

# Math 4370, Section 01: Special Topics: Elementary Number Theory

## Fall 2011 Syllabus

### 1 Course Information

- Location and Time: MWF noon–12:50pm, 204 Lee Drain Building
- Professor: Dr. Martin Malandro
- Department: Mathematics and Statistics
- Office: 409 Lee Drain Building
- E-mail (preferred method of contact): malandro@shsu.edu
- Phone number: (936) 294–1580
- Office Hours: Tu noon–2pm, Thu noon–2pm, and by appointment
- Required Materials:
  - Textbook: Number Theory, A Lively Introduction with Proofs, Applications, and Stories, by Pommersheim, Marks, and Flapan.
  - Calculator: TI-83 or better recommended.

**Course Description:** This is a senior-level writing enhanced (i.e., proof-based) course in a specific area of interest. The subject for this section of the course is elementary number theory. Topics will include primes, divisibility, the Euclidean algorithm, Diophantine equations, modular number systems, systems of modular congruences, modern cryptography, primality testing, primitive roots, and the art of mathematical proof. Other topics (such as computational issues, quadratic residues, and continued fractions) may be covered depending on the interests of the class and/or the whims of the professor.

Prerequisite: C or better in MTH 295 (2395) or 364 (3300). Credit 3.

**Course Objectives/Learning Outcomes:** A successful student will be able to write clear and correct mathematical proofs (including direct, contrapositive, contradiction, induction, and case-by-case proofs) and will attain mastery of the topics listed in the course description.

### 2 Grading Policy

Your grade in the course will be calculated using the following weights:

Reading assignments	20%
Written homework	35%
Exam 1	15%
Exam 2	15%
Final Exam	15%

Grading Scale:

A	90% or better final average
B	80–89% final average
C	70–79% final average
D	60–69% final average
F	59% or lower final average

**Reading assignments:** Your textbook is excellent, and I expect you to read it! I will assign reading on a near-daily basis. You must read with an aim for understanding. Class time will not be spent rehashing the reading. Rather, we will spend our class time discussing the reading and extensions of the reading. You must do the reading to be prepared for class. I will give you an assignment with each reading, to be turned in the following class period. These assignments are meant to guide your reading and to get you started thinking about the aspects that we will discuss in class.

*You must write up your answers to each reading assignment alone, in your own words.*

Your reading assignment score will simply be the average of your reading assignment scores over the course of the semester.

**Written homework:** I will assign written homework on a regular basis. Homework is the most important part of this course, and the grading scale reflects that. Your learning should be steady over the course of the semester, and the readings and homework together form the primary vehicle for that. Note that you'll need to do the reading to be able to do the homework. This is not a course where you can hope to do well by just cramming the night (or hour) before an exam! Here are some guidelines for writing up your homework.

- Write legibly! If I can't read it, I can't grade it. If you want to impress me, L<sup>A</sup>T<sub>E</sub>X your work.
- Write on only one side of the paper.
- State all claims you intend to prove. This includes writing each problem statement. You may (and should!) state problems in your own words.
- Don't use paper with ragged edges (like paper torn from a spiral). It just aggravates me. Use high quality paper instead, like printer paper.
- Don't staple your papers. Instead, turn in your work in order, with your name on each page.
- Most importantly, you must write up your work *\*by yourself.\** You must acknowledge any sources you use, including anyone you worked with, on a problem.

It's ok if you work together in coming up with solutions to problems. However, I recommend you work alone on the problems for the most part, only consulting your friends or me when you're stuck. When you work in a group it's easy to miss important details, whereas working alone forces you to master the material. You may even find you work and learn faster on your own.

Regardless of how you work on the problems, *you must write up your solutions alone. The work you turn in must be your own, in your own words.*

Each homework problem will get a letter grade. Roughly speaking, here are the guidelines I will follow in assigning grades.

- A = This is clearly written and correct mathematics!
- B = This is good but there is some gap, either in the mathematics or in the exposition.
- C = There is good intuition here, but there is at least one serious flaw.
- D = I don't understand this, but I can see you've worked on it. Please come see me!
- F = I don't think you've worked on this problem enough.

