Course Specifications

Course Title:	Calculus 1
Course Code:	MATH110
Program:	Information Technology
Department:	Computer Science & Information
College:	Science at AL-Zulfi
Institution:	Majmaah University

Table of Contents

A. Course Identification

1. Credit hours: **3**
2. Course type **a.** University ☐ College ☐ Department ☒ Others ☐ **b.** Required ☒ Elective ☐
3. Level/year at which this course is offered: **1th level**
4. Pre-requisites for this course (if any)**:** **Nil**
5. Co-requisites for this course (if any)**:** **Nil**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	48	80%
2	**Blended**	6	10%
3	**E-learning**	6	10%
4	**Correspondence**	-	-
5	**Other**	-	-

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	30
2	**Laboratory/Studio**	
3	**Tutorial**	30
4	**Others** (specify)	
	Total	60
Other Learning Hours*		
1	**Study**	30
2	**Assignments**	30
3	**Library**	
4	**Projects/Research Essays/Theses**	10
5	**Others** (specify)	30
	Total	100

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description :

The current course aims to provide a language for working with ideas relevant to computer science. The course is concerned with two main topics: Differential and Integral Calculus. The 1st topic is covered completely including Basic Concepts of the function as: Domain, Range, Mathematical Modeling, Composition, Boundness, Equality, Intervals of Increase and Decrease, Piecewise-definition, Symmetry and Homogeneity. Classification, Important types, Graphs and Related Properties, Algebraic Operations on the graph. The Inverse: Conditions and Tests of Existence, Principal Branches, Analytical and Graphical Determination of the inverse. Indeterminate Forms (0*∞, ∞-∞): Definitions, Concepts, Related Theorems, and Evaluations, Definitions of Continuity and Discontinuity. The Derivatives of all standard functions: Power Function, Trigonometric Functions and their Inverse, Hyperbolic Functions and their Inverse, considering : Graph, Domain, Range, Symmetry, and Periodicity. Applications of the Derivatives regarding: General derivatives, Implicit Differentiation, Parametric Differentiation and the Chain Rule, Important theorems as: Roll's, Mean Value, Maclurin's, Taylor's and L'Hopital Theorems, Geometric applications: Curve tracing, Polar Coordinates, Famous polar curves.

The 2nd topic covers all the essential requirements of integral Calculus, starting with Indefinite Standard Integration including all the Basic Concepts and Properties, Notable Remarks, Tables Of Standard Integration (All Elementary Functions), Basic Forms, Various Skills Using Algebraic Relations to obtain different forms of the solution of the same problem. Also, the student will have robust study of Techniques of Evaluation of Indefinite Non-standard Integration: Completing a perfect square, Partial Fractions, By-Parts, and Substitutions.

2. Course Main Objective:

1. Introduces specific tools for analysis and verification and a practical framework for understanding important computing ideas.
2. Furnishes procedures, and processes to describe a mathematical result in everyday terms.
3. Describes and defines mathematical models that explain and express physical phenomenon, chemical reaction, and even commercial, social, and political relations.
4. Constructs algebraic tools that create well developed accurate solutions.
5. Verifies independent critical thinking and problem solving skills.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	The students will explain and interpret general knowledge of Calculus	a1
1.2	Enable students to analyze the mathematical problems.	a1
1.3	Outline the logical thinking. Analyze the problem, plan for the solution, develop the solution(s), and justify these solution(s). Manage and compile the effects of quantities that can never be directly evaluated.	a1

CLOs		Aligned PLOs
1.4	The student should interpret how to know the basic mathematical principles using the internet.	a1
1.5	The students will explain and interpret general knowledge of Calculus	a1
2	**Skills :**	
2.1	Classify, and convert relations from one domain to another to reproduce new adequate form that clearly match a solution.	b2
2.2	Enable students to analyze the mathematical problems.	b2
2.3		
2...		
3	**Competence:**	
3.1	Summarize procedures, processes and describe the mathematical results. Distinguish the importance of the different terms in a given relation	C1
3.2	The student should interpret how to know the basic mathematical principles using the internet.	C2
3.3	The student should interpret how to know the basic mathematical principles using the internet.	C2
3...		

