جامعة الزيتونة الأردنية

Al-Zaytoonah University of Jordan

Course Syllabus

According to JORDAN National Qualification Framework (JNQF)

Course Name: Computerized mathematical application

Course Number: 0101274

General Course Information:

Course Title	Computerized mathematical application
Course Number	0101274
Credit Hours	3 credit hours
Education Type	
Prerequisites/Co-requisites	-
Academic Program	Bachelor Program
Program Code	114
Faculty	Faculty of Science and IT
Department	Mathematics
Level of Course	1
Academic Year /Semester	2024/2025 1st Semester
Awarded Qualification	Bachelor
Other Department(s) Involved in Teaching the Course	AI department, CS department,
Language of Instruction	English
Date of Production	
Date of Revision	

Course Coordinator:

Coordinator's Name	
Office No.	
Office Phone Extension Number	
Office Hours	
E-mail	

Instructor Name					
Office No.					
Office Phone Extension Number					
Office Hours				Tuesday	Wednesday
	1				
	2				
	3				
	4				
Email					

Course Description *(English/Arabic)*:

English	- Basic concept in limits (Definition, limit from graphs, limit of polynomials, limit of division functions, limit of piece wise defined functions, limit of Trigonometric functions, limit of composition of functions). - Basic concepts in differentiation :(Definition, Derivative of polynomials, Derivative of division functions, Derivative of multiplying of functions, Derivative of Trigonometric functions, and chain rule) - Basic concepts in numerical analysis: Introduction to the representation of numbers and errors, their types, numerical solutions of nonlinear equations

	in one variable (bisection method, fixed point method, Newton-Arrivson method), recurrence of roots, modified Newton method, synthetic division, numerical solutions of linear systems; direct and indirect methods.
Arabic	**-المفاهيم الأساسية في النهايات: التعريف، النهاية من الرسم البياني، نهاية كثيرات الحدود، نهاية الاقترانات الكسرية، نهاية الاقترانات المتشعبة، نهاية الاقترانات المثلثية، نهاية تركيب الاقترانات.** **-المفاهيم الأساسية في المشتقات: التعريف، مشتقة الاقترانات كثيرة الحدود، مشتقة الاقترانات الكسرية، مشتقة الضرب، مشتقة الاقترانات المثلثية و قاعدة السلسلة.** **- المفاهيم الأساسية في التحليل العددي :مقدمة في تمثيل الأعداد والأخطاء وأنواعها، الحلول العددية للمعادلات غير الخطية بمتغير واحد (طريقة التنصيف، طريقة النقطة الثابتة، طريقة نيوتن -ا رفسون) ،تكرار الجذور، طريقة نيوتن المعدلة، القسمة التركيبية .**

Textbook: *Author(s), Title, Publisher, Edition, Year, Book website.*

Calculus, 10th edition By Howard Anton, Irl Bivens and Stephen Davis.
"Numerical Analysis", by R. Burden & D. Fairs , 7th Ed. 2017

References: *Author(s), Title, Publisher, Edition, Year, Book website.*

1. CALCULUS, 10th Edition, by Finney and Thomas.
2. Vector Calculus" Susan Colley. Pearson Prentice Hall, 3rd Edition (2006)

Course Educational Objectives (CEOs):

CEO1	**Basic concept in limits (Definition, limit from graphs, limit of polynomials, limit of division functions, limit of piece wise defined functions, limit of Trigonometric, limit of composition of functions).**
CEO2	**Basic concepts in differentiation :(Definition, Derivative of polynomials, Derivative of division functions, Derivative of multiplying of functions, Derivative of Trigonometric functions, and chain rule)**
CEO3	**Basic concepts in numerical analysis: Introduction to the representation of numbers and errors, their types, numerical solutions of nonlinear equations in one variable (bisection method, fixed point method, Newton-Arrivson method), recurrence of roots, modified Newton method, synthetic division.**

Intended Learning Outcomes (ILO's):

Intended learning outcomes (ILOs)		Relationship to CEOs	Contribution to PLOs	Bloom Taxonomy Levels*	JNQF Descriptors**
K	Knowledge and Understanding				
ILO1-k	Rrecognize the Concept of limits	CEO1	PLO1-k	Remembering	K
ILO2-k	Recognize the Main Concepts of differentiation.	CEO2	PLO2-k + PLO3-k	Remembering	K
ILO3-k	Rrecognize Some basic Concept in numerical analysis.	CEO3	PLO4-k	Understanding	K

S					
ILO4-s	Calculate the limit for algebraic functions	CEO1	PLO6-S	Applying	S
ILO5-s	Apply rules to Calculate the derivative of functions at know point.	CEO2	PLO6-S	Applying	S
ILO6-s	Apply rules to find numerical solutions of nonlinear equations in one variable	CEO3	PL06-S	Applying	S
ILO7-s	Apply rules to find recurrence of roots, modified Newton method, synthetic division.	CEO4	PLO6-S	Applying	S
C	Subject specific skills				
ILO8-c	Develop the individual's ability to communicate and interact with other mathematical courses.	CEO1+ CEO2+ CEO3+	PLO9-c	Analysing	C

