MATH 701: GRADUATE SEMINAR IN COMPUTATIONAL MATHEMATICS: NUMBER THEORY II

Course number: MAT 701-05

Course title: Selected Topics: Number Theory II

Credits: 3

Meetings: MWF 1:00–1:50 PM

Prerequisites: Number Theory I or permission of instructor.

Instructor information:
Instructor: Dr. Dan Yasaki `d_yasaki@uncg.edu`
Homepage: `http://www.uncg.edu/math/faculty/d_yasaki/teaching.html`
Office Hours (146 Petty): Mondays 8:30 - 9:30 AM, Tuesdays & Thursdays 11:00 - noon

For whom planned: First and second year graduate students interested in number theory.

Catalog description: This is the second part of a two semester sequence on elementary, analytic, and algebraic number theory. Building on results from the first part the second part covers subjects from algebraic number theory including number fields, rings of integers, ramification theory, and ideal class groups.

Student learning outcomes: Upon successful completion of this course, students shall be able to

SLO 1: Define some fundamental objects in number theory.
SLO 2: Summarize some of the main results.
SLO 3: Compute invariants of number fields.
SLO 4: Construct proofs of some fundamental results in number theory.

Teaching methods and assignments for achieving learning outcomes:

Reading: Weekly reading assignments. (SLO 1, SLO2)
Lectures: This is the primary method of content delivery. (SLO 1, SLO 2)
Homework: Weekly written assignments to address computational as well as theoretical aspects of number theory. (SLO 1–4)
Tests: Tests and the final exam serve as the primary gauge of evaluation. (SLO 1–4)

Evaluation and grading: Semester averages are rounded to the nearest point, and letter grades are assigned on a 10 point scale.

A+ : 97–100	B+ : 87–89	C+ : 77–79	D+ : 67–69	
A : 93–96	B : 83–86	C : 73–76	D : 63–66	F : 0 – 59
A− : 90–92	B− : 80–82	C− : 70–72	D− : 60–62	

Homework: Weekly written homework assignments (30%)
Tests: Two tests (20% each)
Final Exam: Comprehensive final exam (30%)

This document was last modified on August 14, 2014.

TABLE 1. Topical outline

Week	Topic
1	Commutative rings and ideals
2–3	A special case of Fermat's conjecture
4–5	Number fields and number rings
6-7	Prime decomposition in number rings
8	Fractional ideals and the different
9	Galois theory for subfields of $\mathbb{C}$
10–11	Galois theory applied to prime decomposition
12	Ramification groups
13–14	The ideal class group

Required text:

Daniel A. Marcus, *Number Fields (Universitext)*, 3rd ed., Springer 1995. ISBN 13: 978-0387902791

This text by Daniel Marcus, first published in 1977, is still one of the best introductions to algebraic number theory. It follows a constructive approach and contains a large number of excellent exercises at various levels of difficulty.

Academic Integrity Policy: Each student is required to sign the Academic Integrity Policy on all major work submitted for the course.

I have abided by the UNCG Academic Integrity Policy on this assignment.
Signature _____ Date _____

More information can be found at

`http://sa.uncg.edu/handbook/academic-integrity-policy/`.

Attendance Policy: Attendance is mandatory. Two consecutive absences or four total absences during the semester may result in a failing grade, regardless of semester average. Attendance will be measured using quizzes.

Additional information:

(1) Students with Disabilities: If you have a documented disability and wish to discuss academic accommodations, please contact me as soon as possible. You are responsible for contacting the OARS in 215 EUC (334-5440, `http://ods.dept.uncg.edu/`) and for arranging the necessary forms for me to fill out and sign. Without these forms the services provided by the OARS will not be available. OARS cannot schedule or reschedule tests without consent from the instructor.
(2) Assignments Policy:
   (a) Assignments are due at the beginning of class. Late assignments will be accepted as late as 5 PM on the due date for half credit and not accepted after that.
   (b) Written assignments must be
      (i) legible.

(ii) stapled (if more than one page).
(iii) not torn from a spiral bound notebook.

(3) Absence Policy: You are responsible for all missed material. Any missed assignment, test, or final exam will result in a score of 0. Make-up tests and final exam will be given only if you receive prior approval for a valid excuse by contacting me at least one week in advance.

(4) Copyright Policy: Selling or purchasing notes from classes for commercial gain is a violation of the UNCG Copyright Policy.

`http://policy.uncg.edu/copyright/`

Any student who sells notes taken in class for commercial gain, or who purchases notes taken by another student for commercial gain, is in violation of this policy and, by extension, is committing a violation of the Student Code of Conduct.

`http://sa.uncg.edu/handbook/student-code-of-conduct/`

(5) Email Policy: All email correspondence should be made using your UNCG email account. You must check your email regularly for updates and announcements.

(6) Calculators are not allowed on tests, quizzes, or the final exam. There will be homework exercises that require the use of MATLAB or similar software.