

MATH 7230: Class Field Theory
Fall 2019

Lectures: Lockett 119, TTh 10:30 – 11:50

Professor: Karl Mahlborg	Office: Lockett 320
Office Hour: T 4:30	E-mail: mahlburg@math.lsu.edu
Webpage: www.math.lsu.edu/~mahlburg	

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 N. Childress. *Class Field Theory*, Springer-Verlag, New York, 2009.

The textbook is available electronically as e-book through LSU Libraries: www.lib.lsu.edu.

Content This course is an introduction to Class Field Theory, which is the study of abelian extensions of number fields. These extensions are described in terms of arithmetic invariants such as the ideal and ray class groups. One of the main results is Artin's Reciprocity Law, which generalizes quadratic reciprocity, and can be viewed analytically as a first case of Langlands Program.

We will cover the majority of Childress' book. Chapters 2, 3, 5, and 6 develop the more classical global approach, while Chapters 4 and 7 (and part of 6) develop the local, or *idelic* approach.

Prerequisites You must have completed MATH 7230 – Algebraic Number Theory in order to enroll in this course. A good understanding of Galois Theory at the level of MATH 7211 – Algebra II is recommended.

Schedule Due to University holidays, class will **not** be held on Thursday, Oct. 17; or Thursday, Nov. 28. 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 **Tuesdays** 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, based on the number of problems satisfactorily completed 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.