



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Homological Algebra II							
Course Code		MTK626		Couse Level		Third Cycle (Doctorate Degree)			
ECTS Credit	7.5	Workload	188 (<i>Hours</i>)	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		To introduce advanced homological algebra.							
Course Content		To give abstract homological algebra, to study properties of kernels and cokernels, to study arrow categories, to study limit and colimit, to give Lazard's Theorem, to give dimensions in homology.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Individual Study					
Name of Lecturer(s)									

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	25
Final Examination	1	60
Assignment	2	15

Recommended or Required Reading

1	Basic Homological Algebra, M. Scott Osborne, Springer Verlag, 2000.
2	Homology , Saunders Mclane, Springer Verlag , 1995.
3	Introduction of Homological Algebra, Rotman, J.J., 2009.
4	Relative Homological Algebra, Edgar, E, Enochs, Overtoun M.G. Jenda, Berlin, New York: de Gruyter, 2000.

Week	Weekly Detailed Course Contents	
1	Theoretical	Abstract homological algebra (without elements)
2	Theoretical	Additive categories
3	Theoretical	Kernel and cokernel
4	Theoretical	To study in projectives
5	Theoretical	Arrow categories
6	Theoretical	Homologies in abelian categorie
7	Theoretical	Long exact sequences
8	Intermediate Exam	Midterm exam
9	Theoretical	A choice for unbalanced categories
10	Theoretical	Limit and colimit
11	Theoretical	Adjoint functors
12	Theoretical	Directed colimits, tensor product and Tor
13	Theoretical	Lazard's Theorem
14	Theoretical	Weak dimensions
15	Theoretical	Injektive envelopes

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	3	3	84
Assignment	2	0	20	40
Midterm Examination	1	25	2	27
Final Examination	1	35	2	37
Total Workload (Hours)				188
[Total Workload (Hours) / 25*] = ECTS				7.5

*25 hour workload is accepted as 1 ECTS



Learning Outcomes

1	To introduce advanced homological properties
2	To study some algebraic subjects in homological way
3	To analyse some proof techniques in other fields in homological way
4	To study dimensions in homological way
5	To be able to use mathematical concepts in solving certain types of problems

Programme Outcomes (Mathematics Doctorate)

1	To be able to develop the current and advanced knowledge of mathematics domain to expertise level by an original idea or research, based on the level of its knowledge at the graduate level, and to be able to reach original definitions that will bring innovation to Mathematics.
2	To be able to comprehend the interdisciplinary interaction associated with Mathematics.
3	To be able to use and evaluate the new knowledge in the field of Mathematics with a systematic approach.
4	To be able to develop an idea, a method, a design or an application that will bring innovation to Mathematics, to use well known ideas, methods, designs or applications on a different research area, or to search, comprehend, design, adapt and apply an original subject matter.
5	To be able to criticize, analyze, synthesize and evaluate new and complex ideas.
6	To be able have high-level skills in research methods related to studies on Mathematics.
7	To be able to expand the frontiers knowledge in the field of Mathematics via generating or interpreting an original study, or publishing at least a scientific paper in national/international refereed journals.
8	To be capable of leadership in the positions that require the analyses of problems related to the field of Mathematics.
9	To be able to defend his/her original ideas among the experts in the discussion of math related issues, and to be able to communicate effectively to show his/her competence in the field of Mathematics.
10	To be able to contribute to the solution of the social, scientific, cultural and ethical problems related to the Mathematics, and to be able to support the development of social, scientific, cultural and ethical values.
11	To be able to have both oral and written communication using a foreign language.

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	3	4	4	4
P2	3	3	4	4	4
P3	4	4	4	4	4
P4	4	4	4	4	4
P5	4	4	4	4	4
P6	4	4	4	4	4
P7	4	4	4	4	4
P8	3	3	4	4	4
P9	3	3	4	4	5
P10	3	3	3	3	3
P11	4	4	4	4	4

