



Course Specifications

Course Title:	Calculus 1
Course Code:	MH 113,
Program:	Basic Science
Department:	Computer Science
College:	College of Computer and Information Sciences
Institution:	Majmaah University



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A. Course Identification

1. Credit hours: 3(3,0,1)
2. Course type a. University <input type="checkbox"/> College <input checked="" type="checkbox"/> Department <input 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: Level 1
4. Pre-requisites for this course (if any): N/A
5. Co-requisites for this course (if any): N/A

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	40	100%
2	Blended		
3	E-learning		
4	Distance learning		
5	Other		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	
3	Tutorial	
4	Others (specify) Exercises	10
	Total	40

B. Course Objectives and Learning Outcomes

1. Course Description

1) **Limits and Continuity:** The Concept of Limit, Computation of Limits, Continuity and its Consequences, 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 and inverse trigonometric functions. Exponential, logarithmic. Implicit differentiation and inverse function's derivative. Derivatives of high order.

3) **Applications of the Derivative:** Linear approximation. Hospital's Rule and undetermined forms. 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.

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.

2. Course Main Objective

- a) This course aims at giving student knowledge in fields:
- b) Give the intuitive knowledge of limits and continuity of a function.
- c) Study the fundamental concepts of differential calculus.
- d) Study the applications of derivatives to solve a variety of problems.
- e) Study the fundamental concepts of integral calculus
- f) Develop students' skills in problem solving.
- g) Pursue the later courses of the mathematics

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1		
1.2		
1.3		
1...		
2	Skills :	
2.1	CLO-1: Find a limit (numerically, graphically and analytically).	S5
2.2	CLO-2: Calculate derivatives of complicated functions.	S5
2.3	CLO-3: Apply differentiation to problems such as related rates, graphing and optimization.	S5
2.4	CLO-4: Find and interpret the integrals of elementary functions.	S5
2.5	CLO-5: Pursue later courses in calculus.	S5
3	Values:	
3.1		

CLOs		Aligned PLOs
3.2		
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	The Concept of Limit: definition concept, some question, Continuity and its Consequences: definition concept, some question,	4
2	Asymptotes Definition working rules and some questions, Tangent lines & velocity, The	4
3	Derivative definition, Computation of Derivatives: some example and basic formula, Power rule.	4
4	Higher order derivatives. The Product and Quotient Rules, Chain rule for finding derivatives of composite functions, Derivatives of trigonometric functions.	4
5	By using first law of derivative, Derivatives of Exponential, logarithmic, and hyperbolic functions, Derivatives of hyperbolic functions continue	4
6	Derivatives Implicit differentiation, Inverse functions and their derivative. Derivatives Inverse functions continues, Derivatives of high order involving inverse functions	4
7	L' Hospital's Rule and undetermined forms, Linear approximation Applications of the Derivative: Absolute and local extreme, critical points, Tests for local extreme, concavity and inflection points, and applications	4
8	Rolle's Theorem: Definition, Mean Value Theorem: Definition & Example, Curve sketching using calculus, Curves of binomial, algebraic, trigonometric functions etc, simple method	4
9	Integrals: Anti-derivatives definition & result of basic functions, Indefinite Integral, Integration by Substitution: Working method and questions, Integration by Parts : Working rules and questions	4
10	Riemann sums; Definition and process of finding Integral, Definite Integral Continue some questions, Area of curves: Application of integral, The Mean Value Theorem of Integration,	4
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	Knowledge and Understanding		
1.1			
1.2			
...			
2.0	Skills		
2.1	CLO-1: Find a limit (numerically, graphically and analytically).	Classroom Method	Quiz, Midterm Final Assignments
2.2	CLO-2: Calculate derivatives of complicated functions.	Classroom Method	Quiz, Final Assignments
2.3	CLO-3: Apply differentiation to problems such as related rates, graphing and optimization.	Classroom Method	Quiz, Midterm Final Assignments
2.4	CLO-4: Find and interpret the integrals of elementary functions.	Classroom Method	Quiz, Midterm Final Assignments

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.5	CLO-5: Pursue later courses in calculus.	Classroom Method	Quiz, Final Assignments
3.0	Values		
3.1			
3.2			
...			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quiz 1	Week 3	10%
2	Assignment 1	Week 3	10%
3	Midterm	Week 6	20%
4	Assignment 2	Week 7	10%
5	Quiz 2	Week 9	10%
6	Final Exam	Week 12	%40
7			
8			

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Students are invited to meet their academic advisors regularly for any kind of problems related to academics and personal growth

Students are also invited to consult with their respective course instructors during office hours for any kind of problems related to academics and personal growth

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Robert Smith, Roland Minton “Calculus, Early Transcendental Functions” McGraw-Hill, 4 edition (2012). ISBN 978-0-07-338311-8
Essential References Materials	1. Calculus Early Transcendentals, C. Henry Edwards, David E. Penney, Prentice Hall, 2008 2. Calculus, L. Hostetler & Edwards, Houghton Mifflin Publisher, 2005, 8th 3. Calculus, O. Swokowski, et al, PWS Pub. Co., 1994, 6th
Electronic Materials	a) tutorial.math.lamar.edu/Classes/CalcI/CalcI.a.spx . b) mathforum.org/calculus/calculus.units.html

	c) https://apstudent.collegeboard.org/apcourse/ap-calculus.../calculator-poli .
Other Learning Materials	Robert Smith, Roland Minton “Calculus, Early Transcendental Functions” McGraw-Hill, 4 edition (2012). ISBN 978-0-07-338311-8

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom
Technology Resources (AV, data show, Smart Board, software, etc.)	Smart Board, Projector
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Internet Connection

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Final Exam Evaluation	Peers	Verification of Marks
Course Report Verification	Quality Coordinator	Check List

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	