



Kırıkkale University

GRADUATE SCHOOL OF NATURAL APPLIED SCIENCES
Mathematics (Master) (With Thesis)

MAT8055 Fixed Point Theory-1					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
1	MAT8055	Fixed Point Theory-1	3	3	7

Mode of Delivery:

Face to Face

Language of Instruction:

Türkisch

Level of Course Unit:

Master's Degree

Work Placement(s):

No

Department / Program:

Mathematics (Master) (With Thesis)

Type of Course Unit:

Elective

Objectives of the Course:

To introduce fixed point theorems and applications.

Teaching Methods and Techniques:

Banach fixed point theorem and various generalizations.

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Prof. Dr. İshak ALTUN

Assistants:

Recommended or Required Reading

Resources R.P. Agarwal, D. O'Regan, D.R. Sahu, Fixed Point Theory for Lipschitzian-type Mappings with Applications, Springer, 2009.,S. Singh, B. Watson, P. Srivastava, Fixed Point R. P. Agarwal, M. Meehan, D. O'Regan, Fixed Point Theory and Application, Cambridge University Press, 2001.

Course Category

Mathematics and Basic Sciences	: 100	Education	:
Engineering	:	Science	:
Engineering Design	:	Health	:
Social Sciences	:	Field	:

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Order relations, partial ordered sets and some discrete fixed-point theorems		
2	Metric spaces		
3	Normed spaces		
4	Contraction and contractive mappings		
5	Banach and Edelstein fixed point theorems		
6	Some applications of Banach fixed point theorem (Systems of linear equations)		
7	Some applications of Banach fixed point theorem (Differential equations, Picard's Existence and Uniqueness Theorems)		
8	Midterm Exam		
9	Some applications of Banach fixed point theorem (Integral equations, Fredholm integral equations)		
10	Some applications of Banach fixed point theorem (Integral equations, Volterra integral equations)		
11	Contraction type mappings (Kannan and Chatterjea mappings)		
12	Contraction type mappings (Generalized Ćirić type and Meir-Keeler mappings)		
13	Contraction type mappings (Quasi contraction mappings)		
14	Contraction type mappings (Almost contraction mappings)		
15	Picard and weakly Picard operators		

Course Learning Outcomes

No Learning Outcomes

C01 Students will have learned what is fixed point of a mapping and how to find it.
C02 Students will have learned basic fixed-point theorems and some applications of them.

Program Learning Outcomes

No Learning Outcome

P03 Define a problem and propose a solution for it, and to solve the problem, evaluate the results and apply them if it is necessary in his/her areas of expertise.
P08 Produce solution and to take responsibility and to develop new strategic approaches in situations which are not predicted in his/her areas of expertise.
P04 Transfer systematically the current developments, his/her studies to other people as verbal or written form confidently.
P09 Follow scientific, social, and ethical values and to teach and to control them in the step of data collection, evaluation and announcement of them.
P05 Develop new strategic approach and produce solutions by taking responsibility in unexpected and complicated situations in his/her area of practice.
P01 Evaluate the fundamental notions, theories and data with academic methods. Determining and analyzing the encountered problems and subjects, exchanging of ideas, improving suggestions prop
P10 Apply the digested knowledge and problem solving ability in the collaborations between different groups.
P02 Expand knowledge by scientific methods and use them with scientific, social and ethical responsibility.
P07 Have oral or written communication ability in one of the common foreign languages ("European Language Portfolio Global Scale", Level B2).
P06 Develop strategic, political and practice plans and evaluate the results by considering the quality process in his/her area of expertise.

Assessment Methods and Criteria		
In-Term Studies	Quantity	Percentage
Mid-terms	1	%40
Quizzes	0	%0
Assignment	0	%0
Attendance	0	%0
Practice	0	%0
Project	0	%0
Final examination	1	%60
Total		%100

ECTS Allocated Based on Student Workload			
Activities	Quantity	Duration	Total Work Load
Course Duration	16	3	48
Hours for off-the-c.r.stud	16	3	48
Assignments	3	15	45
Presentation	1	20	20
Mid-terms	1	20	20
Practice	0	0	0
Laboratory	0	0	0
Project	0	0	0
Final examination	1	30	30
Total Work Load			211
ECTS Credit of the Course			7

Contribution of Learning Outcomes to Programme Outcomes											
bbb											
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	

All	5	5	4	4	4	3	3	2	4	5	
C01	5	5	5	5	5	5	5	5	5	5	
C02	5	5	5	5	5	5	5	5	5	5	

Kırıkkale Üniversitesi