C. Course Content

No	List of Topics	Contact Hours
1	The Function Definitions, Domain, Range, Mathematical Modeling, Composition, Boundness, Equality, Intervals of Increase and Decrease, Piecewise-defined functions, Symmetric and Homogenous Functions.	9
	Classification, Important types, Graphs and Related Properties, Algebraic Operations on the graph. The Inverse: Conditions and Tests of Existence, Principal Branches, Analytical and Graphical Determination of the inverse.	
	Indeterminate Forms (0*∞, ∞-∞): Definitions, Concepts, Related Theorems, and Evaluations, Definitions of Continuity and Discontinuity.	
2	The Derivative Basic Concepts; Change; Average of Change and Rate of Change. Algebraic and Geometrical meanings.	9
	Elementary Functions: Power Function, Trigonometric Function and their Inverse, Hyperbolic Functions and their Inverse. And regarding : Graph, Domain, Range, Symmetry, Periodicity.	
3	Applications of the Derivative General derivatives: Implicit Differentiation, Parametric Differentiation and the Chain Rule.	9

	Important theorems: Definitions and importance of: Roll's, Mean Value, Maclurin's, Taylor's and L'Hopital Theorems. Geometric applications: Curve tracing, Polar Coordinates, Famous polar curves	
4	Indefinite Standard Integration Introduction & Basic Concepts and Properties. Notable Remarks. Tables Of Standard Integration (All Elementary Functions), Basic Forms, Various Skills Using Algebraic Relations to obtain different forms of the solution of the same problem.	6
5	Techniques of Evaluation of Indefinite Standard Integration : Completing a perfect square, Partial Fractions, By-Parts, Substitutions.	6
...		
Total		

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**		
1.1	Recognize, indicate and discuss the rate of growth/decay of any relation. Classify, and convert relations from one domain to another to reproduce new adequate form that clearly match a solution. Summarize procedures, processes and describe the mathematical results.	Start each chapter by general idea and the benefit of it. Demonstrate the course information and principles through lectures.	Written Exam Homework assignment Class Activities Quizzes.
1.2	Distinguish the importance of the different terms in a given relation		
…			
2.0	**Skills**		
2.1	The students will explain and interpret a general knowledge of Calculus	Encourage the student to look for some complicated problems in the different references. Ask the student to attend lectures for practice solving problem.	Written Exam Homework assignment Class Activities Quizzes
2.2	Enable students to analyses the mathematical problems		
…	Student's ability to write physical equations in a correct mathematical way.		
3.0	**Competence**		
3.1	The student should appraise how to Use the computer skills and	Encourage the student to ask good	Written Exam

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	library.	question to help solve the problem.	Homework assignment Class Activities Quizzes
3.2	The student should illustrate how to Search the internet and using software programs to deal with problems.		
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	First written mid-term exam	6	15%
2	Second written mid-term exam	12	15%
3	Presentation, class activities, and group discussion	Every week	10%
4	Homework assignments	After each chapter	10%
5	Homework + reports	Every two weeks	10%
6	Final written exam	16	40%
7	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 :

Office hours: Sun: 8-10, Mon. 10-12

Email: m.badawi@mu.edu.sa

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Calculus And Its Applications,David J. Ellenbogen Addison Wesley 2007,9783319701516
Essential References Materials	Calculus,James Stewart,Brooks/Cole Publishing Company, 2007
Electronic Materials	
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms etc.)	Classroom and Labs as that available at college of science at AzZulfi are enough.
Technology Resources (AV, data show, Smart Board, etc.)	Smart Board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	N/A

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Questionnaires (course evaluation) achieved by the students and it is electronically organized by the university.	Students	Indirect
Student-faculty management meetings.	Program Leaders	Direct
Discussion within the staff members teaching the course	Peer Reviewer	Direct
Departmental internal review of the course.	Peer Reviewer	Direct
Reviewing the final exam questions and a sample of the answers of the students by others.	Peer Reviewer	Direct
Visiting the other institutions that introduce the same course one time per semester.	Faculty	Indirect

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	Dr. Maria Altaib
Reference No.	
Date	19/09/2019