



Course name: MATH 330 Integral Equations		Department: Mathematics					Semester
							6
Methods of Education						Credit (ECTS)	
Lecture	Recitation/ (Etud)	Lab	Exams	Homework/ Quiz	Other	Total	
42	0	0	40	0	98	180	
						6	

Language English

Compulsory/Elective Elective

Prerequisites None

Weeks	Subjects
1	<ul style="list-style-type: none"> • Preliminary concept of the integral equation • Historical background of the integral equation ▪ Classification of integral equations
2	<ul style="list-style-type: none"> • Converting Volterra equation to ODE • Converting IVP to Volterra equations • Converting BVP to Fredholm integral equations
3	<ul style="list-style-type: none"> • Types of solution techniques
4	<ul style="list-style-type: none"> • Volterra integral equations • The method of successive approximations • The method of Laplace transform
5	<ul style="list-style-type: none"> • The method of successive substitutions • The Adomian decomposition method • The series solution method
6	<ul style="list-style-type: none"> • Volterra equation of the first kind • Integral equations of the Faltung type • Volterra integral equation and linear differential equations
7	<ul style="list-style-type: none"> • Fredholm integral equations • Various types of Fredholm integral equations • The method of successive approximations: Neumann's series
8	<ul style="list-style-type: none"> ▪ The method of successive substitutions ▪ The Adomian decomposition method
9	<ul style="list-style-type: none"> ▪ The direct computational method ▪ Homogeneous Fredholm equations
10	<ul style="list-style-type: none"> • Integro-differential equations • Volterra integro-differential equations • The series solution method
11	<ul style="list-style-type: none"> • Converting to Volterra integral equations • Converting to initial value problems

Course Contents

	12	<ul style="list-style-type: none"> • Fredholm integro-differential equations • The direct computation method 	
	13	<ul style="list-style-type: none"> • Converting to Fredholm integral equations • The Laplace transform method 	
	14	<ul style="list-style-type: none"> • Nonlinear integral equations • The method of successive approximations • Picard's method of successive approximations • Existence theorem of Picard's method 	
Course Objectives	<p>1.To familiarize students with the basic concepts, principles and methods of Integral Equations</p> <p>2.To provide the knowledge of applications of Integral Equations</p>		
Learning Outcomes and Competences	<p>To understand and use basic methods with:</p> <ul style="list-style-type: none"> • Types of Integral Equations • Types of solution techniques • Solving Volterra integral equations • Solving Fredholm integral equations • Solving Integro-differential equations 		
Textbook and /or References	<ul style="list-style-type: none"> • Integral Equations and their Applications, M. Rahman, WIT Press 2007 • İntegral Denklemler, Kevser Özden KÖKLÜ, Papatya, 2018. 		
Assessment Criteria		If any, mark as (X)	Percentage (%)
	Midterm Exams	X	40
	Quizzes		
	Homework		
	Projects		
	Term Paper		
	Laboratory work		
	Other		
	Final Exam	X	60
Instructors			