MATH 112

CALCULUS (2)
Term 4 - 2014

Course Profile

All details in this course profile for MATH 112 have been officially approved by College of Computer and Information Science, Majmaah University. The information will not be change unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

General Information

OVERVIEW

Calculus is the mathematical study of change, in the same way that geometry is the study of shape and algebra is the study of operations and their application to solving equations. It has two major branches, differential calculus (concerning rates of change and slopes of curves), and integral calculus (concerning accumulation of quantities and the areas under curves); these two branches are related to each other by the fundamental theorem of calculus. Both branches make use of the fundamental notions of convergence of infinite sequences and infinite series to a well-defined limit. Generally considered to have been founded in the 17th century by Isaac Newton and Gottfried Leibniz, today calculus has widespread uses in science, engineering and economics and can solve many problems that algebra alone cannot..

DETAILS

Level	3
Credit Points	3(3+0+1)
Student Contribution Band	-
Function of full Time Student Load	-

PRE-REQUISITES OR CO-REQUISITES

Pre-requisite: Nil

ATTENDANCE REQUIRMENTS

All CSIS students are expected to attend scheduled classes, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. The attendance and academic progress requirements in each study period (satisfactory attendance for all students is defined as maintaining at least a 90% attendance record).

ASSESSMENT OVERVIEW

Assessment Task	Weighting
1. Midterm Exam-1	**: 20%**
2. Midterm Exam-2	**: 20%**
3. Quizzes	**: 10%**
4. Assignments/Report/Seminar	**: 10%**
5. Final Exam	**: 40%**

This is a graded course: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the course of at least 60%, or an overall grade of 'pass' in order to pass the course. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than

60%). Consult the University's Grades and Results Procedures for more details of interim results and final grades.

MAJMAAH University Policies

All University policies are available on the WEBPortal (mu.edu.sa) .

You may wish to view these policies:

- Assessment of Coursework Procedures
- Grads and Results Procedure
- Review ox Grade Policy
- Plagiarism Procedure
- Student Misconduct and Plagiarism Policy
- Monitoring Academic Progress Policy
- Monitoring Academic Progress Policy
- Monitoring Academic Progress Procedures
- Refund Excess Payments (Credit Balances) Policy
- Student complaints Policy
- Use of Internet, mail and Computing Facilities Policy

This list is not an exhaustive list of all University policies. The full lists of University policies are available on the http:/mu.edu.sa

Course Leaning Outcomes

Upon successful completion of the course, students should 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.

Alignment of Learning outcomes, Assessment and Graduate attributes

ALLIGNMENT OF ASSESSMENT TASKS TO LEARNING OUTCOMES

	Learning Outcomes

Assessment Task	1	2	3	4	5
1. Midterm Exam-1	.	.			.
2. Midterm Exam-2	.	.	.		.
3. Quizzes	.	.	.	.	.
4. Assignments/Report/Seminar	.	.	.	.	.
5. Final Exam	.	.	.	.	.

Textbook and Resources

1. Calculus, Early Transcendental Functions, Robert Smith, Roland Minton, McGraw-Hill Science Engineering, 2007.

PRESCRIBED TEXTBOOKS

Guide to Firewalls 7 VPN			
Author/s	: Robert Smith, Roland Minton	Year	: 2007
Edition	:	McGraw-Hill Science Engineering	:
City	:	State	:MA
Country	:USA		

IT RESOURCES

You will need access to the following IT resources:

- CSIS, Majmaah University Student Email
- Internet
- Course Website

Referencing style

All submissions for this course must use the **American Psychological Association (APA)** referencing style (details can be obtained here), OR **Harvard (author-date)** referencing style (details can be obtained here). For further information, see the Assessment Tasks below.

