

MATH 519: Algebraic Number Theory, Fall 2022

Instructor: Mohammad Sadek

email: mohammad.sadek@sabanciuniv.edu

Office Hours: by appointment

Textbook:

Algebraic Number Theory; 1st edition; by Frazer Jarvis; Springer; 2014 ; ISBN: 978-3-319-07544-0.

Prerequisites:

Algebra I

Course Description:

The aim of the course is to give an introduction to the basic concepts of algebraic number theory. The course covers the following topics:

- 1) Number Fields and their Extensions.
- 2) The Field of Algebraic Numbers.
- 3) Norms, Traces and Characteristic Polynomials.
- 4) Embeddings of Number Fields into the complex field. 5) The Primitive Element Theorem.
- 5) Rings of Integers in Number Fields.
- 6) Discriminants and Bases.
- 7) Integral Bases.
- 8) Unique Factorization of Ideals.
- 9) The Dedekind-Kummer Theorem.
- 10) Ideal Class Group and Class Number.
- 11) Groups of Units and Dirichlet's Theorem.

Grading:

There will be four lists of suggested problems. Please solve them all as they will help you get prepared for exams.

Your grade depends ONLY on the items listed below. There will be no extra-credit opportunities.

- Two Midterms: 25% each
- Final Project: 15%

- Final Exam: 35%

Locations and Times of the midterms and project submission will be announced in fashionable time.

All exams are cumulative. What you fail to learn in the beginning may hurt you at the end.

Are there any make-up exams, extra credit assignments?

There is NO extra credit. Also, there will be NO make-up exams, unless the circumstances are extraordinary.

Is there anything I need to know for exams?

- 1) You must SHOW ALL WORK on exams. Unsupported answers are considered miracles and, while inspirational, will receive little or no credit.
- 2) Graded exams will be returned to you as soon as possible.

Classroom Discipline:

It is our responsibility to provide students with excellent learning environments. We are therefore asking you to please respect both our responsibility to teach and the right of other students to learn. Any action that disturbs your classmates or interrupts the lecture is unacceptable. The following rules must be followed in all classes:

1. Classes will start on time. By coming to a class late, you will lose important material and announcements.
2. If you are unable to attend a class, you are responsible to find out what you have missed.
3. You are responsible for every announcement made in class or on Itslearning.

Academic integrity:

Finally, but most importantly, while I expect you to help and cooperate with each other in study groups, the work in the assignments, projects, and exams is expected to be your own. Academic integrity is a commitment, even in the face of adversity, to five fundamental values: honesty, trust, fairness, respect and responsibility. All activities at Sabancı, from teaching to administrative and support functions, serve the process of learning. Together, the university's faculty, staff, and students form a cohesive academic community which shares the Code of Academic and Professional Ethics. Academic fraud and dishonesty includes, but is not limited to, the following categories: cheating, plagiarism, fabrication, multiple submissions, obtaining unfair advantage, unauthorized access to academic or administrative systems, aiding and abetting, impersonation, threatening harm, and copyright infringement. University's Academic Standards, Integrity, and Honesty Codes will be strictly enforced. I have zero-tolerance for any violation of the academic integrity code.