ALGEBRAIC NUMBER THEORY II

1	Course Title:	ALGEBRAIC NUMBER THEORY II	
2	Course Code:	MAT5208	
3	Type of Course:	Optional	
4	Level of Course:	Second Cycle	
5	Year of Study:	1	
6	Semester:	2	
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. OSMAN BİZİM	
15	Course Lecturers:	Prof. Dr. Osman BİZİM	
16	Contact information of the Course Coordinator:	Uludağ Üniversitesi, Fen-Edebiyat Fakültesi Matematik Bölümü, Görükle Bursa-TÜRKİYE 0 224 294 17 57 / obizim@uludag.edu.tr	
17	Website:		
18	Objective of the Course:	The aim of this lecture is to illustrate how basic notions from the theory of algebraic numbers may be used to solve problems in number theory. The main focus is to extend properties of the integer numbers to more general number structures: algebraic number fields and their rings of algebraic integers. So students can So students have the ability conduct original research and independent publication.	
19	Contribution of the Course to Professional Development:		
20	Learning Outcomes:		
		1	Learns integral domains, unique factorization domains, ideals, Noetherian domains, principal ideal domains.
		2	Learns field extensions, auto-morphisms, Galois groups.
		3	Learns norms and traces, integral bases and discriminants, norms of ideals.
		4	Learns class groups, binary quad-ratic forms, ideal class group.
		5	Learns Kummer extensions and class-field theory and ideal decomposition in number fields, ramification.
		6	Learns, the ideal class group, Minkowski theorem, determining the ideal class group.
		7	Learns, Dirichlet's unit theorem, valuations and properties of valuations.
		8	
		9	
		10	
21	Course Content:		
	Course Content:		

Week	Theoretical	Practice
1	Integral domains, unique factorization domains, ideals.	
2	Noetherian domains,principal ideal domains, algebraic numbers and number fields, quadratic fields.	
3	Field extensions, automorphisms, Galois groups.	
4	Norms and traces, integral bases and discriminants, norms of ideals.	
5	Class groups, binary quadratic forms, ideal class group.	
6	Prime power representation, Bachet's equation, The Fermat equation, factor-ing.	
7	Ideal decomposition in number fields, ramification.	
8	Splitting of prime ideals, Galois theory and decomposition.	
9	The ramification of prime ideals in Galois extensions.	
10	The fundamental theorem of abelian extensions and nuerical examples.	
11	Kummer extensions and class-field theory.	
12	The ideal class group, Minkowski theorem, determining the ideal class group.	

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	5.00	70.00
Homeworks	0	0.00	0.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	0	0.00	0.00
Others	14	5.00	70.00
Final Exams	1	43.00	43.00
Total Work Load			225.00
Total work load / 30 hr			7.50
ECTS Credit of the Course			6.00

[2] Algebraic Number Theory, J. Neukirch.

[4] Algebraic Numbers, Paulo Ribenboim.

23 Assesment

TERM LEARNING ACTIVITIES	NUMBE	WEIGHT
Midterm Exam	0	0.00
Final work	0	0.00
Total	1	100.00
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		

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	5	5	5	5	5	5	5	5	5	0	0	0	0	0	0
ÖK2	5	5	5	5	5	5	5	5	5	5	0	0	0	0	0	0
ÖK3	5	5	5	5	5	5	5	5	5	5	0	0	0	0	0	0
ÖK4	5	5	5	5	5	5	5	5	5	5	0	0	0	0	0	0
ÖK5	5	5	5	5	5	5	5	5	5	5	0	0	0	0	0	0
ÖK6	5	5	5	5	5	5	5	5	5	5	0	0	0	0	0	0
ÖK7	5	5	5	5	5	5	5	5	5	5	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**			