



ÇANKAYA UNIVERSITY

Faculty of Arts and Sciences

Course Definition Form

This form should be used for either an elective or a compulsory course being proposed and for a curriculum development process for an undergraduate curriculum at Çankaya University, Faculty of Arts and Sciences. Please fill in the form completely and submit the print-out carrying the approval of the Department Chair to the Dean's Office and mail its electronic copy to @cankaya.edu.tr. Upon receipt of *both copies*, the print-out will be forwarded to the Faculty Academic Board for approval. Incomplete forms will be returned to the Department. The approved form is finally sent to the President's office for approval by the Senate.

Part I. Basic Course Information

Department Name	MATHEMATICS	Dept. Numeric Code	2 7
Course Code	M A T H 4 5 6	Number of Weekly Lecture Hours	3
		Number of Weekly Lab/Tutorial Hours	0
		Number of Credit Hours	3
Course Web Site	http:// math4.cankaya.edu.tr		ECTS Credit
			0 5

Course Name

This information will appear in the printed catalogs and on the web online catalog.

English Name

Introduction to Metric Fixed Point Theory

Turkish Name

Metrik Sabit Nokta Teorisine Giriş

Course Description

Provide a brief overview of what is covered during the semester. This information will appear in the printed catalogs and on the web online catalog. Maximum 60 words.

Metric space, b-metric space, quasi-metric space, ultra-metric space, partial metric space, Banach mapping principle and its extensions, Caristi's fixed point theorem and its extensions, Edelstein's fixed point theorem and its extensions, Meir-Keeler's fixed point theorems and its extensions,

Prerequisites (if any) <i>Give course codes and check all that are applicable.</i>	1 st	2 nd	3 rd	4 th
	<input type="checkbox"/> Consent of the Instructor	<input type="checkbox"/> Senior Standing	<input type="checkbox"/> Give others, if any.	
Co-requisites (if any)	1 st	2 nd	3 rd	4 th
Course Type <i>Check all that are applicable</i>	<input type="checkbox"/> Must course for dept. <input type="checkbox"/> Must course for other dept.(s) <input checked="" type="checkbox"/> Elective course for dept. <input checked="" type="checkbox"/> Elective course for other dept.(s)			

Course Classification

Give the appropriate percentage for each category.

Category	Mathematics & Natural Sciences	Engineering & Architectural Sciences			
Percentage	80	20			

Part II. Detailed Course Information**Course Objectives***Maximum 100 words.*

The course aims to present an overview of various facets of difference equations that can be studied by elementary mathematical methods.

Learning Outcomes*Explain the learning outcomes of the course. Maximum 10 items.*

1. The students will be able to solve many types of fixed point problems.
2. The students will use the terminology of difference equations which help them in modeling problems from various disciplines

Textbook(s)*List the textbook(s), if any, and other related main course material.*

Author(s)	Title	Publisher	Publication Year	ISBN
William Kirk and Naseer Shahzad	Fixed Point Theory in Distance Spaces	Springer	2014	978-3-319-10926-8

Reference Books*List, if any, other reference books to be used as supplementary material.*

Author(s)	Title	Publisher	Publication Year	ISBN
R.P. Agarwal, E. Karapinar, D. O'Regan, A.F. Roldán-López-de-Hierro	Fixed Point Theory in Metric Type Spaces	Springer	2015	978-3-319-24080-0

Teaching Policy*Explain how you will organize the course (lectures, laboratories, tutorials, studio work, seminars, etc.)*

3 hours of lecturing per week. Attendance is compulsory.

Laboratory/Studio Work*Give the number of laboratory/studio hours required per week, if any, to do supervised laboratory/studio work and list the names of the laboratories/studios in which these sessions will be conducted.***Computer Usage***Briefly describe the computer usage and the hardware/software requirements for the course.*

Course Outline <i>List the weekly topics to be covered.</i>	
Week	Topic(s)
1	Metric and Metric Spaces
2	Semimetric space, quasi-metric space
3	B-metric space
4	partial-metric space
5	ultra-metric space
6	Banach Contraction Mapping theorems
7	Extension of Banach Contraction Mapping theorems
8	More extension of Banach Contraction Mapping theorems
9	Caristi's Fixed point theorem
10	Extension of Caristi's Fixed point theorem
11	Edelstein's Fixed Point theorem
12	Meir-Keeler fixed point theorem
13	Proinov's Fixed Point theorems
14	Simulation function and Z-contraction

Grading Policy <i>List the assessment tools and their percentages that may give an idea about their relative importance to the end-of-semester grade.</i>								
Assessment Tool	Quantity	Percentage	Assessment Tool	Quantity	Percentage	Assessment Tool	Quantity	Percentage
Homework	5	5	Case Study			Attendance		
Quiz(es)	5	5	Lab Work			Field Study		
Midterm Exam	2	50	Classroom Participation			Project		
Term Paper			Oral Presentation			Final Exam	1	40

ECTS Workload <i>List all the activities considered under the ECTS.</i>			
Activity	Quantity	Duration (hours)	Total Workload (hours)
Attending Lectures (<i>weekly basis</i>)	14	3	42
Attending Labs/Recitations (<i>weekly basis</i>)			
Compilation and finalization of course/lecture notes (<i>weekly basis</i>)	14	1	14
Collection and selection of relevant material (<i>once</i>)	1	5	5
Self study of relevant material (<i>weekly basis</i>)	14	1	14
Take-home assignments	5	2	10
Preparation for quizzes	5	1	5
Preparation for mid-term exams (<i>including the duration of the exams</i>)	2	7.5	15
Preparation of term paper/case-study report (<i>including oral presentation</i>)			
Preparation of term project/field study report (<i>including oral presentation</i>)			
Preparation for final exam (<i>including the duration of the exam</i>)	1	20	20
TOTAL WORKLOAD / 25			125/25
ECTS Credit			5

Total Workloads are calculated automatically by formulas. To update all the formulas in the document first press CTRL+A and then press F9.

Program Qualifications vs. Learning Outcomes Consider the program qualifications given below as determined in terms of learning outcomes and acquisition of capabilities for all the courses in the curriculum. Look at the learning outcomes of this course given above. Relate these two using the Likert Scale by marking with X in one of the five choices at the right.						
No	Program Qualifications	Contribution				
		0	1	2	3	4
1	Adequate knowledge in mathematics; ability to use applied and theoretical information in these areas to solve pure and applied mathematics problems.					X
2	Ability to use modern computational tools to analyze an abstract or real life problem				X	
3	Adequate knowledge in theoretical and historical background in mathematics				X	
4	Ability to work individually and in teams efficiently, ability to collaborate effectively in teams to analyze complex systems from intra-disciplinary and multi-disciplinary areas				X	
5	Ability to communicate effectively in English about technical subjects, both orally and in writing				X	
6	Ability to use, develop and implement new experiments and algorithms to solve scientific, engineering and financial problems				X	
7	Ability to analyze a mathematical problem using both analytical and numerical methods; use and compare theoretical and simulational methods to gain deeper insight					X
8	Ability to report the findings, conclusions and interpretations related to a project in the area of pure and applied mathematics, ability to write technical reports, to prepare and conduct effective presentations				X	
9	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to keep continuous self-improvement				X	
10	Awareness of professional and ethical responsibility issues and their legal consequences					X

Scale for contribution to a qualification: 0-none, 1-little, 2-moderate, 3-considerable, 4-highest