

Course Syllabus

MATH 3307, section 001

Elementary Number Theory: Spring 2019

Instructor: Dr. Esteban Diaz

Office: PKH 436

Phone: 817-272-5516

Email: esteban.diaz@uta.edu (preferred method of communication)

Office Hours: WF 11-1 p.m.

Faculty Profile: <https://mentis.uta.edu/explore/profile/esteban-diaz>

Meeting time / place: MWF 10:00 – 10:50 in PKH 109

Description of Course Content: Number Theory is the study of the properties of numbers, perhaps most importantly prime numbers. For the most part, the numbers we study will be integers, but we'll also take a look at some other number systems. The idea is that by studying familiar structures in unfamiliar settings, we can get a better understanding of why the definitions and algebraic techniques we've been using since childhood work the way they do. While number theory is heavily interlaced with many other subfields of mathematics, the point of *elementary* number theory is to prove what we can using relatively simple techniques. We should have time to get to a few popular applications, like public-key cryptography. We'll need to prove the results we come across, so if you're not familiar with basic proof techniques, you'll have to pick them up on the fly. [Note: this is perfectly doable – I did so many years ago in linear algebra].

Prerequisite: 2.0 or better in 9 hours of college math.

Student Learning Outcomes: Upon completion of Math 3307, students should be able to:

1. Prove statements and solve problems involving divisibility, prime numbers, and the Euclidean Algorithm;
2. Solve linear Diophantine equations and various types of congruence problems, and use the theory of congruence in applications;
3. Apply properties of multiplicative functions such as the Euler phi-function and quadratic residues.
4. Justify and explain their steps in problem solving. Students should be able to construct correct and detailed mathematical arguments to justify their claimed solutions to problems.

Required Textbooks and Other Course Materials: Elementary Number Theory and its applications, 6 th edition, Rosen (Addison-Wesley). We'll cover as much of the book as time allows.

Grading Scale: A: 90-100 B: 80-89 C: 70-79 D: 60-69 F: 0-59

Grade Components and Major Assignments and Examinations:

Homework / Quizzes: 20%

Midterm 1: 25% (Feb 15)

Midterm 2: 25% (March 27)

Final Exam: 30% (Friday, May 10, 8:00 – 10:30 am)

Homework: Homework is a crucial step in any mathematical class and more so in an introductory class to upper level math. I'll be assigning Weekly Homework. Late homework will not be accepted, not ever, for any reason. If you have to miss class for a good reason (illness, court, etc), just get me the documentation, and I'll count your homework grade out of less points.

Attendance: At the University of Texas at Arlington, taking attendance is not required. Rather, each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. I suggest you show up, as (a) you're paying for it, and (b) what we cover in class tends to correlate closely with what shows up on exams, but attendance will not be taken nor directly factored into your grade. Be aware that you will be held responsible for any information you miss, including class announcements.

Grading: You are expected to keep track of their performance throughout the semester and seek guidance from available sources (including me) if your performance drops below satisfactory levels. I'll post your grades on blackboard as I get them done. Keep me honest! If my record of your grade is different from yours, it's your responsibility to correct that. Keep graded papers in a safe place until the end of the semester in case they are ever needed to resolve a grade dispute – your returned paper is proof that your grade is what you say it is.

Midterms and Final Exam: As this course is not so tightly coordinated as those in the first-year curriculum, I'll be writing and grading the midterm and final exams. There will be no multiple-choice; you'll just have to demonstrate what you know.

Advice for my midterms: always tell me what you know, and always do the part of the question that you can. I'm a big proponent of partial credit. My exams tend to have fewer, but more involved questions. Questions will be similar in flavor to those you've seen on the homework, but they will not be exactly like them. In other words, you'll have to think.

Any student who scores below 50 on the final exam cannot receive a grade higher than D in the course. Any student who scores a 0 on the final exam will receive an F in the course.

Make-up Policy: Please don't miss my exams if you don't have to. If you have a good (read: documentable) reason, it's your responsibility to find me and schedule a makeup as soon as you can. Be aware that a makeup may be more difficult than the original exam.

Calculator: You must only use nonprogrammable calculators with basic computational features, such as arithmetic and transcendental functions. You may NOT use any calculator with the following capabilities: graphing, equation solving, differentiation, integration, QWERTY keyboard, and any device that has internet. No, you can't use your phone. Because it's a phone.

