Course Syllabus

According to JORDAN National Qualification Framework (JNQF)

Course Name: Ordinary Differential Equations 1

Course Number: 0101273

General Course Information:

Course Title	Ordinary Differential Equations 1
Course Number	0101273
Credit Hours	3 credit hours
Education Type	Traditional learning
Prerequisites/Co-requisites	Calculus (2) 0101102
Academic Program	Mathematics
Program Code	
Faculty	Faculty of Information Technology
Department	Mathematics
Level of Course	2
Academic Year /Semester	2023/2024 1st Semester
Awarded Qualification	BS'c
Other Department(s) Involved in Teaching the Course	-
Language of Instruction	English
Date of Production	2021-2022
Date of Revision	

Course Coordinator:

Coordinator's Name	Dr.Iqbal Batiha
Office No.	117
Office Phone Extension Number	380
Office Hours	12:30 - 14:00
E-mail	i.batiha@zuj.edu.jo

Other Instructors:

Instructor Name	Dr. Amjed Zraiqat
Office No.	127
Office Phone Extension Number	380
Office Hours	12:30 - 14:00
Email	amjad@zuj.edu.jo

Course Description *(English/Arabic)*:

English	Differential equations of first-order, Methods for solving linear differential equations of higher order, Methods for solving Cauchy – Euler equations,
Arabic	المعادلات التفاضلية العادية من الرتبة الاولى و المعادلات التفاضلية العادية من الرتب العليا. معادلة كوشي – اويلر .

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

A First Course in Differential Equations with Modeling Applications, Zill, Dennis G**.** 10th edition,2013

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

1. Elementary Differential Equation and Boundary Value Problems, William Boyce & Richard C. Diprima, 10 [th] edition, 2013.
2. Introduction to theory of Ordinary Differential Equations, V. hamrmaiah, 2013.
3. Ordinary Differential Equation, Purna Chandra, 2012.
4- A First Course in Differential Equations with Applications". By W.R. Derrick and S.I. Grossman, 3 [ed] Edition, 1987

Course Educational Objectives (CEOs):

CEO1	Recognize and classify ordinary differential equations.
CEO2	Solve linear first-order ordinary differential equations.
CEO3	Solve constant-coefficient linear second-order differential equations.

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	Define the basic concepts of the ordinary differential equations	CEO 1	PLO1-K	Remembering	K
ILO2-k	Describe of the properties of higher order linear differential equations with constant coefficients.	CEO 1	PLO2-K	Understanding	K
S	Intellectual skills				
ILO3-s	Apply the methods of solutions of first and higher-order differential equations.	CEO 2 CEO 3	PLO6-S	Applying	S
C	Subject specific skills				
ILO5-c	Cooperate to work effectively in the group assignments	CEO 1 CEO 2 CEO 3	PLO11-C	Applying	C
D	Transferable skills:				
ILO6-d					

*Bloom Taxonomy Levels:

Level #	1	2	3	4	5	6
Level Name	Remembering	Understanding	Applying	Analyzing	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 definitions. Solution, general solution, examples.	Particular solution and initial value problem.	ILO1-K	PLO1-K	K
2	Existence and Uniqueness Theorem.	Directional fields. Separable ODEs	ILO1-K	PLO1-K	K
3	Homogeneous functions	Homogeneous differential eqns of the first order	ILO3-S	PLO3-K	K,S
4	Definition of exact equations.	Necessary and sufficient condition for exactness.	ILO3-S	PLO6-S	S
5	Non-exact differenial equations	Integrating factors .	ILO3-S	PLO6-S	S

6	Linear ODE of the first order	Bernoulli's equation	ILO3-S	PLO6-S	S
7	Higher order equations (some special cases).	Reduction of order of higher order differential equations.	ILO1-K	PLO6-S	K,S
Midterm Exam (30%)					
9	The Basic Theory of Linear differential equations of n-th order.	Linear dependence and independence of functions. The Wronskian.	ILO1-K	PLO2-K	K
10	Homogeneous Linear differential equations with constant coefficients.	Distinct and repeated real roots of Characteristic equations.	ILO3-S	PLO6-S	S
11	Complex roots of the characteristic equation of the homogenous differential equations.	Method of undetermined coefficients. Finding the particular solution for higher order nonhomogeneous linear differential equations	ILO3-S	PLO6-S	S
12	Method of variation of parameters	Finding the particular solution for higher order nonhomogeneous linear differential equations.	ILO3-S	PLO6-S	**S**
13	Laplace Transform	Finding Laplace Transform for some functions	ILO1-K	PLO6-S	K,S
14	Inverse Laplace transform	Using Laplace transf[o] solve initial-value problems.	ILO1-K	PLO6-S	K,S
15	**Projects Discussion**				
16	**Final Exam**				

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

Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:
- Lecture.
- 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) **20%**
- Midterm 30**%**
- Final Exam 50**%**

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

Required Equipment:

- Access to the ZUJ E-Learning Platform at https://exams.zuj.edu.jo/

Assessment Tools Implemented in the Course:

- Final Exam
- Midterm Exam
- Quizzes
- Homework

Responsible Persons and their Signatures:

Course Coordinator	Dr.Iqbal Batiha	Completed Date	October 2023
		Signature	

Received by (Department Head)		Received Date	/ /
		Signature	