finding the tangent of the curve and the maximum and minimum values of the function.
- Have of knowledge of how the function increased and decreased and draw it to the shape of the curve.
- Identify the quantity to be optimized and the constraint and solving it .
- Having the knowledge of the function and its properties and its different kinds.
- Having knowledge of how to find the limit of a function and studying its continuity.
- Have a knowledge of the derivative of a function and derivatives of different types of functions.
- Have knowledge of finding the equation of tangent and normal of a curve and the maximum and minimum values of the function.
- Learning curve sketching
- Identify the quantity to be optimized and the constraint and solving it.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Define functions- Limits - continuity – Differentiability – trigonometric functions, inverse trigonometric functions. Hyperbolic functions, inverse Hyperbolic functions and their derivatives.	K1
1.2	Reproduce and State Methods of differentiability – exponential and logarithmic functions Have the knowledge of the function and its properties and its different kinds. Have knowledge of how to find the limit of a function and studying its continuity. Have a knowledge of the derivative of a function and derivatives of different types of functions. Have knowledge of finding the equation of tangent and normal of a	K1

CLOs		Aligned PLOs
	curve and the maximum and minimum values of the function. Learning curve sketching.	
1.3	Recognize Real numbers and real line – Inequalities – Functions – The graph of a functions – Even and Odd Functions – Composite of Functions – Trigonometric Functions – Inverse Functions – Inverse Trigonometric Functions – Limits – Properties of Limits.	K1
1.4		
2	Skills :	
2.1	The students will explain and interpret a general knowledge of calculus	S1
2.2		
2.3		
2...		
3	Values:	
3.1	Solve different mathematical problems (Limits- Continuity – Differentiation)	C2
3.2		
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Real numbers and real line – Inequalities – Functions – The graph of a functions – Even and Odd Functions – Composite of Functions – Trigonometric Functions – Inverse Functions – Inverse Trigonometric Functions – Limits – Properties of Limits.	12
2	Techniques for evaluating Limits – Infinite Limits – Continuity – Properties of Continuity – Differentiation	08
3	The Relationship between Differentiation and Continuity – Differentiation Laws.	12
4	Derivative of Trigonometric and Inverse Trigonometric Functions – Derivative of Hyperbolic and Inverse Hyperbolic Functions.	08
5	Logarithmic and Exponential Functions and their derivatives – Using the first derivative to studying an increasing and decreasing functions – Chain Role's Implicit Differentiation.	12
6	L'hospital's Role - Rolle's Role and the Mean Value Theorems Using Differentiation to studying concavity of functions and studying some applications of Differentiation.	08
Total		60

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	Recognize Real numbers and real line – Inequalities – Functions – The graph of a functions – Even and Odd Functions – Composite of Functions – Trigonometric Functions – Inverse Functions – Inverse Trigonometric Functions – Limits – Properties of Limits.	Direct teaching: lectures Aimed teaching: Discovery and oral questions	<ul style="list-style-type: none"> • Homework • Quiz • Midterms • Final Exams • E-exam •
1.2	Define Functions – The graph of a functions – Even and Odd Functions – Composite of Functions – Trigonometric Functions – Inverse Functions – Inverse Trigonometric Functions – Limits – Properties of Limits.	Direct teaching: lectures Aimed teaching: Discovery and oral questions •	<ul style="list-style-type: none"> • Homework • Sudden Quizzes • Midterms • Final Exams • E-exam •
1.3	Reproduce and State The Relationship between Differentiation and Continuity – Differentiation Laws. Techniques for evaluating Limits – Infinite Limits – Continuity – Properties of Continuity – Differentiation	Direct teaching: lectures Aimed teaching: Discovery and oral questions. Indirect teaching: Peer Learning •	<ul style="list-style-type: none"> • Continuous discussions with the students during the lectures. • Midterms • Final Exams • E-exam •
2.0	Skills		
2.1	The students will explain and interpret a general knowledge of calculus.	Aimed teaching: Discovery and oral questions. Encourage the student to look for some complicated problems in the different references. Indirect teaching: Peer Learning •	Continuous discussions with the students during the lectures. • Continuous discussions with the students during the lectures.
2.2	Enable students to analyses the mathematical problems.	• Ask the student to attend lectures for practice solving problem.	Doing homework. • Check the problems solution.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.3	Ability to understand and analyze the mathematical problems	<ul style="list-style-type: none"> Homework assignments. 	<ul style="list-style-type: none"> Quizzes
3.0	Values		
3.1	Ability to work in a team to understand the problem	<ul style="list-style-type: none"> Group discussion 	<ul style="list-style-type: none"> Exercise Electronic MCQ Test
3.2			
...			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm Exam 1	7th	20 %
2	Midterm Exam 2	12th	20 %
3	Electronic Exam	13th	5 %
4	Homework	During semester	5 %
5	Group Homework	During semester	5 %
6	Quizzes	During semester	5 %
7	Final Examination	14th	40 %
8	Total		100 %

*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 :

Department of mathematics has “**Student Academic Advisory Committee**”. This committee is responsible for students counseling and advising works in synchronization and collaboration with the Deanship of Admissions and Registration and Student Affairs. Department of mathematics Alzulfi has a continuous and standardized procedure that be associated with the student's progress until completion of degree and includes psychological, social and behavioral guidance. This advisory committee also maintain the student's files. The students with GPA below than 50 % in Mid 1 and Mid 2 are stayed under serious observation and continuous consultations with respective course instructor about their performing. The course teacher will commit to a minimum scheduled time for student consultation equivalent to 4 HOURS PER WEEK.

The contact with students by e-mail and website.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Single Variable Calculus : Early Transcendentals seventh edition James Stewart. Cengage learning 2011 13:978 -0-538-49857-8 0:978 -0-538-49867-6 1)
Essential References Materials	1) Calculus Smith/Minton Mc Graw Hill 2012 9780071316576 2) أحمد.د.أ جهينه رمضان .د.أ ترجمه فريدي .ا.ج التكامل و التفاضل حساب نظريه الكرماني صادق Mc Graw Hill 2010 3) اخرون و مندلسون شوم ايزي ملخصات التكامل و التفاضل حساب Mc Graw Hill 2013 1)
Electronic Materials	http://joshua.smcvt.edu/calculus http://faculty.mu.edu.sa/khaled/calculus 1 http://www.youtube.com/calculus/
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	<ul style="list-style-type: none"> - The size of the room should be proportional to the number of students - Provide enough seats for students. - The number of students do not exceed on 30 in the classroom
Technology Resources (AV, data show, Smart Board, software, etc.)	<ul style="list-style-type: none"> - Mathematics Lab is equipped with a computer. - Provide overhead projectors and related items i.e smart Board, Wi-Fi, AV. - Updated Math Software i. e Mathematica, Matlab, Maple. etc
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students/ internal committee	Direct (Students evaluation electronically organized by Deanship of registration and admission)/ Verification of students' papers
Extent of achievement of course learning outcomes	Staff members (Peer Reviewer)	Indirect (Frequent meetings consultation among the teaching staffs)

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Quality of learning resources.	Staff members (course coordinators)	Direct (Meeting between course coordinators and the tutors)

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	