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>. 3 Blackboard: We will be making heavy use of Blackboard in this class. Copies of our syllabus will be located here under the syllabus section, and homework assignments (both varieties) will be posted on the main announcements page. Students should periodically log onto Blackboard in order to check on their grades. To access the course, go to <http://elearn.uta.edu/> or click on the Blackboard link located on the UTA student home page and log in with your NetID and password. Click on the name of the course in the upper left module after logging in.

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. Students will not be automatically dropped for non-attendance. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://www.uta.edu/aao/fao/>). The last day for students to drop is 4:00pm, Friday 29-March-2019! (Submit requests to advisor prior to 4:00 pm,)

Drop for Non-Payment of Tuition: If you are dropped from this class for non-payment of tuition, you may secure an Enrollment Loan through the Bursar's Office.

Grade Replacement and Exclusion: These policies are described in detail in the University catalog, which can be found online at <http://catalog.uta.edu/academicregulations/grades/>

Important Dates:

- Jan 21 (Mon) MLK holiday
- Jan 30 (Wed) Census Date
- Feb 15 (Fri) Midterm 1, in class
- Mar 11-16 Spring Break
- Mar 27 (Wed) Midterm 2, in class
- Mar 29 (Fri) Last Day to Drop Classes (4 PM)
- May 3 (Fri) Last Day of Classes
- May 10 (Fri) Final Exam, 8:00 AM.

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code: I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence. I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and

uphold the spirit of the Honor Code. UT Arlington faculty members may employ the Honor Code in their courses by having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System Regents' Rule 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University. Additional information is available at <https://www.uta.edu/conduct/>.

Disability Accommodations: UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including The Americans with Disabilities Act (ADA), The Americans with Disabilities Amendments Act (ADAAA), and Section 504 of the Rehabilitation Act. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing me with official notification in the form of a letter certified by the Office for Students with Disabilities (OSD). Please do so no later than the census date, Wed 1-Feb-2017. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting: The Office for Students with Disabilities, (OSD) www.uta.edu/disability or calling 817-272-3364. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability. Counseling and Psychological Services, (CAPS) www.uta.edu/caps/ or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives. If you require an accommodation based on disability, I would like to meet with you in the privacy of my office, during the first two weeks of the semester, to make sure you are appropriately accommodated.

Non-Discrimination Policy: The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos.

Title IX Policy: The University of Texas at Arlington ("University") is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. For information regarding Title IX, visit www.uta.edu/titleIX or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or jmhood@uta.edu.

Campus Carry: Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit <http://www.uta.edu/news/info/campus-carry/>

Student Disruption: The University reserves the right to impose disciplinary action for an infraction of University policies. For example, engagement in conduct, alone or with others, intended to obstruct, disrupt, or interfere with, or which in fact obstructs, disrupts, or interferes with, any function or activity sponsored, authorized by, or participated in by the University. **Student Feedback Survey:** At the end of each term, students enrolled in classes categorized as “lecture,” “seminar,” or “laboratory” shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit <http://www.uta.edu/sfs>.

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabus. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities. PKH 111 is on a first-floor hallway with exits at both ends, so you should have no trouble getting out.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at <http://www.uta.edu/universitycollege/resources/index.php>.

Math Clinic: The Math Department operates the Math Clinic, a tutoring service staffed by upper level undergraduate students. The Math Clinic is on the 3rd floor of Pickard Hall; the phone number is 817-272-5674; and the hours of operation for fall and spring are

Monday – Thursday 8:00a – 9:00p

Friday 8:00a – 12:00p

Saturday 1:00p – 6:00p

Sunday 1:00p – 7:00p

Go to the Math Clinic webpage <http://www.uta.edu/math/clinic/> to get more information or to access assignment sheets for the courses for which tutoring is offered.

Tutor List: The Math Department maintains a list of people who have expressed an interest in tutoring. These persons are not necessarily recommended by the Math Department and they set their own fees. You may obtain a copy of the tutor list in the Math Office, 478 PKH.

IDEAS Center: The IDEAS Center (2nd Floor of Central Library) offers free tutoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. To schedule an appointment with a peer tutor or mentor email IDEAS@uta.edu or call (817)272-6593.

Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at 817-272-3003 (non-campus phone), 2-3003 (campus phone). You may also dial 911. Non-emergency number 817-272-3381.