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. İSMAİL NACİ CANGÜL	
15	Course Lecturers:	Prof.Dr.İsmail Naci CANGÜL Prof.Dr.Osman BİZİM	
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:		
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.
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21	Course Content:		

Course Content:

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	Farey sequences	
11	Quadratic forms and their relationship between the groups GL(2,Z) and SL(2,Z)	
12	Positive definite and indefinite quadratic forms	
13	Minkowski theorem and its application	
14	The ring Z[exp(2pi/ n)]	

22	Textbooks, References and/or Other Materials:	[1] J. Buchmann and U. Vollmer. Binary Quadratic Forms: An Algorithmic Approach. Springer-Verlag, Berlin, Heidelberg, 2007. [2] D.A. Buell. Binary Quadratic Forms, Clasical Theory and Modern Computations. Springer-Verlag, New York, 1989. [3] H.M. Edward. Fermat's Last Theorem: A Genetic Introduction to Algebraic Number Theory. Graduate Texts York, London, Tokyo, 1996. [6] R.A. Mollin. Fundamental Number Theory with

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	7.00	98.00
Homeworks	0	0.00	0.00
Projects	14	5.00	70.00
Field Studies	0	0.00	0.00
Midterm exams	0	0.00	0.00
Others	0	0.00	0.00
Final Exams	1	15.00	15.00
Total Work Load			225.00
Contribution of Term (Year) Learning Activities to Success Grade	0.00		7.50
ECTS Credit of the Course			6.00

Contribution of Final Exam to Success Grade	100.00
Total	100.00
Measurement and Evaluation Techniques Used in the Course	

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**