I recognize that your proof-writing abilities are likely to increase over the course of the semester. To take this into account, your homework score for the semester shall not be *lower* than your average problem score over the course of the semester. If you'd like my current assessment of your homework score at any point in the class, please come see.

**Exams:** Many exam problems will be similar to homework problems or examples worked in class. The final exam will be cumulative. Exams should be relatively routine and straightforward, provided you've been keeping up on your homework.

If you arrive late to an exam, you may still take the exam in the remaining time as long as nobody has finished the exam yet.

**Make-up policy:** No make-ups for missed homework assignments or reading assignments will be available. I will drop your (1) lowest reading assignment.

If you miss an exam, you will be expected to show appropriate cause in writing. If you must miss an exam, I expect you to contact me beforehand. If that is impossible, then you must contact me no later than 24 hours after the exam. If you miss an exam and have not contacted me by this time, you forfeit your right to a make-up.

**Academic Honesty Policy:** You may work together to find solutions to homework problems and you may consult whatever sources you deem necessary while doing so. You must acknowledge any people or sources (beyond your textbook) that you consult. Using such sources will not harm your grade, but failing to acknowledge them will. When it comes time to write up your work to be turned in, *you must write it alone, in your own words*. Doing otherwise is considered cheating.

Exams are individual endeavors, where no help is to be given or received. Cheating on an exam includes, but is not limited to, sharing answers or using any form of cheat sheet (note: notes programmed into a calculator count as a cheat sheet).

If I catch you cheating, I will forbid you from attending any further class meetings and assign you a grade of F in the course. You may also be referred to the dean on academic dishonesty charges.

**Extra Credit Policy:** There may be occasional opportunities for extra credit over the course of the semester. All extra credit opportunities will be announced in class. Under no circumstances will individual extra credit opportunities be available.

**Grade Dispute Policy:** All grade issues need to be brought to my attention within one week of having your grade returned/posted.

**Final Exam Schedule:** Mon Dec 12, 2pm–4pm

### 3 Classroom Policies

**Attendance Policy:** I expect you to attend every class. If you miss a class, then I expect you to get notes from a classmate. I expect you to arrive to class on time.

**Classroom Rules of Conduct:** Students must refrain from behavior in class that disrupts the learning process. Students are prohibited from using tobacco products in class, making offensive remarks, reading newspapers, sleeping, talking at inappropriate times or about inappropriate things, wearing inappropriate clothing, using cellphones, or engaging in any other form of distraction. Inappropriate behavior in the classroom shall result in a directive to leave class. Students who are especially disruptive also may be reported to the Dean of Students for disciplinary action in accordance with university policy.

Math-related questions and math-related discussion in the classroom are encouraged. However, chatter is disruptive to the learning process and will not be tolerated under any circumstances. Furthermore, any variation of the question “do we need to know this for the test?” is banned.

**Use of Telephones and Text Messengers in Class:** Generally speaking, you may not use cell phones, computers, or other devices capable of communication in class. The one exception is that during lecture periods, you may keep your cell phone on vibrate so that you can receive text messages in case of an emergency. You may not, however, be distracted or distracting to others in checking your text messages in class, and you may not send text messages in class. All messengers must be put away for exams. SHSU Academic Policy Statement 100728 states that *even the visible presence of such a device during the test period will result in a zero for that test. Use of these devices during a test is considered de facto evidence of cheating and could result in a charge of academic dishonesty*. I have no choice in this matter, so if your phone goes off during a test, please don’t answer it or even pull it out to look at it.

## 4 Tentative Schedule

Ch. 1–4, some ch. 5	Aug 24–Oct 2
Exam 1	Oct 3
Ch. 5–8, some ch. 9	Oct 4–Nov 3
Exam 2	Nov 4
Ch. 9–10, ch. 12, further topics	Nov 5–Dec 9
Final Exam	Mon Dec 12, 2pm–4pm

The date/time of the final exam is set by official SHSU policy. All other dates in this list are tentative and subject to change.

## 5 Additional Information

All information on this syllabus is subject to change. All changes will be announced in class. Further university policies regarding academic dishonesty, student absences on religious holy days, disabilities, and visitors in the classroom which apply to this course may be found at <http://www.shsu.edu/syllabus/>. If there is a conflict between information on this syllabus and official university policy, university policy takes precedence.