

AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Homological Algebra I								
Course Code		MTK625		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		Introduction to homological algebra and give some fundamental properties.								
Course Content		To introduce categorie theory, to define tensor product and funktors in module theory, to study Ext and Tor funktors, to give homological approach for ring theory.								
Work Placement		N/A								
Planned Learning Activities and Teaching Methods			Explan	ation	(Presentat	ion), Individua	I 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, Spinger Verlag,
2	Homology, Saunders Mclane, Spinger Verlag
3	Introduction of Homological Algebra, Rotman, J.J.
4	Relative Homological Algebra, Edgar, E, Enochs, Overtoun M.G. Jenda

Week	Weekly Detailed Cours	e Contents						
1	Theoretical	Categories						
2	Theoretical	Modules (generalities, tensor products, exactness of functors)						
3	Theoretical	Modules (projectives, injectives and flats)						
4	Theoretical	Ext and Tors (complexes and projective resolutions)						
5	Theoretical	Long exact sequences						
6	Theoretical	Flat resolutions and injective resolutions						
7	Theoretical	Consequences						
8	Intermediate Exam	MIDTERM EXAM						
9	Theoretical	Dimension theory						
10	Theoretical	Change of rings (computational considirations)						
11	Theoretical	Change of rings (matrix rings, polynomials)						
12	Theoretical	Quotients and localization						
13	Theoretical	Additive functors						
14	Theoretical	Derived functors						
15	Theoretical	Long exact sequences (existence)						

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	
	188					
[Total Workload (Hours) / 25*] = ECTS					7.5	
*25 hour workload is accepted as 1 ECTS						

Learning Outcomes					
1	To introduce fundamental properties in advanced category theory				
2	To introduce homological approche in module theory				
3	To study some special functors				
4	To study some other homological approches				
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	4	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	3	4	3
P8	4	4	4	4	4
P9	4	4	3	4	4
P10	3	3	3	3	3
P11	4	4	4	4	4

