Kingdom of Saudi Arabia
Ministry of Higher Education
College of Computer & Information Sciences
Majmaah University

College of Computer
and Information Sciences
كلية علوم الحاسب والمعلومات

جامعة المجمعة
Majmaah University

Course Profile

Course Name:-	**Calculus (1)**
Course Code:-	**MATH-112**
Academic Year:-	**1435-1436 H**
Semester:-	**Level 3**

Course Overview

This course is introducing the following topics

1) **Limits and Continuity:** The Concept of Limit, Computation of Limits, Continuity and its Consequences, The Method of Bisections, Limits Involving Infinity, Asymptotes.

2) **The Derivative**: Tangent Lines and Velocity, The Derivative, Computation of Derivatives: The Power Rule, Higher Order Derivatives, The Product and Quotient Rules, Chain rule. Derivatives of trigonometric functions. Exponential, logarithmic, and hyperbolic functions and their derivatives. Implicit differentiation and inverse function's derivative. Derivatives of high order. Hospital's Rule and undetermined forms.

3) **Applications of the Derivative:** Absolute and local extreme, critical points, tests for local extreme, concavity and inflection points, and applications. Rolle's Theorem and the Mean Value Theorem. Curve sketching using calculus. Optimization problems, Linear approximation. Newton and fixed point iteration methods.

4) **Integrals:** Anti-derivatives, Indefinite Integral; Integration by Substitution; Integration by Parts; .Riemann sums; The Definite Integral; Area under curves; The Fundamental Theorems of Calculus; The Mean Value Theorem of Integration.

Course Details

Level:-	3
Credit:-	3(3+0+1)
Pre-Requisites:-	None
Co- Requisites:-	None

Learning Outcomes of Course

After successful completion of this course, student will be able to-

1. Find a limit (numerically, graphically and analytically).
2. Calculate derivatives of complicated functions.
3. Apply differentiation to problems such as related rates, graphing and optimization.
4. Find and interpret the integrals of elementary functions.

5. Pursue later courses in calculus.

Course Assessment

Name of Assessment Task	Weight of Assessment	Week Due
1. Midterm Exam-1	20%	7th
2. Midterm Exam-2	20%	12th
3. Quizzes	10%	4th , 9th , 12th
4. Assignments	10%	5th , 8th, 11th, 14th
5. Final Exam	40%	16th

Assessment Task and Learning Outcomes Alignment

Assessment Task Name	Course Learning Outcomes				
	1	2	3	4	5
1. Midterm Exam-1	√	√			
2. Midterm Exam-2			√	√	
3. Quizzes	√	√	√	√	
4. Assignments/Report/Seminar	√	√	√	√	
5. Final Exam	√	√	√	√	√

Teaching Contact Details

Name of Course Coordinator:-	Dr. Sunil Kumar Sharma
Email of Course Coordinator:-	s.sharma@mu.edu.sa
Lab/Tutorial Instructor:-	N/A
Email of Lab/Tutorial Instructor:-	N/A
Office Hours:-	Monday 10am-11 am, Thursday 11.00 am - 12. pm
Office Number:-	024-1-18-1
Office Phone Number:-	0164045388

Details of Required Text Book

Book Name	Authors Name	Publisher	Year	Edition
1. Calculus, Early Transcendental Functions,.	Robert Smith, Roland Minton,	McGraw-Hill Science Engineering,	4th	2007

Details of Required Reference Books

Book Name	Authors Name	Publisher	Year	Edition
1. Calculus, Early Transcendental	C. Henry Edwards, David E. Penney	Prentice Hall	2008	
2. Calculus	L. Hostetler & Edwards	Houghton Mifflin Publisher	2005	8th
3. Calculus	O. Swokowski	PWS Pub. Co	1994	6th

IT Resources

The following IT Resources will require to access-
1. https://www.desmos.com/
2. http://tutorial.math.lamar.edu/

