Course Specifications

Course Title:	Calculus 1
Course Code:	MATH 112
Program:	B.Sc. in Computer Science and Information
Department:	Computer Science and Information
College:	College of Science
Institution:	Majmaah University

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A. Course Identification

1. Credit hours:	3(3+0)								
2. Course type									
a.	University		College		Department	√	Others		
b.	Required	√	Elective						
3. Level/year at which this course is offered:	3rd level / second year								
4. Pre-requisites for this course (if any)**:** PMATH 127									
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**	21	70%
2	**Blended**		
3	**E-learning**	3	10%
4	**Correspondence**	3	10%
5	**Other**	3	10%

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	21
2	Laboratory/Studio	
3	Tutorial	6
4	Others (specify) Seminars and presentations	3
	Total	30
Other Learning Hours*		
1	Study	20
2	Assignments	15
3	Library	10
4	Projects/Research Essays/Theses	15
5	Others (specify)	
	Total	60

* 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

Recognize the functions - Types of functions- The Domain of functions – The range of functions - decomposition on functions - properties of functions – Operations on functions.

Define functions - Limits - continuity – Differentiability – trigonometric functions, inverse trigonometric functions, Hyperbolic functions, inverse Hyperbolic functions and their derivatives.

Reproduce and State Methods of differentiability – exponential and logarithmic functions Have the knowledge of the function and its properties and its different kinds. Have knowledge of how to find the limit of a function and studying its continuity. Have knowledge of the derivative of a function and derivatives of different types of functions. Have knowledge of finding the equation of tangent and normal of a curve.

2. Course Main Objective

Generally,

Students are expected to:

1- Enable to understand the concepts of calculus.

2- The course aims at providing the student with the proper knowledge, cognitive skills, interpersonal skills, responsibility, communication skills, use of information technology skills and self – kinetics skills.

Specially, Study of main concepts of Calculus as follows:

- Have the knowledge of the function of one variable and studying its properties and kinds also how to draw the curve of the function.
- Have knowledge of how to find limit of the function and studying its Continuity.
- From this course the student can find the derivative of the function and studying the relationship between Differentiation and Continuity.
- Have knowledge of finding the tangent of the curve.
- Have knowledge of how the function increased and decreased and draw it.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
1.3	Recognize: Functions – The graph of functions – Even and Odd Functions – Composite of Functions – Trigonometric Functions – Inverse Functions – Inverse Trigonometric Functions – Limits – Properties of Limits. Define: Techniques for evaluating Limits – Infinite Limits – Continuity – Properties of Continuity – Differentiation. Reproduce and State: The Relationship between Differentiation and Continuity – Differentiation Laws. Describe: The Derivative of Trigonometric and Inverse Trigonometric Functions – Derivative of Hyperbolic and Inverse Hyperbolic Functions.	K3
2	**Skills:**	
2.1	The students will explain and interpret a general knowledge of Calculus 1. Enable students to analyses the mathematical problems. Ability to understand and analyze the mathematical problems. Ability to think analytically and critically.	S1
3	**Competence:**	
3.3	Use current techniques, skills, and tools necessary for computing practice. The student should illustrate how take up responsibility. Must be shown the ability of working independently and with groups. Students can actively and critically participate in class activities.	C3

C. Course Content

No	List of Topics	Contact Hours
1	Functions – The graph of a functions – Even and Odd Functions – Composite of Functions – Trigonometric Functions – Inverse Functions – Inverse Trigonometric Functions – Limits – Properties of Limits.	5
2	Techniques for evaluating Limits – Infinite Limits – Continuity – Properties of Continuity – Differentiation	5
3	The Relationship between Differentiation and Continuity – Differentiation Laws.	5
4	Derivative of Trigonometric and Inverse Trigonometric Functions – Derivative of Hyperbolic and Inverse Hyperbolic Functions.	5
5	Logarithmic and Exponential Functions and their derivatives – Chain Rule's - Implicit Differentiation.	5

6	L'Hopital's Rule - Rolle's Theorem and the Mean Value Theorem - studying some applications of Differentiation.	5
Total		30

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**		
1.3	Recognize: Functions – The graph of functions – Even and Odd Functions – Composite of Functions – Trigonometric Functions – Inverse Functions – Inverse Trigonometric Functions – Limits – Properties of Limits. Define: Techniques for evaluating Limits – Infinite Limits – Continuity – Properties of Continuity – Differentiation. Reproduce and State: The Relationship between Differentiation and Continuity – Differentiation Laws. Describe: The Derivative of Trigonometric and Inverse Trigonometric Functions – Derivative of Hyperbolic and Inverse Hyperbolic Functions.	**Direct teaching**: Inquiry-based instruction PowerPoints Discussions **Aimed teaching**: Discovery Oral questions **Indirect teaching**: Peer Learning	Mid terms Final Exams E-exam Quiz
2.0	**Skills**		
2.1	The students will explain and interpret a general knowledge of Calculus 1. Enable students to analyses the mathematical problems. Ability to understand and analyze the mathematical problems. Ability to think analytically and critically.	**Direct teaching**: Inquiry-based instruction PowerPoints Discussions **Aimed teaching**: Discovery Oral questions **Indirect teaching**: Peer Learning	Midterms Final Exams
3.0	**Competence**		
3.3	Use current techniques, skills, and tools necessary for computing practice.	**Direct teaching**: Lectures **Aimed teaching**:	Midterms Final Exams Homework

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	The student should illustrate how take up responsibility. Must be shown the ability of working independently and with groups. Students can actively and critically participate in class activities.	Discovery Oral questions **Indirect teaching**: Cooperative Learning	

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	7th week	20 %
2	Midterm 2	12th week	20 %
3	HomeWorks	Through of semester	5 %
4	Quizzes	Through of semester	10 %
5	Electronic Exam	13th week	5 %
6	Final exam	End of semester	40 %
7			
8			

***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:

1- 4-office hours per week in the lecturer schedule:

Sunday 12-2 & Tuesday 12-2.

2- The contact with students by e-mail and website.

3- Activation of the virtual classrooms and academic guidance via Black Board LMS.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Single Variable Calculus: Early Transcendental seventh edition James Stewart. Cengage learning 2011 13:978 -0-538-49857-8 0:978 -0-538-49867-6
Essential References Materials	Calculus, Smith/Minton Mc Graw Hill 2012 9780071316576

Electronic Materials	http://joshua.smcvt.edu/alculus http://www.youtube.com/calculus/
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Lecture room with speakers and internet access. Classroom with capacity of 30-students. Library
Technology Resources (AV, data show, Smart Board, software, etc.)	Desktop or laptop with internet facility. Data show to facilitate going over students' papers in class.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students/ internal committee	Direct (Students evaluation electronically organized by Deanship of registration and admission)/ Verification of students' papers
Extent of achievement of course learning outcomes	Staff members (Peer Reviewer)	Indirect (Frequent meetings consultation among the teaching staffs)
Quality of learning resources.	Staff members (course coordinators)	Direct (Meeting between course coordinators and the tutors)

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	