Teaching Contacts

Course Coordinator:	Dr Sunil Kumar Sharma
Lab/Tutorial Instructor:	-
Email:	s.sharma@mu.edu.sa
Office Hours:	8.00 a.m. to 02.30 p.m.
Office Number:	0164045381

Schedule

Week	Module/Topic	Chapter	Event and submission
Week-1	Limits	Functions, Concept of Limit, computation of limit	
Week-2	Continuity	Definition of continuity, computation of continuity	Assignment-1
Week-3	The Method of Bisections	Intermediate Value theorem, Compuation of roots by bisection method	Quiz 1
Week-4	Limits Involving Infinity	Limit at Infinity Horizontal Asymptotes, Slant Asymptotes	
Week-5	The Derivative	Tangent Lines and Velocity, The Derivative, Computation of Derivatives: The Power Rule	Assignment 2
Vacation week	The Derivative	Higher Order Derivatives, The Product and Quotient Rules, Chain rule.	
Week-6	The Derivative	Derivatives of trigonometric	First Midterm

		functions. Exponential, logarithmic, and hyperbolic functions and their derivatives.	Test
Week-7	The Derivative	Derivatives of high order. Hospital‘s Rule and undetermined forms.	
Week-8	The Derivative	Hospital‘s Rule and undetermined forms. Derivatives of high order	Quiz2
Week-9	Applications of the Derivative	Absolute and local extreme, critical points, tests for local extreme, concavity and inflection points, and solution to the problems	Assignment -3
Week-10	Applications of the Derivative	Rolle’s Theorem and the Mean Value Theorem. Curve sketching using calculus.	Second Midterm Test
Week-11	Applications of the Derivative	Optimization problems, Linear approximation. Newton and fixed point iteration methods.	Assignment 4
Week-12	Integrals	Anti-derivatives, Indefinite Integral; Integration by Substitution; Integration by Parts;	Display of the result.
Week-13	Integrals	Riemann sums; The Definite Integral; Area under curves; The Fundamental Theorems of Calculus; The Mean Value Theorem of Integration.	Quize-4
Review Exam Week			Final Examination
Exam Week			Final Examination

,

Assessment Task

WRITTEN ASSESMENT

Assessment Title	Midterm Exam-1
Task Description	This assignment is aligned to learning outcomes 1,. In that regard, the assignment contains questions that assess: 1) students' gain knowledge of Limit; 2) students' able to understand contunity;
Assessment Due Date	**Week 6**
Return Date to Students	Week 8
Weighting	20%
Assessment Criteria	Students have to write a written test question paper will be provided to he sudents
Referencing Style	American Psychological Association (APA) or Harvard (author-date)
Submission	Question paper will be collected and collected from the students and marks will be displayed.
Learning Outcomes Assessed	**1.** Find a limit (numerically, graphically and analytically). **2.**

Assessment Title	Midterm Exam-2
Task Description	This assignment is aligned to learning outcomes 1, 2, 4 and 5. 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.
Assessment Due Date	**Week 10**
Return Date to Students	Week 12
Weighting	20%
Assessment Criteria	Students have to write a written test question paper will be provided to the sudents.
Referencing Style	American Psychological Association (APA)
Submission	Question paper will be collected from the students and marks will be displayed.
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.** Pursue later courses in calculus.

Assessment Title	Final Examination
Task Description	This assignment task is aligned to learning outcomes 1, 2, 3, 4 and 5. In that regard, the assignment contains questions that assess: 1) Students are able to find the limits of functions and determine continuity of functions. 2) Students are able to find derivatives of algebraic and some trigonometric functions, and use derivatives to solve applied problems. 3) Solve elementary optimization problems and characterize the critical points of functions of one variable. 4) Describe the definite integral as the signed area under the curve, y = g(x), and state the definition as the limit of Riemann sums that approximate this area. 5) Successfully apply the Substitution Method and Integration by Parts to express antiderivatives in terms of elementary functions. 6) Evaluate definite integrals and demonstrate a working knowledge of the inverse relationship between differentiation and integration.
Assessment Due Date	**Week 14**
Return Date to Students	Week 15

Weighting	40%
Assessment Criteria	Students have to write a written test question paper will be provided to the sudents.
Referencing Style	American Psychological Association (APA)
Submission	Question paper will be collected from the students and marks will be displayed.
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.

Outline	Complete an examination
Date	**During University examination period**
Weighting	**40%**
Length	3 Hrs
Details	Question paper will be given to the students Calculator Permitted Closed Books
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.