Course Schedule

Course Topics	Book's Chapter	Event Name	Week Due
Functions, Concept of Limit, computation of limit	**Chapter 1..Limit and Continuity**		Week-1
Definition of continuity, computation of continuity	**Chapter 1..Limit and Continuity**		Week-2
Intermediate Value theorem, Compuation of roots by bisection method	**Chapter 1..Limit and Continuity**		Week-3
Limit at Infinity Horizontal Asymptotes, Slant Asymptotes	**Chapter 1..Limit and Continuity**		Week-4
Tangent Lines and Velocity, The Derivative, Computation of Derivatives: The Power Rule	**Chapter 2.. Differentiation**	Quize-1	Week-5
Higher Order Derivatives, The Product and Quotient Rules, Chain rule.	**Chapter 2.. Differentiation**	Assignment-1	Week-6

Derivatives of trigonometric functions. Exponential, logarithmic, and hyperbolic functions and their derivatives.	**Chapter 2.. Differentiation**	Midterm 1	Week-7
Derivatives of higher order.	**Chapter 2.. Differentiation**	Assignment-2	Week-8
Hospital's Rule and undetermined forms. Derivatives of high order	**Chapter 7.. Integration Technique**	Quize-2	Week-9
Absolute and local extreme, critical points, tests for local extreme, concavity and inflection points, and solution to the problems	**Chapter 3.. Application of Differentiation**		Week-10
Rolle's Theorem and the Mean Value Theorem. Curve sketching using calculus.	**Chapter 2.. Differentiation**	Assignment-3	Week-11
Optimization problems, Linear approximation. Newton and fixed point iteration methods.	**Chapter 3.. Application of Differentiation**	Midterm -2	Week-12
Anti-derivatives, Indefinite Integral; Integration by Substitution; Integration by Parts;	**Chapter 4.. Integration**	Assignment-4	Week-13
Riemann sums; The Definite Integral; Area under curves	**Chapter 4.. Integration**	Quize-3	Week-14
The Fundamental Theorems of Calculus; The Mean Value Theorem of Integration.	**Chapter 4.. Integration**		Week-15
Final Examination		Final Examination	Exam Week

Course Assessment Task

The **American Psychological Association (APA)** referencing style must be use for all submissions of this course.

Assessment Name:-	Midterm Exam-1
Description of Task Assessment:-	**The closed book written examinations of 2 hour will be conducted. The questions will be asked in this paper are of remembering, understanding, application and analysis level question which will in turn increase the mathematical logical skill, linguistic and spatial skill.**
Task Assessment Due Week/Date:-	**7th**
Return Week/Date to Students:-	**8th**
Weight of Task Assessment:-	**20%**
List of Learning Outcomes Assessed:-	1. Find a limit (numerically, graphically and analytically). 2. Calculate derivatives of complicated functions.

Assessment Name:-	Midterm Exam-2
Description of Task Assessment:-	This assignment is aligned to learning outcomes 1, 2,3and 4.In that regard, the assignment contains questions that assess: 1)Students' gain knowledge of the fundamental definition of the derivative, 2)Students' able to understand its relationship to the tangent line. 3) Students are able to recognize when a function is not differentiable. 4) Students are able to evaluate the derivative of any function constructed via composition, multiplication, division, and addition of elementary functions. 5) Students are able to distinguish between implicitly- and explicitly-defined functions and be able to determine derivative information for implicit functions. 6) Students are able to solve elementary optimization problems and characterize the critical points of functions of one variable.
Task Assessment Due Week/Date:-	7th
Return Week/Date to Students:-	8th
Weight of Task Assessment:-	20%
List of Learning Outcomes Assessed:-	1. Find a limit (numerically, graphically and analytically). 2. Calculate derivatives of complicated functions. 3. Apply differentiation to problems such as related rates, graphing and optimization.

Assessment Name:-	Final Exam
Weight of Task Assessment:-	40%
Duration:-	3 Hours
Warning:-	NIL
List of Learning Outcomes Assessed:-	1. Find a limit (numerically, graphically and analytically). 2. Calculate derivatives of complicated functions. 3. Apply differentiation to problems such as related rates, graphing and optimization. 4. Find and interpret the integrals of elementary functions. 5. Pursue later courses in calculus.