اعتماد
NCAAA

T4

2020

Course Specifications

Course Title:	Integral Equations
Course Code:	Math 408
Program:	Bachelor of Science in Mathematics
Department:	Mathematics
College:	Science
Institution:	University of Tabuk

Table of Contents

A. Course Identification

1. Credit hours: 03 Hours/Week	

2. Course type:

a.	University	☐	College	☐	Department	√	Others	☐
b.		Required	√	Elective	☐			

3. Level/year at which this course is offered: L7/Y4

4. Pre-requisites for this course (if any)**: Math 305; Math 311**

5. Co-requisites for this course (if any)**:**
None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	45	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	45
2	**Laboratory/Studio**	
3	**Tutorial**	
4	**Others** (specify)	
	Total	45

B. Course Objectives and Learning Outcomes

1. Course Description

The main purpose of this course is to present the fundamental concepts of integral equations and the different methods of solutions of integral equations as well as discussing the relation between integral and differential equations.

2. Course Main Objective
- Student will be able to solve integral equations by different methods.
- Student will be able to recognize the applications of integral equations directly from setting up the physical relationship in a physical problem.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Students will be able to recall methods and techniques of solving integral equations.	K1
1.2		
2	**Skills :**	

	CLOs	Aligned PLOs
2.1	Students will be able to solve integral equations using different methods.	S3
2.2	Students will be able to prove theorems of integral equations.	S2
2.3	Students will be able to apply integral equations methods to physical problems.	S3
2.4	Students will be able to recall demonstrate Proficiency in communicating concepts and theories of integral equations.	S5
3	**Values:**	
3.1	Students will be able to develop enhanced self-learning.	V1
3.2	Students will be able to work independently and in groups.	V2

C. Course Content

No	List of Topics	Contact Hours
1	Problems on definition of solution of the integral equation.	3 Hrs
2,3	Problems and theory on conversion of ordinary differential equations (IVP &BVP) into integral equation.	6 Hrs
4	Problems and theory of finding Kernel for Volterra integral equation.	3 Hrs
5	Solution of Volterra integral equation using Analytic Kernel	3 Hrs
6	Mid-Exam#1	
6,7	Solution of Volterra integral equations by Method of successive approximations	6 Hrs
8,9	Solution of homogeneous Fredholm integral equations(Eigen values and Eigen functions).	6 Hrs
10,11	Solution of integro-differential equation by Laplace Transform.	6 Hrs
11	Mid-Exam#2	
12,13	Solution of Fredholm integral equation of second kind with degenerated Kernels.	6 Hrs
14	Solution of Fredholm integral equation by Second Kind.	3 Hrs
15	Revision & Final Exam	3 Hrs
	Total	**45 Hrs**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	Recall methods and techniques of solving integral equations.	Introducing new ideas through case study Lectures Class Discussions	Quizzes I II Midterm Exams Final Exams homework assignments.
1.2			
2.0	**Skills**		
2.1	Solve integral equations using different methods.	- Lectures Group work - Case Study	- Quizzes -Assignments -Midterm exams
2.2	Prove theorems of integral equations.		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.3	Apply integral equations methods to physical problems.	- Brainstorming	- Final exam
2.4	Demonstrate Proficiency in communicating concepts and theories of integral equations.		
3.0	**Values**		
3.1	Students will be able to develop enhanced self-learning.	Cooperative learning and teamwork	- Quizzes -Assignments -Class participation
3.2	Students will be able to work independently and in groups.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Home works and Assignments	Weekly basis	10%
2	First mid-term exam	5th week	25%
3	Second mid-term exam	15th week	25%
4	Final Exam	At End of Semester	40%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :
Six office hours per week in the lecturer schedule.

F. Learning Resources and Facilities
1.Learning Resources

Required Textbooks	Abdul-Majid Wazwaz, Linear and Nonlinear Integral Equations, Method and Applications. Spriger, Heidelberg Dordrecht London New York, 2011
Essential References Materials	None
Electronic Materials	None
Other Learning Materials	None

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1.Lecture Room with max capacity of 30 students and equipped with White Board, Overhead projector and internet connection. 2.Library
Technology Resources (AV, data show, Smart Board, software, etc.)	Projectors

Item	Resources
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	Direct and Indirect
Extent of achievement of course learning outcomes	Teachers	Direct
Quality of learning resources	Students	Indirect

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Program and study plan committee
Reference No.	
Date	25/08/2021

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