AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Introduction to Homological Algebra								
Course Code	MTK575		Couse Level	Second Cycle (Master's Degree)					
ECTS Credit	8	Workload	200 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	This course aims to give students the basic concepts of homological algebra, to develop analytical thinking and understanding of abstract concepts. This course aims to gain a systematic approach to define problems and to solve the problems by the discussed topics and their applications.								
Course Content	Abel Groups, Rings, Modules, Homomorphisms, Free Modules, Exact Sequences, 5- Lemma ve 3x3 Lemma, Hom Functor, Projektive ve İnjektive Modules, Essential and Superfluous Submodules, Supplements, Category of Complexes, Projektive and İnjektive Resolutions, Derived Functor								
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	Rotman, J.J., “An Introduction to Homological Algebra”, Academic Press, 1979
2	Northcott D. G. “An Introduction to Homological Algebra”, Cambridge at the University Press, 1960

Week	Weekly Detailed Course Contents	
1	Theoretical	Abelian Groups
2	Theoretical	Rings
3	Theoretical	Modules
4	Theoretical	Homorphisms
5	Theoretical	Free Modules, Exact Sequences
6	Theoretical	5- Lemma and 3x3 Lemma
7	Theoretical	Hom Functor
8	Theoretical	Projective and Injective Modules
9	Intermediate Exam	MIDTERM EXAM
10	Theoretical	Essential and Superfluous Submodules, Supplements
11	Theoretical	Category of Complexes
12	Theoretical	Category of Complexes
13	Theoretical	Projektive and İnjektive Resolutions
14	Theoretical	Derived Functor
15	Theoretical	Derived Functor
16	Final Exam	FINAL EXAM

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	3	3	84
Assignment	1	10	2	12
Midterm Examination	1	45	2	47
Final Examination	1	55	2	57
			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 comprehend the concepts of Abelian group, Ring, module and homomorphism
2	To be able to comprehend the basic concepts of homological algebra
3	To be able to comprehend abstract concepts
4	To be able to develop analytical thinking
5	To be able to gain the skill of interpreting some interrelations among these concepts

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	4	4	4	4	4
P3	3	4	4	4	4
P4	4	4	5	5	4
P5	4	4	4	4	4
P6	4	5	5	5	4
P8	4	5	5	5	4
P9	4	4	4	4	4
P10	4	4	4	4	4
P13			4	3	3
P14			3	3	3
P15	4	5	5	5	3