MATH 7230: Algebraic Number Theory
Fall 2018

Lectures: Lockett 134, MWF 1:30 – 2:20

Professor: Karl Mahlburg	**Office:** Lockett 320
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Website All important course information, including lecture information, homework assignments, and other announcements will be found on the course website. Most announcements will also be sent by e-mail. Please check frequently!

Textbook(s) R. Ash, *A course in Algebraic Number Theory*, Dover Publications, 2010.
Online, https://faculty.math.illinois.edu/~r-ash/ANT.html.

J. S. Milne, *Algebraic Number Theory*, online,
https://www.jmilne.org/math/CourseNotes/ANT.pdf.

W. Stein, *Algebraic Number Theory, A Computational Approach*, online,
https://wstein.org/books/ant/ant.pdf.

Content This course gives an introduction to Algebraic Number Theory. We will cover material from Chapters 1–8 of Ash's book; a more explicit (and less algebraic) approach is found in Chapters 1–6 of Milne's book. Topics include norms, traces, discriminants, Dedekind domains, unique factorization of ideals, ideal class groups, class numbers, Dirichlet's Unit Theorem, and cyclotomic fields.

Time permitting, we will also cover Chapters 13–19 of Stein's book, which uses the theory of p-adic rings/fields to give an alternative *adelic* approach to the above material.

Prerequisites You must have completed MATH 7210: Algebra I in order to enroll in this course. Complex analysis at the undergraduate level (MATH 4036) is also helpful.

Schedule Due to University holidays, class will **not** be held on Monday, Sep. 3; Friday, Oct. 5; or Wednesday, Nov. 21. If you are unable to attend the regularly held office hours, you may also schedule an appointment.

Homework Your grade will be based on weekly homework assignments. Regular attendance and participation during lectures is also expected.

Homework assignments will be due on most **Wednesdays** throughout the semester. There will be approximately 8 – 10 assignments, containing a total of at least **40** problems. Your course grade will be determined on a scale of **20** problems, with your total grade determined as follows:

Grade	Homework Problems completed
A	18 – 20
B	16 – 18
C	14 – 16
D	12 – 14
F	Less than 12

You therefore have the choice to work on the problems that interest you the most. However, you must complete **at least one** problem from each assignment in order to receive credit. If you skip an assignment, your grade may be lowered by one step on the plus/minus scale.

Group Work You are allowed, and even encouraged to work in small groups on homework assignments, subject to the following conditions:

1. You must list the names of all of the other students with whom you discussed the problems at the top of your assignment;
2. You must write up your own solutions using your own words and arguments.

Conduct LSU students are expected to maintain high standards of academic integrity. Any incidences of suspected cheating on exams and quizzes will be reported directly to the Judicial Affairs Division in the Dean of Students Office; offenses can result in loss of course credit or expulsion from the university. Instances of direct copying on homework assignments will result in loss of credit for **both** students involved.

Scientific calculators and touchscreen or stylus computers are allowed *solely* for note-taking. Cell phones, MP3 players, and all other electronic devices are not allowed in the classroom at any time.