Theory of numbers (Math 126), Spring 2009
MacQuarrie Hall 235, MW noon–1:15pm (Sec. 01, code 42296)

Instructor: Dr. Tim Hsu (pronounced "shoe").

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

Office hours: MWF 9:30–10:30am, MW 1:30–2:30pm, or by appointment. Current schedule: `http://www.math.sjsu.edu/~hsu/courses/generic/sched.pdf`

E-mail: `hsu@math.sjsu.edu` or `hsu.math.sjsu@gmail.com`. I can be reached by e-mail at most times of the day, and will often answer within a few hours.

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

Text: *A Friendly Introduction to Number Theory*, Joseph H. Silverman, 3rd ed.

Grading: Your semester grade consists of:

Homework:	20%
Exam 1:	14%
Exams 2–3:	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/beeper-free zone. Please turn off all cellphones and beepers before you get to class.

Homework. Homework will be due roughly once a week, with an outline of problem set 01 due **Mon Aug 31**, and the final version due **Wed Sep 02**. For more details on homework content and the process of doing homework (including 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 Aug 28**, I will also hold problem sessions for this class every **Fri**, **noon–1pm**, in a room to be posted at my office door (MH419). These sessions are completely optional, and you should be fine without them, but the time is available for those who can make it.

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 **Tue Dec 15**, 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 Dec 14).

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 **Thu Sep 03**, mainly based on completeness of homework, and as long as there is room, I will continue to give out add codes until add date (**Fri Sep 11**). Note, however, that graduating seniors have the highest priority, and that Open University students have the lowest priority.

How to drop this course. Until **Thu Sep 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 Thu Sep 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: `http://sa.sjsu.edu/student_conduct`

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 Disability Resources Center to establish a record of their disability.

Syllabus

Date	Reading	Date	Reading
Mon Aug 24	Chs. 1–2	Mon Oct 19	**FURLOUGH DAY**
Wed Aug 26	Chs. 3–4	Wed Oct 21	Ch. 16
Mon Aug 31	Ch. 5	Mon Oct 26	Ch. 17
Wed Sep 02	Ch. 6	Wed Oct 28	Ch. 18
Mon Sep 07	**Labor Day**	Mon Nov 02	Ch. 20
Wed Sep 09	Ch. 7	Wed Nov 04	Ch. 21
Mon Sep 14	Ch. 8	Mon Nov 09	Ch. 22
Wed Sep 16	**Exam 1**	Wed Nov 11	**Veterans Day**
Mon Sep 21	Ch. 9	Mon Nov 16	Ch. 23
Wed Sep 23	Ch. 10	Wed Nov 18	**Exam 3**
Mon Sep 28	Ch. 11	Mon Nov 23	Ch. 24
Wed Sep 30	Ch. 12	Wed Nov 25	Ch. 25
Mon Oct 05	Ch. 13	Mon Nov 30	Ch. 26
Wed Oct 07	Ch. 14	Wed Dec 02	Ch. 27
Mon Oct 12	Ch. 15	Mon Dec 07	What's next?
Wed Oct 14	**Exam 2**	**Tue Dec 15**	**FINAL, 9:45am–noon**