Course Plan

First: Course Information

Course Name	Method of Applied 1		Course Number		0301751
Credit Hours	3 hours	Theoretical	3 hours	Practical	0 hours
Prerequisite		Section Number: 1		Lecture Time: 9.00 – 12:00	
Level in JNQF	9				

Type Of Course	☐ Obligatory Faculty Requirement	☐ Elective University Requirement
	☐ Obligatory University Requirement	☐ Faculty Requirement
	☐ Course Elective Specialty Requirement	■ Obligatory Specialization Requirement
Type of Learning	☐ Face-to-Face Learning	
	■ Blended Learning (1 Face-to-Face to 1 Asynchronous)	
	☐ Online Learning (2 Synchronous + 1 Asynchronous)	

Second: Instructor's Information

Course coordinator		
Name: Gharib Gharib	Academic Rank: professor	
Office Number: 324 D	Phone Number: 1557	E-mail: ggharib@zu.edu.jo
Instructor		
Name: Gharib Gharib	Academic Rank: professor	
Office Number: 324 D	Phone Number: 1557	E-mail: ggharib@zu.edu.jo

Office Hours:	Sunday 11:00 – 12:00	Monday 11:00 – 12:00	Tuesday 11:00 – 12:00	Wednesday 11:00 – 12:00	Saturday 12-13

Third: Course Description

Introduction, classification of I. E., Volterra I. E., Fredholm I. E., converting I. E. to BVP & IVP, methods of solutions of Volterra I. E., methods of solutions of Fredholm I. E., Integro-diff. Equations. ,Singular integral equation.

Fourth: Course Objectives

Upon completion of this course, the student should be able to

1. Understanding the concepts of Introduction in integral equations.
2. Follow and to construct a formal mathematical classification of I. E.
3. Demonstrate an understanding of the relationship of converting I. E. to BVP & IVP.
4. Demonstrate an understanding of the relationship of methods of solutions of Volterra I. E.
5. Follow and to construct a formal mathematical methods of solutions of Fredholm I. E.
6. Follow and to construct a formal mathematical Integro-diff. Equations.
7. Follow and to construct a formal mathematical Sengular Integral Equations.
8. Independently explore related topics using resources other than the text.

Fifth: Learning Source

Main Reference	Integral equations and their Applications	
Author: Rahman M	Issue No.: 4 Edition	Publication Year:2023
Additional Sources & Websites	1) An Introduction to the study of Integral Equations ; ; Maxime Boche Cambridge ,2017, ed). .E nd 2)Jerri A. J., Introduction to Integral Equations with Applications, Wiely-Interscience, 2014	

Teaching Type	■	Classroom	☐	Laboratory	☐	Workshop	■	MSTeams	■	Moodle

Sixth: Learning Outcomes

Level descriptor according to (JNQF)	CILOs Code	CILOs	Associated PILOs Code Choose one PILO for each CILO*	Assessment method** Choose at least two methods	Scores out of 100 State the total score identified for each CILO	Minimum acceptable Score/percentage (%) The percentage should not be less than 50% ***
Knowledge	K1	Define and illustrate the concept of Introduction in integral equations.	PK1	Mid Exam, Final Exam	10	5 (50%)
	K2	Comprehend basic properties of classification of I. E.	PK2	Mid Exam, Final Exam, Assignment	30	15 (50%)
	K3	Comprehend the converting I. E. to BVP & IVP	PK2			
	K4	Comprehend basic properties of methods of solutions of Volterra I. E.	PK2			
	K5	Comprehend the fundamental theorem of methods of solutions of Fredholm I. E.	PK2			
Skills	S1	Employ basic properties of Introduction in integral equations.	PS1	Assignment	10	5 (50%)
	S2	Employ the of classification of I. E	PS2	Mid Exam, Final Exam, Assignment	30	15 (50%)
	S3	Find integer solutions of the converting I. E. to BVP & IVP	PS2			
	S4	Determine whether the converting ODE. to IE.	PS2			
	S5	Study the of methods of solutions of Volterra I. E.	PS2			
	S6	Discuss divisibility for methods of solutions of Fredholm I. E.	PS2			
	S7	Find the remainder of Integro-diff. Equations.	PS2			
Competencies	C1	Working in a team to handle some advanced topics in PDE	PC3	Assignment	10	5 (50%)
	C2	Develop the personal skills and capacity to carry responsibility	PC1	Mid Exam, Final Exam, Assignment	10	5 (50%)

