

COURSE PROFILE

Course Name	Code	Semester	Term	Theory +PS+Lab. (hour/week)	Local Credits	ECTS
Introduction to Modern Algebra	MATH 441	Fall	7	3+0+0	3	8

Prerequisites	None
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Course Language	English
Course Type	Required
Course Lecturer	
Course Assistant	
Course Objectives	The aim of the course is to introduce students to the fundamentals of algebraic structures groups, rings, fields, and so forth. The students learn how to think mathematically, mathematical reasoning, using and handling with abstract mathematical objects and structures
Course Learning Outcomes	By the end of the course the students should be able to: <ul style="list-style-type: none"> 1. to identify, compare, classify, justify, operate and apply the fundamental algebraic structures 2. prepare for high-level mathematical courses 3. to argue, create and formulate mathematical arguments and mathematical reasoning 4. recognize the impact of abstract algebra on coding, cryptology and science 5. recognize professional and ethical responsibilities of scientific writing
Course Content	<p>Fundamentals: Sets, mappings, binary operations, relations, mathematical induction. Integers: Divisibility, prime factors, the greatest common divisor, congruence of integers and congruence classes.</p> <p>Groups: Definition of a group, subgroups, cyclic groups, isomorphism, homomorphism, permutation groups, Cayley's theorem, normal subgroups, finite groups and Lagrange's theorem, quotient groups.</p> <p>Rings, integral domains and fields: Definition of a ring, integral domains and fields, ideals and quotient rings, ring homomorphism.</p> <p>Polynomials: Polynomials over a ring, divisibility of polynomials.</p>

COURSE CONTENT

Week	Subjects	Related Preparation
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1	Binary Operation; Permutation and Inverses	Chapter 1
2	Relations; Postulates for the integers; Mathematical Induction	Chapter 2
3	Divisibility; Prime Factors and the Greatest Common Divisor	Chapter 2
4	Congruence of Integers; Congruence Classes	Chapter 2
5	Definition of a Group;	Chapter 3
6	Subgroups; Cyclic Groups	Chapter 3
7	Isomorphisms; Homomorphisms	Chapter 3
8	Finite Permutation Groups; Cayley's Theorem	Chapter 4
9	Normal Subgroups	Chapter 4
10	Quotient Groups	Chapter 4
11	Definition of a Ring; Integral Domains and Fields	Chapter 5
12	Ideals and Quotient Rings; Ring Homomorphisms	Chapter 6
13	Polynomials over a Ring;	Chapter 8
14	Divisibility and the Greatest Common Divisor;	Chapter 8

Course Textbooks	J. Gilbert and L. Gilbert: Elements of Modern Algebra, sixth Edition, Thomson.
Recommended References	I.N. Herstein, Abstract Algebra, Prentice-Hall. J.B. Fraleigh, Abstract Algebra, Addison-Wesley.

Semester Requirements	Number	Percentage of Grade
Attendance/Participation	1	10
Laboratory	-	-
Application	-	-

Special Course Internship (Work Placement)	-	-
Quizzes/Studio Critics	-	-
Homework Assignments	13	-
Presentation	-	-
Project	-	-
Seminar/Workshop	-	-
Midterms/Oral Exams	2	60
Final/Resit Exam	1	30
Total	17	100

PERCENTAGE OF SEMESTER WORK	16	70
PERCENTAGE OF FINAL WORK	1	30
Total	17	100

Course Category	Core Courses	
	Major Area Courses	X
	Supportive Courses	
	Media and Management Skills Courses	
	Transferable Skill Courses	

COURSE'S CONTRIBUTION TO PROGRAM

#	Program Qualifications / Outcomes	* Level of Contribution				
		1	2	3	4	5
1	To have a grasp of basic mathematics, applied mathematics and theories and applications of statistics.				X	
2	To be able to use theoretical and applied knowledge acquired in the advanced fields of mathematics and statistics,					X
3	To be able to define and analyze problems and to find solutions based on scientific methods,					X
4	To be able to apply mathematics and statistics in real life with interdisciplinary approach					X

	and to discover their potentials,					
5	To be able to acquire necessary information and to make modeling in any field that mathematics is used and to improve herself/himself,					X
6	To be able to criticize and renew her/his own models and solutions,					X
7	To be able to tell theoretical and technical information easily to both experts in detail and nonexperts in basic and comprehensible way,				X	
8	To be able to use international resources in English and in a second foreign language from the European Language Portfolio (at the level of B1) effectively and to keep knowledge up-to-date, to communicate comfortably with colleagues from Turkey and other countries, to follow periodic literature,				X	
9	To be familiar with computer programs used in the fields of mathematics and statistics and to be able to use at least one of them effectively at the European Computer Driving Licence Advanced Level,		X			
10	To be able to behave in accordance with social, scientific and ethical values in each step of the projects involved and to be able to introduce and apply projects in terms of civic engagement,				X	
11	To be able to evaluate all processes effectively and to have enough awareness about quality management by being conscious and having intellectual background in the universal sense,				X	
12	By having a way of abstract thinking, to be able to connect concrete events and to transfer solutions, to be able to design experiments, collect data, and analyze results by scientific methods and to interfere,					X
13	To be able to continue lifelong learning by renewing the knowledge, the abilities and the competencies which have been developed during the program, and being conscious about lifelong learning,				X	
14	To be able to adapt and transfer the knowledge gained in the areas of mathematics and statistics to the level of secondary school,				X	
15	To be able to conduct a research either as an individual or as a team member, and to be effective in each related step of the project, to take role in the decision process, to plan and manage the project by using time effectively.				X	

*1 Lowest, 2 Low, 3 Average, 4 High, 5 Highest

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION

Activities	Number	Duration (Hours)	Total Workload
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Course Hours (Including Exams)	14	3	48
Tutorials	-	-	-
Laboratory	-	-	-
Application	-	-	-
Special Course Internship (Work Placement)	-	-	-
Field Work	-	-	-
Study Hours Out of Class	14	4	56
Presentations / Seminar	-	-	-
Project	-	-	-
Preparatory reading	13	2	26
Homework Assignments	13	4	52
Quizzes	-	-	-
Midterm Exams	2	4	8
Final / Resit Exam	1	10	10
		Total Workload	200

COURSE CATEGORY

ISCED GENERAL AREA CODES	GENERAL AREAS	ISCED BASIC AREA CODES	BASIC EDUCATIONAL AREAS	
1	Education	14	Teacher Training and Educational Sciences	0
2	Humanities and Art	21	Art	0
2	Humanities and Art	22	Humanities	0
3	Social Sciences, Management and Law	31	Social and Behavioral Sciences	0
3	Social Sciences, Management and Law	32	Journalism and Informatics	0
3	Social Sciences, Management and Law	38	Law	0
4	Science	42	Life Sciences	0

4	Science	44	Natural Sciences	0
4	Science	46	Mathematics and Statistics	100
4	Science	48	Computer	0
5	Engineering, Manufacturing and Civil	52	Engineering	0
5	Engineering, Manufacturing and Civil	54	Manufacturing and Processing	0
5	Engineering, Manufacturing and Civil	58	Architecture and Structure	0
6	Agriculture	62	Agriculture, Forestry, Livestock, Fishery	0
6	Agriculture	64	Veterinary	0
7	Medicine and Welfare	72	Medical	0
7	Medicine and Welfare	76	Social Services	0
8	Service	81	Personal Services	0
8	Service	84	Transport Services	0
8	Service	85	Environment Protection	0
8	Service	86	Security Services	0