COURSE DESCRIPTIONS

Faculty	Science and Information Technology				
Department	Mathematics			**NQF level**	
Course Title	Calculus I	**Code**	853101	**Prerequisite**	
Credit Hours	3	**Theory**	3	**Practical**	
Course Leader	Dr. Areen Alkhateeb	**email**	Areen.k@jadara.edu.jo		
Lecturers	Dr. Areen Alkhateeb Dr Ahmed Heilat Dr. Tareq Qawasmeh	**emails**	Areen.k@jadara.edu.jo a.heilat@jadara.edu.jo ta.qawasmeh@jadara.edu .jo		
Lecture time	8:30-10:00 Sun-Tus	**Classroom**	D006 + Online		
Semester	2	**Production**	2021	**Updated**	2022
Awards				**Attendance**	Fulltime

Short Description
Functions: domain, operations on functions, graphs of functions; trigonometric functions; limits: meaning of a limit, computational techniques, limits at infinity, infinite limits; continuity; limits and continuity of trigonometric functions; the derivative: techniques of differentiation, derivatives of trigonometric functions; the chain rule; implicit differentiation; differentials; Roll's Theorem; the mean value theorem; the extended mean value theorem; L'Hopital's rule; increasing and decreasing functions; concavity; maximum and minimum values of a function; graphs of functions including rational functions (asymptotes) and functions with vertical tangents (cusps); antiderivatives; the indefinite integral; the definite integral; the fundamental theorem of calculus ; logarithmic and exponential functions and their derivatives and integrals; limits (the indeterminate forms); some techniques of integration.
Course Objectives
Upon completion of this course, the student should be able to: • Know the basic theories of calculus and the accompanying mathematical techniques and procedures required and become well-trained on them. • Solve several practical applications of calculus and to solve several applied problems using differentiation and integration in a clear, logical manner. • Develop ability to reason logically, then transfer mathematical concepts from one situation to another rather than memorizing mechanical procedures..

Learning Outcomes
A. Knowledge - Theoretical Understanding
Student is expected to a1) Explain the limit for various types of functions and explain whether a given function is continuous at a certain point. a2) Discuss the idea of the differentiation and integration for various types of functions
B. Knowledge - Practical Application

a3) Use correctly some famous Theorems in calculus such as: Intermediate Value Theorem, Mean Value Theorem, and Fundamental Theorem of Calculus.
C. Skills - Generic Problem Solving and Analytical Skills
b1) Calculate limits and determine continuity for functions. b2) Differentiate and integrate various types of functions correctly.
D. Skills - Communication, ICT, and Numeracy
b3) Gauge the capacity of knowledge by doing home works and exercises .
E. Competence: Autonomy, Responsibility, and Context
Teaching and Learning Methods
• Face to face learning • E-learning. • Distance learning using (Microsoft Teams). • Problem based learning (PBL), • Direct students to self-learning through textbooks, library, e-library, and research papers. • Tutorials, and discussion.
Assessment Methods
Lectures, Assignments, Exams, Quizzes, Discussion and Interaction

Course Contents						
Week	**Day**	**Hours**	**CLOs**	**Topics**	**Teaching & Learning Methods**	**Assessment Methods**
1.	Sun	1.5	a1,b3	1.1 Real Numbers System,	Face to face learning	Assignments, Exams, Quizzes, Discussion and Interaction
	Tus	1.5	a1,b3	1.2 Exponents and Surds	Face to face learning	
2.	Sun	1.5	a1,b3	1.3 Functions	Face to face learning	Assignments, Exams, Quizzes, Discussion and Interaction
	Tus	1.5	a1,b3	1.4 Inverse functions. 1.5 Trigonometric Functions	Face to face learning	
3.	Sun	1.5	a1,b3	1.7 Exponential Functions	Face to face learning	Assignments, Exams, Quizzes, Discussion and Interaction
	Tus	1.5	a1,b3	1.8 Logarithm Functions	Face to face learning	
4.	Sun	1.5	a1, b1,b3	2.1 Limit of a function and limit laws.	Face to face learning	Assignments, Exams, Quizzes,