*Refer to document (   ) and page 2 in document (   )

** Refer to document (   )

***80% of the students must achieve the minimum acceptable percentage or higher for each CILO

Seventh: Course Structure

Lecture Date	Intended Teaching Outcomes(ILOs)	Topics	Teaching Procedures*	Teaching Methods**	References
19/10	K1, K2, S1, S7, , S2, C1	Preliminary concept of the integral equation, Classification of integral equations, Converting VIE to ODE Converting IVP to VIE	Face-to-Face	Lectures, cooperative learning and discussion	1-9
26/10	K1, K2, S1, S7, , S2, C1	Converting BVP to Fredholm integral Equations,	Asynchronous	Self reading, Videos and Assignment	9-17
2/11	K1, K2, S1, S7, , S2, C1	Volterra integral equations The method of successive approximations, The Laplace transform	Face-to-Face	Lectures, cooperative learning and discussion	17-25
9/11	K1, K2, S1, S6	The method of successive substitutions Using theatrical data to convert	Asynchronous	Self reading, Videos and Assignment	25-28
16/11	S1, S2, C1, C2	The Adomain decomposition method	Face-to-Face	Lectures, cooperative learning and discussion	28-31
23/11	K1, S2	The Medofied decomposition method	Asynchronous	Self reading, Videos and Assignment	28-31
30/11	K1, S2, S5	The series solution method, Relation between linear differential equation and the Volterra integral equation,	Face-to-Face	Lectures, cooperative learning and discussion	31-33
7/12		**Mid Exam**	Face-to-Face		
14/12	K3, S2, S7	Fredholm integral equations The method of successive approximations: Neumann's series	Face-to-Face	Lectures, cooperative learning and discussion	40-55+
21/12	K3, S2, S4, C1, C2	Volterra equation of the first kind,Integral equations of the Faltung type, Solution of a Volterra equation by differentiation Eigen values and Eigen function ,	Asynchronous	Self reading, Videos and Assignment	33-55
28/12	K1, S6, S7, C1, C2, S3, S5	The decomposition method The Medofied decomposition method The direct Computational method Homogeneous Fredholm equations	Face-to-Face	Lectures, cooperative learning and discussion	55-60
4/1		Degenerated kernel's, Solve the Problem	Asynchronous	Self reading, Videos and Assignment	60-64
11/1	K1, K4, S4	Volterra integro-differential equations, The series solution method I-D E, The decomposition method Volterra Integro-differential equations, The direct Computational method The decomposition method Vol.	Face-to-Face	Lectures, cooperative learning and discussion	165-173
18/1	K5, S5	Converting to VIE, Converting to IVP Fredholm IE,	Asynchronous	Self reading, Videos and	173-189

		The decomposition method Fredholm Integro-differential equations, The direct Computational method The decomposition method Vol.		Assignment	
19-30/1/ 2025		الامتحانات النهائية			

Eighth: Assessment methods

Methods	Direct Teaching	K1	K2	K3	K4	K5	S1	S2	S3	S4	S5	S6	S7	C1	C2
mid Exam	30	4	5	2			6	3	2			2		6	
Assignment	30	2	3	3	3	1	2		7	2		3	2		2
Final Exam	40	4	3	2	3	5	2		2	2	3		2	4	8
Total	100	10	30				10	30						10	10

ninth: Course Policies

- All course policies are applied on all teaching patterns (online, blended, and face-to-face Learning) as follows:
  a. Punctuality.
  b. Participation and interaction.
  c. Attendance and exams.
- Academic integrity: (cheating and plagiarism are prohibited).

Approved by:	Name	Date	Signature
Head of Department	Dr. Mohammad Al-Amleh	25.9.2024	
Faculty Dean	Dr. Aliaa Burqan	25.9.2024	