



## AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Theory of Semigroups							
Course Code		MTK514		Couse Level		Second Cycle (Master's Degree)			
ECTS Credit	8	Workload	200 ( <i>Hours</i> )	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		The purpose of this course is to understand the general structure of the semigroups by giving basic properties of semigroups and some important relations of semigroups.							
Course Content		Basic definitions on semigroups, monogenic semigroups, ordered sets, semilattices and lattices, binary relations, congruences, free semigroups, Ideals, Rees congruences, Green's equivalences, the structure of D-classes, regular D-classes, regular and 0-simple semigroups, inverse semigroups, the natural order relation of inverse semigroups, congruences on inverse semigroups.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Discussion, Individual Study, Problem Solving					
Name of Lecturer(s)									

### Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	30
Final Examination	1	50
Assignment	1	20

### Recommended or Required Reading

1	Fundamentals of Semigroup Theory, J.M. Howie, Clarendon, Oxford Univ. Press, 1995.
---	--

Week	Weekly Detailed Course Contents	
1	Theoretical	Basic definitions
2	Theoretical	Monogenic semigroups
3	Theoretical	Ordered sets, semilattices and lattices
4	Theoretical	Binary relations
5	Theoretical	Congruences on semigroups
6	Theoretical	Free semigroups and monoids
7	Theoretical	Ideals on semigroups and Rees congruences
8	Theoretical	Green's equivalences
9	Intermediate Exam	Midterm Exam
10	Theoretical	The structure of D-classes
11	Theoretical	Regular D-classes
12	Theoretical	Regular and 0-simple semigroups
13	Theoretical	Inverse semigroups
14	Theoretical	The natural order relation of inverse semigroups
15	Theoretical	Congruences on inverse semigroups
16	Final Exam	Final Exam

### Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	3	3	84
Assignment	1	20	2	22
Midterm Examination	1	40	2	42



Final Examination	1	50	2	52
Total Workload (Hours)				200
[Total Workload (Hours) / 25*] = ECTS				8
*25 hour workload is accepted as 1 ECTS				

### Learning Outcomes

1	To be able to learn the basic definitions of semigroups
2	To be able to do the applications of monogenic semigroups
3	To be able to use the concepts of lattices and semilattices in the examples
4	To be able to do the applications of some important topics of semigroups
5	To be able to learn the basic definitions and congruences of inverse semigroups

### Programme Outcomes (Mathematics Master)

1	To be able to have an adequate theoretical and practical domain knowledge.
2	To be able to comprehend the interdisciplinary interaction associated with Mathematics.
3	To be able to use theoretical and practical domain knowledge gained in the field of Mathematics.
4	To be able to interpret knowledge from different disciplines integrating knowledge in the field of mathematics and produce new information.
5	To be able to define, analyse, model and to solve the problems by scientific methods in Mathematics.
6	To be able to conduct a math related specialistic study independently.
7	To be able to develop new strategic approaches to solve problems occurred in unforeseen and complex math-related applications by taking responsibility.
8	To be able to lead in situations that require solving problems related to the mathematics.
9	To be able to criticize his/her knowledge and skills acquired in the field mathematics.
10	To be able to transfer his/her ideas and suggestions for solutions to problems by supporting quantitative or qualitative data verbally and in writing.
11	To be able to communicate both orally and written in a foreign language.
12	To be able to use computer hardware and information technologies with software required by Mathematics.
13	To be able to contribute to the solution of the social, scientific, cultural and ethical problems related to the Mathematics, and being able to support the development of social, scientific, cultural and ethical values.
14	To be able to develop mathematics-related strategies, policies and operational plans, and to evaluate the results obtained within the framework of quality processes.
15	To be able to use his/her knowledge in the field of mathematics and practical problem-solving skills in interdisciplinary studies.

### Contribution of Learning Outcomes to Programme Outcomes 1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High

	L1	L2	L3	L4	L5
P1	3	4	5	4	5
P2	4	4	5	5	5
P3	4	5	5	4	5
P4	3	4	5	5	5
P5	3	4	5	5	4
P6	4	4	5	5	4
P7	3	3	3	4	4
P9	3	3	3	3	3
P11	3	3	3	3	3
P13	4	4	4	4	4
P15	4	4	4	4	4

