



ÇANKAYA UNIVERSITY

Faculty of Arts and Sciences

Course Definition Form

Part I. Basic Course Information

Department Name	MATHEMATICS	Dept. Numeric Code	2 7	
Course Code	M A T H 1 4 4	Number of Weekly Lecture Hours	2	
		Number of Weekly Lab/Tutorial Hours	2	
		Number of Credit Hours	3	
Course Web Site	http:// math144.cankaya.edu.tr		ECTS Credit	0 6

Course Name <i>This information will appear in the printed catalogs and on the web online catalog.</i>	
English Name	Abstract Mathematics
Turkish Name	Soyut Matematik

Course Description <i>Provide a brief overview of what is covered during the semester. This information will appear in the printed catalogs and on the web online catalog. Maximum 60 words.</i>	
Propositional Logic, Predicates and Quantifiers, Techniques of Proofs, Set Theory, Functions, Relations, Integers, Groups, Subgroups, Cyclic Groups, Groups of Permutations, Cosets, Theorem of Lagrange, Homomorphisms, Isomorphisms, Factor Groups, Rings, Integral Domains and Fields.	

Prerequisites (if any) <i>Give course codes and check all that are applicable.</i>	1 st	2 nd	3 rd	4 th
	_ _ _ _ _ _ _	_ _ _ _ _ _ _	_ _ _ _ _ _ _	_ _ _ _ _ _ _
	<input type="checkbox"/> Consent of the Instructor		<input type="checkbox"/> Senior Standing	
	<input type="checkbox"/> Give others, if any. _ _ _ _ _ _ _ _			
Co-requisites (if any)	1 st	2 nd	3 rd	4 th
	_ _ _ _ _ _ _	_ _ _ _ _ _ _	_ _ _ _ _ _ _	_ _ _ _ _ _ _
Course Type <i>Check all that are applicable</i>	<input checked="" type="checkbox"/> Must course for dept. <input type="checkbox"/> Must course for other dept.(s) <input type="checkbox"/> Elective course for dept. <input type="checkbox"/> Elective course for other dept.(s)			

Course Classification <i>Give the appropriate percentage for each category.</i>				
Category	Mathematics & Natural Sciences			
Percentage	100			

Part II. Detailed Course Information**Course Objectives***Maximum 100 words.*

The aim of the course is to give the necessary background about logic, making proofs and algebraic structures.

Learning Outcomes*Explain the learning outcomes of the course. Maximum 10 items.*

The students will learn:

1. how to read, write and think in a mathematical way
2. how to create new mathematical arguments and prove them
3. how to work with abstract mathematical structures: sets, functions, relations
4. divisibility and how to find greatest common divisor of two integers
5. definition of group, subgroup and examples of some basic and specific groups: groups of integers, real numbers, complex numbers, groups of functions, linear groups, symmetric groups, finite and infinite cyclic groups.
6. how to get a partition for a given group: cosets.
7. how to construct new groups from the old ones: factor groups
8. definition of ring, ideal, integral domain, field, quotient ring

Textbook(s)*List the textbook(s), if any, and other related main course material.*

Author(s)	Title	Publisher	Publication Year	ISBN
Ethan D. Bloch	Proofs and Fundamentals: A First Course in Abstract Mathematics	Springer	2011	ISBN-13: 978-1-4419-7126-5
Linda Gilbert & Jimmie Gilbert	Elements of Modern Algebra	Cengage Learning	2015	ISBN-13: 978-1-285-46323-0

Reference Books*List, if any, other reference books to be used as supplementary material.*

Author(s)	Title	Publisher	Publication Year	ISBN

Teaching Policy*Explain how you will organize the course (lectures, laboratories, tutorials, studio work, seminars, etc.)*

4 hours of lecturing per week. Attendance to the lectures is compulsory.

Laboratory/Studio Work*Give the number of laboratory/studio hours required per week, if any, to do supervised laboratory/studio work and list the names of the laboratories/studios in which these sessions will be conducted.*

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Computer Usage

Briefly describe the computer usage and the hardware/software requirements for the course.

