

# NUMBER THEORY I

1	Course Title:	NUMBER THEORY I
2	Course Code:	MAT5203
3	Type of Course:	Optional
4	Level of Course:	Second Cycle
5	Year of Study:	1
6	Semester:	1
7	ECTS Credits Allocated:	6.00
8	Theoretical (hour/week):	3.00
9	Practice (hour/week):	0.00
10	Laboratory (hour/week):	0
11	Prerequisites:	None
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Prof. Dr. MUSA DEMİRCİ
15	Course Lecturers:	Prof.Dr.İsmail Naci CANGÜL Prof.Dr.Gökhan SOYDAN Doç. Dr. Musa DEMİRCİ
16	Contact information of the Course Coordinator:	Uludağ Üniversitesi, Fen-Edebiyat Fakültesi Matematik Bölümü, 16059 Görükle Bursa-TÜRKİYE 0 224 294 17 51 tekcan@uludag.edu.tr
17	Website:	
18	Objective of the Course:	The aim of the course is to make the students gain the some algebraic properties on number theory
19	Contribution of the Course to Professional Development:	To have advanced knowledge in Number Theory.
20	Learning Outcomes:	
	1	Learn the some fundamental concepts on number theory.
	2	Learn the finite fields and algebra on these fields.
	3	Learn the Legendre symbol and the relationship between quadratic congruencies and Legendre symbol.
	4	Learn the Gauss sums and some properties of this sum.
	5	Learn the find the simple continued fraction expansion of rational and irrational numbers.
	6	
	7	
	8	
	9	
	10	
21	Course Content:	
	<b>Course Content:</b>	
Week	Theoretical	Practice
1	Overview of basic concepts on lessons	
2	Algebraic numbers, algebraic groups and reduction theorems	

3	Finite fields and algebraic operations on them				
4	Prime numbers and the number of prime numbers				
5	Legendre symbol and the relationship between quadratic congruencies and Legendre symbol				
6	Ring of Gauss integers				
7	Gauss primes, Galois groups and sums				
8	Rings and units of rings				
9	The relationship between units of rings and the integer solutions of Pell equations				
10	Indeterminate equations, Fermat's Conjecture.				
11	Quadratic forms and their relationship between the groups GL(2,Z) and SL(2,Z)				
12	The prime number theorem and Elementary proof of the prime number theorem.				
13	The problem of sums of squares and summary.				
14	Continued Fractions. The uniqueness of a Continued Fraction Expansion				
22	Textbooks, References and/or Other Materials:	[1] Hua Loo Keng, Introduction to Number Theory. Springer-Verlag, New York, 1982 [2] D.A. Buell. Binary Quadratic Forms, Clasical Theory and Modern Computations. Springer-Verlag, New York, 1989.			
Activites			Number	Duration (hour)	Total Work Load (hour)
Theoretical			14	42.00	42.00
Practicals/Labs			0	0.00	0.00
Self study and preperation			14	56.00	56.00
Homeworks			0	0.00	0.00
Projects			14	70.00	70.00
Assesment			0	0.00	0.00
Field Studies			0	0.00	0.00
Midterm exams		R	0	0.00	0.00
Others			0	0.00	0.00
Quiz		0	0	15.00	15.00
Final Exams		0	0	15.00	15.00
Total Work Load					183.00
Final Exam		1	100.00		6.10
ECTS Credit of the Course					6.00
Contribution of Term (Year) Learning Activities to Success Grade			0.00		
Contribution of Final Exam to Success Grade			100.00		
Total			100.00		
Measurement and Evaluation Techniques Used in the Course			Summative assessment (Final Exam)		
24	ECTS / WORK LOAD TABLE				

25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	5	4	2	4	3	3	5	5	5	3	0	0	0	0	0	0
ÖK2	4	3	2	4	3	2	5	5	4	4	0	0	0	0	0	0
ÖK3	5	4	2	4	4	4	4	5	5	4	0	0	0	0	0	0
ÖK4	4	3	2	4	3	2	5	5	4	3	0	0	0	0	0	0
ÖK5	5	3	2	4	3	5	4	5	5	3	0	0	0	0	0	0
LO: Learning Objectives    PQ: Program Qualifications																
Contribution Level:	1 very low		2 low			3 Medium			4 High			5 Very High				