***Bloom Taxonomy Levels:**						
Level #	1	2	3	4	5	6
Level Name	Remembering	Understanding	Applying	Analysing	Evaluating	Creating

**** Descriptor (National Qualification Framework Descriptors): K: Knowledge, S: Skill, C: Competency.**

Program Learning Outcome (PLOs):

(PLOs)	**JNQF Descriptors****		
	K	**S**	**C**

1.	Knowledge of the main concepts in pure mathematics.	√		
2.	Knowledge of the main concepts in applied mathematics.	√		
3.	Explain concepts, principles and theories in the fields of probability and statistics.	√		
4.	Possession of technological culture related to the fields of mathematics and its applications.	√		
5.	Making use of mathematical logic in practical life.		√	
6.	Engaging scientific methodology as a way of thinking and as a tool in facing problems.		√	
7.	Applying mathematical software packages in problem solving.		√	
8.	Being capable of data analysis.		√	
9.	Capability of teaching according to modern educational techniques.		√	
10.	Develop creative and innovative methods of teaching mathematics.		√	
11.	Showing the ability to work under ethical and professional standards within teams.			√
12.	Gaining critical thinking and scientific research skills.			√

**** Descriptors according to the national qualifications framework (K: knowledge, S: skill, C: Competency)**

Weekly Schedule *(please choose the type of teaching)*

- ☒ **Face to Face (F2F)**
- ☐ **Hybrid** *(One – To - One)*
- ☐ **Online**

Schedule of Simultaneous and their Topics:

Week	First Lecture (F2F)	Second Lecture (F2F)	ILOs	PLOs	JNQF Descriptors*
1	Basic concept in limits: Definition, limit from graphs	Introduction to R- tool +Application to limit	ILO1-k	PLO1-k	k
2	limit of polynomials, limit of division functions,	Solving examples + applications on R	ILO1-k ILO4-s	PLO1-k	K, S
3	limit of division functions, and applications	limit of piece wise defined functions,	ILO1-k ILO4-s	PLO1-k	K, S
4	limit of Trigonometric functions,	Solving examples + applications on R	ILO1-k ILO4-s	PLO1-k	K, S
5	limit of composition of functions	Solving examples + applications on R	ILO1-k ILO4-s	PLO1-k	K ,S
6	Solving examples + applications on R	Basic concepts in differentiation: Definition, Derivative of polynomials.	ILO2-k ILO5-s	PLO1-k	K, S
7	Solving examples + applications on R	Derivative of multiplying of functions.	ILO2-k ILO5-s	PLO1-k + PLO3-k	K, S
Midterm Exam (30%)					
9	Derivative of division functions	Derivative of Trigonometric functions	ILO2-k ILO5-s	PLO1-k+ PLO3-k	K, S
10	Solving examples + applications on R	Basic concepts in numerical analysis:	ILO3-k ILO6-s	PLO1-k	K, S

		Introduction to the representation of numbers and errors, their types,			
11	numerical solutions of nonlinear equations in one variable :bisection method.	Solving examples + applications on R	ILO3-k ILO6-s	PLO1-k + PLO3-k	K, S
12	fixed point method	Newton-Arrivson method	ILO3-k ILO6-s	PLO1-k	K, S
13	recurrence of roots, modified Newton method.	recurrence of roots, modified Newton method.	ILO3-k ILO7-s	PLO1-k	K, S
14	synthetic division.	Solving examples	ILO3-k ILO7-s	PLO1-k	K, S
15	**Projects Discussion**				
16	**Final Exam**				

* **K: Knowledge, S: Skills, C: Competency**

Teaching Methods and Assignments:

The development of ILOs is promoted through the following teaching and learning methods:

- Lecture.
- learning through projects.
- learning through problem solving.

Course Policies:

A- Attendance policies:
The maximum allowed absences is 15% of the lectures.
B- Absences from exams and handing in assignments on time:
Midterm exam can be retaken based on approval of excuse by the instructor's discretion.
Not handing assignment on time will incur penalties.
C- Academic Health and safety procedures
D- Honesty policy regarding cheating, plagiarism, and misbehaviour:
Cheating, plagiarism, misbehaviour will result in zero grade and further disciplinary actions may be taken.
E- Grading policy:

- All homework is to be posted online through the e-learning system.
- Exams will be marked within 72 hours and the marked exam papers will be handed to the students.
- Online Activities (Course Videos, Discussion Forums, Quizzes) 3**0%**
- Midterm 30**%**
- Final Exam **4** 0**%**

F- Available university services that support achievement in the course: **E-Learning Platform, Labs, Library.**

Required Equipment:

- PC / Laptop with webcam and mic
- Internet Connection
- Access to the ZUJ E-Learning Platform at https://exams.zuj.edu.jo/
- E-learning plan
- Satisfaction questionnaires for online and face-to-face learning
- Software for e-learning

Assessment Tools Implemented in the Course:

- Final Exam
- Midterm Exam
- Quizzes
- Homework
- Discussion Forums
- Improvement plans for online or face-to-face teaching.

Responsible Persons and their Signatures:

Course Coordinator		**Completed Date**	
		Signature	

Received by (Department Head)		**Received Date**	/ /
		Signature	