

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.Wadei al-omeri	email	w.omari @jadara.edu.jo		
Lecturers	Dr. Raed Htamelh Dr Ahmed Heilat Dr. Osamh Dr. Belal Batiha Dr. Ahmad Helat Dr. AymanHazaimh Dr. Hamzah	emails	w.omari@jadara.edu.jo		
Lecture time	10:00-11:30 Sun-Tus	Classroom	D409		
Semester	1	Production	2022	Updated	2023
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
<ul style="list-style-type: none"> • 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. Functions and models -Four ways to represent a function	Face to face learning, Tutorials, and discussion	Discussion and Interaction
	Tus	1.5	a1,b3	-Mathematical models: A catalog of essential functions -	Face to face learning, Tutorials, and discussion	
2.	Sun	1.5	a1,b3	New functions from old functions	Face to face learning, Tutorials, and discussion	Discussion and Interaction
	Tus	1.5	a1,b3	-Exponential functions	Face to face learning, Tutorials, and discussion	
3.	Sun	1.5	a1,b3	-Inverse functions	Face to face learning,	Assignments,

					Tutorials, and discussion	
	Tus	1.5	a1,b3	logarithms	Face to face learning, Tutorials, and discussion	
4.	Sun	1.5	a1, b1,b3	2. Limits and derivatives Limit of a function and limit laws.	Face to face learning, Tutorials, and discussion	Discussion and Interaction
	Tus	1.5	a1,b1, b3	Computing limits.	Face to face learning, Tutorials, and discussion	
5.	Sun	1.5	a1,b1, b3	Continuity	Face to face learning, Tutorials, and discussion	Discussion and Interaction
	Tus	1.5	a1,b1, b3	Limits at infinity; Horizontal asymptotes -	Face to face learning, Tutorials, and discussion	
6.	Sun	1.5	a1,b1, a3	Derivatives and rate of change	Face to face learning, Tutorials, and discussion	Exam, Discussion and Interaction
	Tus	1.5	a1,b1, a3	-The derivative as a function	Face to face learning, Tutorials, and discussion	
7.	Sun	1.5	a2,b2, b3	Midterm exam	Midterm Exam	Discussion and Interaction
	Tus	1.5	a2,b2, b3	3. Differentiation rules -Derivatives of polynomials and	Face to face learning, Tutorials, and discussion	
8.	Sun	1.5	a2,b2, b3	The product and quotient rules	Face to face learning, Tutorials, and discussion	Discussion and Interaction

	Tus	1.5	a2,b2, b3	-Derivatives of trigonometric functions	Face to face learning, Tutorials, and discussion	
9.	Sun	1.5	a2,b2, b3	-The Chain rule	Face to face learning, Tutorials, and discussion	Discussion and Interaction
	Tus	1.5	a2,b2, b3	-Implicite différentiation	Face to face learning, Tutorials, and discussion	
10.	Sun	1.5	a2,b2	-Derivatives of logarithmic functions	Face to face learning, Tutorials, and discussion	Discussion and Interaction
	Tus	1.5	a2,b2	4. Applications of differentiation -Maximum and minimum values -	Face to face learning, Tutorials, and discussion	
11.	Sun	1.5	a2,b2, b3	-The mean value theorem	Face to face learning, Tutorials, and discussion	Discussion and Interaction
	Tus	1.5	a2,b2, b3	5. Integrals -The definite integral	Face to face learning, Tutorials, and discussion	
12.	Sun	1.5	a2,b2, b3	-The fundamental theorem of calculus	Face to face learning, Tutorials, and discussion	Quizz, Discussion and Interaction
	Tus	1.5	a2,b2 b3,	-Indefinite integrals and the net change theorem	Face to face learning, Tutorials, and discussion	
13.	Sun	1.5	a2, a3,b2	- The substitution rule	Face to face learning, Tutorials, and discussion	Discussion and Interaction
	Tus	1.5	a2, a3,b2	6. Volumes and Area Volumes by Slicing; Disks and Washers.	Face to face learning, Tutorials, and discussion	

14.	Sun	1.5	a2,b2, a3,b3	Area Between Two Curves	Face to face learning, Tutorials, and discussion	Discussion and Interaction
	Tus	1.5	a2,b2, a3,b3	Volumes by Slicing; Disks and Washers	Face to face learning, Tutorials, and discussion	
15.	Sun	1.5	a2,b2, a3,b3	Volumes by Cylindrical Shells	Face to face learning, Tutorials, and discussion	Discussion and Interaction
	Tus	1.5	a2,b2, a3,b3		Face to face learning, Tutorials, and discussion	
Final Exam				Final Exam		Final Exam

Infrastructure	
Textbook	James Stewart (2015) Calculus (Early Transcendental), 8th Edition, Thomson, Metric international version.
References	(1) G. Thomas (2005) Calculus, 11 th edition, Addison Wesley (Person Education). (2) R. Smith and R. Minton (2007) Calculus, 3 rd edition, McGraw Hill. (3) Howard Anton, Irl Bivens and Stephen Davis (2013) Calculus, 10 th edition, John Wiley and sons Inc., New York.
Required reading	
Electronic materials	
Other	

Course Assessment Plan							
Assessment Method	Grade	CLOs					
		a1	a2	a3	b1	b2	b3
First (Midterm)	30	14			16		
Second (if applicable)							
Final Exam	50	4	6	4	6	30	
Coursework							
Coursework	Assignments	5					5
	Case study						
	Discussion and interaction	10					

Group work activities							
Lab tests and assignments							
Presentations							
Quizzes	5					5	
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.

مدرس المساق: د. وديع العمري

رئيس القسم: د. طارق قواسمة