Course goals:

This course is a continuation of Math 223A. We will talk about global class field theory. This can be seen as a vast generalization of quadratic reciprocity laws. We will cover analytic methods in algebraic number theory, introduce Brauer groups and central simple algebras. If time permits, we will give a brief introduction to the Langlands program.

Course format:

Lectures.

Schedule:

- **Meeting times:** Tuesday-Thursday 09:00 AM-10:15 AM.
- **Room:** Science Center 113.
- **First meeting:** Tuesday, January 23rd .
- **Office hours:** Friday, 3PM to 4:30PM.

Course assistant:

Jianqiao Xia <jianqiaoxia@g.harvard.edu>

- **Office hours: Tuesdays 3-4pm, Science Centre 111**

Assignments and grading:

For students requiring a grade, homework will be assigned. The solutions can either be scanned or typed and uploaded on Canvas. Homework will count for at least 70% of the final grade. Late homework can only be accepted under special circumstances. Collaborative work on homework is accepted but you must write your own solution as well as the names of the collaborators. There will be a final paper which will count for 30% of the grade.

References:

- The main references will be:
- Jean-Pierre Serre,"Local Fields".
- JÃ¼rgen Neukirch, "Algebraic Number Theory".
- For more advanced reading and exercises, I recommend the following books:

- Gerald J.Janusz, "Algebraic Number fields".
- JÃ¼rgen Neukirch, "Cohomology of Number Fields".
- Daniel Bump et al., " An Introduction to the Langlands Program".

Enrollment cap, selection process, notification:

No enrollment cap, but taking Math 223A is highly recommended.

Absence and late work policies:

Homework will be assigned. The solutions can either be scanned or typed and uploaded on Canvas. Homework will count for at least 70% of the final grade. Late homework is not accepted, unless under special circumstances. Collaborative work on homework is accepted but you must write your own solution as well as the names of the collaborators and any other reference used (books, MathOverflow, ChatGPT...), see below for Harvard College Honor Code. There will be a final exam (take-home) and a midterm (take-home), which together with participation will count for 30% of the grade.

Harvard College Honor Code:

"*Members of the Harvard College community commit themselves to producing academic work of integrity â€“ that is, work that adheres to the scholarly and intellectual standards of accurate attribution of*

sources, appropriate collection and use of data, and transparent acknowledgement of the contribution of others to their ideas, discoveries, interpretations, and conclusions. Cheating on exams or problem sets, plagiarizing or misrepresenting the ideas or language of someone else as oneâ€™s own, falsifying data, or any other instance of academic dishonesty violates the standards of our community, as well as the standards of the wider world of learning and affairs."

Accommodations for students with disabilities:

Harvard University values inclusive excellence and providing equal educational opportunities for all students. Our goal is to remove barriers for disabled students related to inaccessible elements of instruction or design in this course. If reasonable accommodations are necessary to provide access, please contact the Disability Access Office (DAO). Accommodations do not alter fundamental requirements of the course and are not retroactive. Students should request accommodations as early as possible, since they may take time to implement. Students should notify DAO at any time during the semester if adjustments to their communicated accommodation plan are needed.