



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 3 4 4	Number of Weekly Lecture Hours	2
		Number of Weekly Lab/Tutorial Hours	2
		Number of Credit Hours	3
Course Web Site	http:// math344.cankaya.edu.tr		ECTS Credit
			0 7

Course Name

This information will appear in the printed catalogs and on the web online catalog.

English Name: Elementary Number Theory

Turkish Name: Elementer Sayı Teorisi

Course Description

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.

Divisibility. The linear Diophantine equation. Primes. Congruences. Euler, Fermat, Wilson, Lagrange and Chinese Remainder Theorems. Arithmetical functions.

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 checked="" type="checkbox"/> Elective course for other dept.(s)			

Course Classification

Give the appropriate percentage for each category.

Category	Mathematics & Natural Sciences	Engineering & Architectural Sciences			
Percentage	90	10			

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

The primary goal is to introduce the theory of numbers. Students will learn some of the history of the theory of numbers, see the importance and uncertainty of conjectures, learn methods of computation in number theory and investigate conjectures, follow deductive proofs of many of the theorems in the subject, and develop and write up some of their own proofs.

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

Upon successful completion of the courses in this discipline, the student will have acquired the following knowledge and skills

- 1) Think logically and critically to solve problems, explain conclusions, and evaluate evidence or critique the thinking of self and others.
- 2) Describe the set of all solutions to linear Diophantine equations.
- 3) Understand the concept of a pseudoprime and be able to determine if a number is pseudoprime or Carmichael.
- 4) Construct the group Q_n directly. Determine the size of Q_n . Compute Legendre symbol, know the properties of Legendre symbol. Know and be able to use the law of quadratic reciprocity.
- 5) Mobius inversion formula and its properties.

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

Author(s)	Title	Publisher	Publication Year	ISBN
David M. Burton	Elementary Number Theory, Seventh Ed.	McGraw-Hill	2011	978-0073383149

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

Author(s)	Title	Publisher	Publication Year	ISBN
Ivan Niven, Herbert S. Zuckerman, Hugh L. Montgomery	An Introduction to the Theory of Numbers 5th ed.	John Wiley & Sons, Inc.	1991	0-471-62546-9

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

4 hours of lecturing per week.

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

Course Outline <i>List the weekly topics to be covered.</i>	
Week	Topic(s)
1	Preliminaries
2	Divisibility
3	Prime Numbers
4	Prime Numbers
5	Number Theoretical Functions
6	Number Theoretical Functions
7	The Algebra of Congruence Classes
8	The Algebra of Congruence Classes
9	Congruences of Higher Degree
10	Some Diophantine Equations
11	Numbers of Special Form
12	Numbers of Special Form
13	Certain Nonlinear Diophantine Equations
14	Representation of Integers as Sums of Squares

Grading Policy <i>List the assessment tools and their percentages that may give an idea about their relative importance to the end-of-semester grade.</i>								
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	15	15
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	20	40
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	22	22
TOTAL WORKLOAD / 25			175/25
ECTS Credit			7

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 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.						
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 mathematical 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