AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Introduction to Module Theory								
Course Code	MTK510		Couse Level		Second Cycle (Master's Degree)				
ECTS Credit	7	Workload	175 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	This course gives the fundamental concepts of modules								
Course Content	To give concept of modules, submodules, sum of submodules and intersection of submodules, to define the generators and cogenerators of modules and to give properties of them, to study constraction of product and coproduct, to introduce small submodule, large submodule and complement submodules and studying related properties, to define injective and projective modules and give some basic facts, to study injective hull and projective covers.								
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	30
Final Examination	1	50
Assignment	1	20

Recommended or Required Reading	
1	Moduln und Ringe, F. Kasch, B.G. Teubner Stuttgart 1977
2	Modules and Rings, F. Kasch, Translated by D.A.R. Wallace, 1982
3	Rings and Categories of Modules, F.W. Anderson- K.R. Fuller, Springer Verlag 1974

Week	Weekly Detailed Course Contents	
1	Theoretical	Modules, submodules and ideals
2	Theoretical	Intersection and sum of submodules, internal direct sums
3	Theoretical	Factor modules and factor rings, ring homomorphisms
4	Theoretical	Generators and cogenerators, factorization of homomorphisms
5	Theoretical	The theorem of Joran-Hölder-Schreier, the endomorphism ring of modules
6	Theoretical	Dual modules, exact sequences
7	Theoretical	Construction of Products and Coproducts
8	Intermediate Exam	Midterm exam
9	Theoretical	Homomorphisms of direct products and coproducts, free modules
10	Theoretical	Free and divisible abelian groups
11	Theoretical	Large and small modules
12	Theoretical	Complements
13	Theoretical	Definition of injective and projective modules and simple corollaries
14	Theoretical	Injective hulls and projective covers
15	Theoretical	Baer’s Criterion, properties of generators and cogenerators
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	32	2	34

Final Examination	1	43	2	45
			Total Workload (Hours)	175
			[Total Workload (Hours) / 25*] = **ECTS**	7
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	To be able to give fundamental properties of module theory
2	To be able to relate module theory with other fields of algebra
3	To be able to develop some theoretical approach on module theory
4	To be able to develop individual work on module theory
5	To be able to relate module theory with some other fields except algebra

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	5
P2	5	5	4	4	5
P3		4	4	4	4
P4	4	4	5	4	5
P5	4	3	4	5	4
P6	3	3	3	5	3
P7	2	3	4	5	3
P11	4	4	4	4	4
P15	2	4	4	5	5