Course Specifications

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

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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
2	**Skills :**	
2.1	Students will be able to solve complex integral equations using	S1

	CLOs	Aligned PLOs
	analytical methods.	
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.	S4
3	**Values:**	
3.1	Students will be able to work in groups and commit to ethics.	V1
3.2	Students will be able to manage duties and time.	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 equation into integral equation.	6 Hrs
4	Problems and theory of finding Resolve 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 Fredholm Determinants.	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	Students will be able to 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.
2.0	**Skills**		
2.1	Students will be able to recall methods and techniques of solving integral equations.	- Lectures Group work - Case Study	- Quizzes -Assignments -Midterm exams

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.2	Students will be able to prove theorems of integral equations.	- Brainstorming	- Final exam
2.3	Students will be able to apply integral equations methods to physical problems.		
2.4	Students will be able to recall demonstrate Proficiency in communicating concepts and theories of integral equations.		
3.0	**Values**		
3.1	Students will be able to work in groups and commit to ethics.	Cooperative learning and teamwork	- Quizzes -Assignments -Class participation
3.2	Students will be able to manage duties and time.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Activities	Weekly basis	5%
2	Homework	Weekly basis	5%
3	Quizzes	Weekly basis	10%
4	Mid Exam1	6th week	20%
5	Mid Exam2	11th week	20%
6	Final Exam	At end of the 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	- S. G. Mikhlin, Linear integral equations. Hindusthan Book Agency, 1960. - Text Book: R.P.Kanwal , Linear integral equations,Theory and technics. Academic Press, New York, 1971
Essential References Materials	I. N. Sneddon, Mixed boundary value problems in potential theory, North Holland,1966
Electronic Materials	None
Other Learning Materials	None

2. Facilities Required

Item	Resources

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
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	The Curriculum committee
Reference No.	
Date	25/08/2021