	Tus	1.5	a1,b1, b3	2.2 Computing limits.	Face to face learning	Discussion and Interaction
5.	Sun	1.5	a1,b1, b3	2.3 Limits involving infinity.	Face to face learning	Assignments, Exams, Quizzes, Discussion and Interaction
	Tus	1.5	a1,b1, b3	2.4 Limits of trigonometric functions.	Face to face learning	
6.	Sun	1.5	a1,b1, a3	2.5 Continuity	Face to face learning	Assignments, Exams, Quizzes, Discussion and Interaction
	Tus	1.5	a1,b1, a3	2.5 Continuity	Face to face learning	
7.	Sun	1.5	a2,b2, b3	3.1 The definition of the derivatives.	Face to face learning	Assignments, Exams, Quizzes, Discussion and Interaction
	Tus	1.5	a2,b2, b3	3.2 Differentiation Formulas.	Face to face learning	
8.	Sun	1.5	a2,b2, b3	3.3 Derivative of Trigonometric Functions.	Face to face learning	Assignments, Exams, Quizzes, Discussion and Interaction
	Tus	1.5	a2,b2, b3	3.5 Derivative of Logarithm and Exponential Functions	Face to face learning	
9.	Sun	1.5	a2,b2, b3	3.6 The Chain Rule.	Face to face learning	Assignments, Exams, Quizzes, Discussion and Interaction
	Tus	1.5	a2,b2, b3	3.7 Implicit Differentiation	Face to face learning	
10.	Sun	1.5	a2,b2	3.8 Higher Order Derivative.	Face to face learning	Assignments, Exams, Quizzes, Discussion and Interaction
	Tus	1.5	a2,b2	3.8 Higher Order Derivative.	Face to face learning	

11.	Sun	1.5	a2,b2, b3	4.1 Critical Points.	Face to face learning	Assignments, Exams, Quizzes, Discussion and Interaction
	Tus	1.5	a2,b2, b3	4.2 Extreme Value of Functions.	Face to face learning	
12.	Sun	1.5	a2,b2, b3	4.3 Increasing and Decreasing Functions.	Face to face learning	Assignments, Exams, Quizzes, Discussion and Interaction
	Tus	1.5	a2,b2 b3,	4.4 Concavity.	Face to face learning	
13.	Sun	1.5	a2, a3,b2	4.5 Curve Sketching.	Face to face learning	Assignments, Exams, Quizzes, Discussion and Interaction
	Tus	1.5	a2, a3,b2	4.6 The Mean Value Theorem.	Face to face learning	
14.	Sun	1.5	a2,b2, a3,b3	5.1 Indefinite Integrals.	Face to face learning	Assignments, Exams, Quizzes, Discussion and Interaction
	Tus	1.5	a2,b2, a3,b3	5.2 Computing Indefinite Integrals. 5.4 The Definite Integrals.	Face to face learning	
15.	Sun	1.5	a2,b2, a3,b3	6.1 Integration by Substitution.	Face to face learning	Assignments, Exams, Quizzes, Discussion and Interaction
	Tus	1.5	a2,b2, a3,b3	6.1 Integration by Substitution.	Face to face learning	
Final Exam						Exam

Infrastructure	
Textbook	Calculus (The easy Way) by Dr. Belal Batiha

References	James Stewart (2015) Calculus (Early Transcendental), 8th Edition, Thomson, Metric international version, Canada
Required reading	
Electronic materials	
Other	

Course Assessment Plan								
Assessment Method		**Grade**		**CLOs**				
			a1	**a2**	**a3**	**b1**	**b2**	**b3**
First (Midterm)		30	10	2		12	6	
Second (if applicable)								
Final Exam		50	8	11	17	4	10	
Coursework								
Coursework assessment methods	Assignments	10						10
	Case study							
	Discussion and interaction	5						5
	Group work activities							
	Lab tests and assignments							
	Presentations							
	Quizzes	5		2			3	
Total		100						

Plagiarism
Plagiarism is claiming that someone else's work is your own. The department has a strict policy regarding plagiarism and, if plagiarism is indeed discovered, this policy will be applied. Note that punishments apply also to anyone assisting another to commit plagiarism (for example by knowingly allowing someone to copy your code). Plagiarism is different from group work in which a number of individuals share ideas on how to carry out the coursework. You are strongly encouraged to work in small groups, and you will certainly not be penalized for doing so. This means that you may work together on the program. What is important is that you have a full understanding of all aspects of the completed program. In order to allow proper assessment that this is indeed the case, you must adhere strictly to the course work requirements as outlined above and detailed in the coursework problem description. These requirements are in place to encourage individual understanding, facilitate individual assessment, and deter plagiarism.

رئيس القسم: د. أيمن هزايمه