Course Specification

(Bachelor)

Course Title:	Calculus 1
Course Code:	MH113
Program:	Basic Science
Department:	Computer Science
College:	College of Computer and Information Sciences
Institution:	Majmaah University
Version:	2023
Last Revision Date:	11/09/2023

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3,1,0)					
2. Course type					
A.	☐University	☒ College	☐Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 1)					
4. Course general Description: Mathematics					
5. Pre-requirements for this course (N/A):					
6. Pre-requirements for this course (if any):					
7. Course Main Objective(s):					
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					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	15
5.	**Others (specify)**	
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	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).	**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**		
…				
3.0	**Values, autonomy, and responsibility**			
3.1				
3.2				
…				

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.	6
2.	Asymptotes Definition working rules and some questions, Tangent lines & velocity	6
3.	Derivative definition, Computation of Derivatives: some example and basic formula, Power rule.	6
4.	Higher order derivatives. The Product and Quotient Rules, Chain rule for finding derivatives of composite functions, Derivatives of trigonometric functions.	8
5.	By using first law of derivative, Derivatives of Exponential, logarithmic, and hyperbolic functions, Derivatives of hyperbolic functions continue	8
6.	Derivatives Implicit differentiation, Inverse functions and their derivative. Derivatives Inverse functions continues, Derivatives of high order involving inverse functions.	6
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	6
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.	6
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**Quiz 1**	**Week 3**	**10%**
2.	Assignment 1	**Week 4**	**10%**
3.	**Midterm**	**Week 7**	**20%**
4.	Assignment 2	**Week 8**	**10%**
5.	Quiz 2	**Week 12**	**10%**
6.	**Final Exam**	**Week 16**	**40%**

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Robert Smith, Roland Minton "Calculus, Early Transcendental Functions" McGraw-Hill, 4 edition (2012). ISBN 978–0–07– 338311–8
Supportive References	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
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	**Classroom**
Technology equipment (projector, smart board, software)	**Smart board**
Other equipment (depending on the nature of the specialty)	**Internet connection**

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer faculty members	Direct
Effectiveness of Students assessment	students	Indirect
Quality of learning resources	Program leaders	Direct
The extent to which CLOs have been achieved	Peer reviewer	Direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**DR. AHMED FARGHALY**
REFERENCE NO.	**170986**

DATE	**11/09/2023**