Course Outline

List the weekly topics to be covered.

Week	Topic(s)
1	Informal Logic: Statement, Relations Between Statements
2	Informal Logic: Valid Arguments, Quantifiers Strategies for Proofs: Direct Proofs
3	Strategies for Proofs: Proof by Contrapositive and Contradiction, Cases, If and Only If, Quantifiers in Theorems
4	Sets
5	Functions
6	Functions, Relations
7	Relations, Finite Sets and Infinite Sets
8	Finite Sets and Infinite Sets; Integers: Induction, Divisibility
9	Integers: Prime Factors, Greatest Common Divisor, Congruence and Congruence Classes
10	Groups: Definition of Group, Subgroups, Cyclic Groups, Homomorphisms
11	Groups: Finite Permutation Groups, Cayley's Theorem, Cosets, Normal Subgroups
12	Groups: Quotient Groups; Rings, Integral Domains and Fields
13	Rings, Integral Domains and Fields
14	Rings, Integral Domains and Fields

Grading Policy

List the assessment tools and their percentages that may give an idea about their relative importance to the end-of-semester grade.

Assessment Tool	Quantity	Percentage	Assessment Tool	Quantity	Percentage	Assessment Tool	Quantity	Percentage
Homework			Case Study			Attendance		
Quiz(es)			Lab Work			Field Study		
Midterm Exam	2	60	Classroom Participation			Project		
Term Paper			Oral Presentation			Final Exam	1	40

ECTS Workload <i>List all the activities considered under the ECTS.</i>			
Activity	Quantity	Duration (hours)	Total Workload (hours)
Attending Lectures (<i>weekly basis</i>)	14	2	28
Attending Labs/Recitations (<i>weekly basis</i>)	14	2	28
Compilation and finalization of course/lecture notes (<i>weekly basis</i>)	14	1	14
Collection and selection of relevant material (<i>once</i>)	1	8	8
Self study of relevant material (<i>weekly basis</i>)	14	2	28
Take-home assignments	-	-	-
Preparation for quizzes	-	-	-
Preparation for mid-term exams (<i>including the duration of the exams</i>)	2	14	28
Preparation of term paper/case-study report (<i>including oral presentation</i>)	-	-	-
Preparation of term project/field study report (<i>including oral presentation</i>)	-	-	-
Preparation for final exam (<i>including the duration of the exam</i>)	1	16	16
TOTAL WORKLOAD / 25			150/25
ECTS Credit			6

Total Workloads are calculated automatically by formulas. To update all the formulas in the document first press CTRL+A and then press F9.

Program Qualifications vs. Learning Outcomes <i>Consider the program qualifications given below as determined in terms of learning outcomes and acquisition of capabilities for all the courses in the curriculum. Look at the learning outcomes of this course given above. Relate these two using the Likert Scale by marking with X in one of the five choices at the right.</i>						
No	Program Qualifications	Contribution				
		0	1	2	3	4
1	Adequate knowledge in mathematics; ability to use applied and theoretical information in these areas to solve pure and applied mathematics problems.					X
2	Ability to use modern computational tools to analyze an abstract or real life problem			X		
3	Adequate knowledge in theoretical and historical background in mathematics					X
4	Ability to work individually and in teams efficiently, ability to collaborate effectively in teams to analyze complex systems from intra-disciplinary and multi-disciplinary areas				X	
5	Ability to communicate effectively in English about technical subjects, both orally and in writing				X	
6	Ability to use, develop and implement new experiments and algorithms to solve scientific, engineering and financial problems				X	
7	Ability to analyze a mathematical problem using both analytical and numerical methods; use and compare theoretical and simulational methods to gain deeper insight			X		
8	Ability to report the findings, conclusions and interpretations related to a project in the area of pure and applied mathematics, ability to write technical reports, to prepare and conduct effective presentations				X	
9	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to keep continuous self improvement				X	
10	Awareness of professional and ethical responsibility issues and their legal consequences					X

Scale for contribution to a qualification: 0-none, 1-little, 2-moderate, 3-considerable, 4-highest