

Theory of numbers (Math 126), Spring 2015
MacQuarrie Hall 233, MW noon–1:15pm (Sec. 01, code 28868)

Instructor: Dr. Tim Hsu (pronounced “shoe”).

Office and phone: MacQuarrie Hall 419, (408)924-5071.

Office hours: MW 9:30–10:30; MW 1:30–2:30. Current schedule available at:
<http://www.math.sjsu.edu/~hsu/courses/generic/sched.pdf>

E-mail: hsu@math.sjsu.edu. I can be reached by e-mail at many times of the day, and will try to respond within 24 hours.

Course web page: <http://www.math.sjsu.edu/~hsu/courses/126/>

Text: *A Friendly Introduction to Number Theory*, Joseph H. Silverman (4th ed., 2013, prime number gears on cover).

Grading: Your semester grade consists of: Homework 20%; Exam 1 14%; Exams 2 and 3 18% each; Final exam 30%.

What is number theory? Number theory is the study of whole numbers and their additive and multiplicative properties. It’s both one of the oldest parts of mathematics, going back to ancient Babylon and Greece, and also one of the most modern, having seen a remarkable number of breakthroughs in the last decade or two — including breakthroughs right here at SJSU. It can reach the highest peaks of abstraction (e.g., the proof of Fermat’s Last Theorem), but it also has applications in everyday life (e.g., Internet security).

The process of mathematical discovery. Besides its intrinsic interest, the best part of studying number theory is that it’s a great place to experience the essence of mathematical discovery: the process of *experimenting*, *finding patterns*, and *proving* them. This process is how professional mathematicians discover new mathematics, and studying number theory gives you a good way to experience that process firsthand.

No proof experience is expected. Although the homework will sometimes involve proof, you do not need to have experience with proofs, and Math 108 is certainly not a prerequisite. In fact, you can look at this class as being complementary to Math 108: Instead of concentrating on *how* to do proofs, we’ll concentrate on *where* mathematicians come up with theorems, and *why* proof is necessary.

Class is a cell-free zone. Please turn off all cellphones before you get to class.

Homework. Homework will be due roughly once a week, with an outline of problem set 01 due **Fri Jan 30**, and the final version due **Mon Feb 02**. For more details on homework content and the process of doing homework (including outlines and revisions), see the handout on homework.

Specific homework assignments will be determined as the term progresses. For a complete list of all homework assigned to date, and downloadable versions of almost all handouts from class, you can always check the course web page.

Problem sessions. In addition to my regular office hours, starting on **Fri Jan 30**, I will also hold problem sessions for this class every **Fri**, at a time and a place to be announced. These sessions are completely optional, and you should be fine without them, but the time is available for those who can make it.

Checkins. Because we only meet on two days each week, it is *crucial* that you do substantial independent work in the long gap between Wed and Mon. To that end, I will require you to “check in” with me each week in that time period. See the handout on check-ins for more details.

Exams. We will discuss this topic in more detail before the first exam, but briefly, the material on exams will mostly resemble the material from the homework. All exams are closed-book.

Calculators. You will *not* be allowed to use calculators for *any* in-class exams. The numerical work on exams will be simple enough that a calculator shouldn’t be necessary, and even if you make numerical mistakes, you won’t lose a lot of points on them.

On the other hand, you are encouraged to use a calculator or computer to help with the homework, especially when the homework involves a fair amount of arithmetic.

Exam dates. The dates of our three in-class exams and final exam are found on the syllabus below. In particular, the final exam will be held on **Thu May 21**, from **9:45am–noon**. Please make sure that you are still on campus at that time (e.g., don't buy a plane ticket that leaves town on May 20).

How to add this course. If you are not registered for this course, and you would like to add it, you must first put a full effort into completing all of the work in the course. Second, if you are a graduating senior, you need to produce documentation to verify that.

I'll make a waiting list, which you get on by filling out and turning in the information form for the course. I'll give out add codes starting **Tue Feb 03** (or possibly earlier), mainly based on completeness of homework, and as long as there is room, I will continue to give out add codes until add date (**Tue Feb 10**). Note, however, that graduating seniors have the highest priority, and that Open University students have the lowest priority.

How to drop this course. Until **Tue Feb 03**, you can drop at my.sjsu.edu. Nothing will appear on your transcript, but please let me know if you drop.

To drop after Tue Feb 03, you must go to the student services center and submit a Course Drop form to the Director of Academic Services. Dropping under these circumstances is only allowed for “serious and compelling reasons” (course catalog). A low grade is not a serious and compelling reason.

Academic integrity. Your commitment to learning (as shown by your enrollment at SJSU) and SJSU's Academic Integrity Policy require you to be honest in all of your academic course work. Faculty are required to report all infractions to the Office of Student Conduct and Ethical Development. See: www.sjsu.edu/studentconduct

Disabilities. If you need course adaptations or accommodations due to a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities register with the Accessible Education Center (formerly the Disability Resources Center) to establish a record of their disability.

Tenative syllabus

| Date | Reading | Date | Reading |
|------------|---------------------|-------------------|--------------------|
| Mon Jan 26 | Chs. 1–2 | Mon Mar 30 | Ch. 17 |
| Wed Jan 28 | Chs. 3–4 | Wed Apr 01 | Ch. 18 |
| Mon Feb 02 | Ch. 5 | Mon Apr 06 | Ch. 19 |
| Wed Feb 04 | Ch. 6 | Wed Apr 08 | Ch. 20 |
| Mon Feb 09 | Ch. 7 | Mon Apr 13 | Ch. 21 |
| Wed Feb 11 | Ch. 8 | Wed Apr 15 | Ch. 22 |
| Mon Feb 16 | Ch. 9 | Mon Apr 20 | More QR |
| Wed Feb 18 | Exam 1 | Wed Apr 22 | Exam 3 |
| Mon Feb 23 | Ch. 10 | Mon Apr 27 | Ch. 24 |
| Wed Feb 25 | Ch. 11 | Wed Apr 29 | Ch. 25 |
| Mon Mar 02 | Ch. 12 | Mon May 04 | Ch. 31 |
| Wed Mar 04 | Ch. 13 | Wed May 06 | Ch. 32 |
| Mon Mar 09 | Ch. 14 | Mon May 11 | Ch. 37 |
| Wed Mar 11 | Ch. 15 | Wed May 13 | Review |
| Mon Mar 16 | Ch. 16 | Thu May 21 | FINAL EXAM |
| Wed Mar 18 | Exam 2 | | 9:45am–noon |
| Mon Mar 23 | SPRING BREAK | | |
| Wed Mar 25 | NO CLASSES | | |