MATH 3307-001: Elementary Number Theory, Spring 2016

Instructor	Richard Chandler	**Email**	richardc@UTA.edu
Office	PKH 463	**Website**	students.uta.edu/rg/rgc7061
Phone	817-272-0008 (Office) 817-272-3261 (Math Office)	**Office Hours**	MWF 11a – 11:50a, 2p – 2:50p, OBA
		Class Times	MWF 10a – 10:50a in PKH 302

Textbook *Elementary Number Theory and its Applications, 6th Edition* by Kenneth Rosen

Prerequisites Grade of C or better in nine hours of college mathematics

Course Description Various topics in elementary number theory including divisibility, congruences, quadratic reciprocity, and multiplicative functions.

Learning Outcomes Upon completing this course, 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.

Grading Scale **A:** 90 and Above **B:** 89 - 80 **C:** 79 - 70 **D:** 69 - 60 **F:** 59 and Below

Grade Components

Test 1	22 Points
Test 2	22 Points
Test 3	22 Points
Project	10 Points
Final Exam (Monday, May 9th, 8:00a – 10:30a)	34 Points

Tests Tests will cover the material as detailed in the attached assignment sheet. Tests are not comprehensive. Each test will be mix of definitions, true-false questions and free-response problems and will be given in a 50 minutes class period.

Final Exam The final exam will follow the university exam schedule. The final exam is comprehensive. The format of the exam will be a mix of definitions, true-false questions and free-response problems.

Project A project will be assigned in the second half of the semester. It will be completed in groups and will require independent study of a topic that will not be discussed in class. Groups will turn in a paper summarizing their topic; there will also be an in class component to the project grade. The project will be due in the last weeks of class; the exact due date will be decided later.

Homework A list of homework problems is attached. Homework will not be collected, but it is your responsibility to complete it in a timely manner. The test problems and final exam will be based off the homework. You are encouraged to come by my office with questions.

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, factoring, greatest common factor, least common multiple, differentiation, integration, QWERTY keyboard, or any device that has internet capabilities (This means NO CELL PHONES, TABLETS, ETC).**

The recommended calculator is the TI-30XS or the TI-30XIIS. The TI-30XS has a number of nice typesetting and evaluation features that you may find useful. If you would like to use another calculator, you must get it approved by me BEFORE the first quiz. Failure to do so may result in not being able to use a calculator on your quiz or exam.

Student Support

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 www.uta.edu/resources.

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://wweb.uta.edu/aao/fao/). Any student who drops this course on or before Wednesday, April 1st at 4 PM will receive a W.

Email Policy

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.T

ADA

The University of Texas at 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)*. 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 that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. 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 or by calling the Office for Students with Disabilities at (817) 272-3364.

Student responsibility primarily rests with informing faculty **at the beginning of the semester and in providing authorized documentation through designated administrative channels.** If you require an accommodation based on disability, I would like to meet with you in the privacy of my office, during the first week of the semester, to make sure you are appropriately accommodated.

Academic Integrity

Students enrolled in this course 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 as they see fit in their courses, including (but not limited to) 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.

Student Feedback

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 Exits

Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is located at the corner of the building. 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 handicapped individuals.

Title IX

The University of Texas at Arlington is committed to upholding U.S. Federal Law "Title IX" such that no member of the UT Arlington community shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity. For more information, visit www.uta.edu/titleIX.

Important Dates

First Day of Class ..... January 20th
Census Date ..... February 3rd
Test 1 ..... February 15th
Spring Break ..... March 14th – March 19th
Test 2 ..... March 28th
Drop Date ..... April 1st
Test 3 ..... April 15th
Last Day of Class ..... May 6th
Final Exam (8:00a – 10:30a) ..... May 9th

Assignment Sheet

"I reserve the right to adjust this schedule in any way that serves the educational needs of the students in this course." – Richard Chandler

Section	Title	Homework Problems
1.3	Mathematical Induction	2, 4, 6, 7, 10, 18, 20, 21
1.4	The Fibonacci Numbers	2, 4, 11, 12, 18 – 20, 23, 28
1.5	Divisibility	2 – 16 even, 17 – 21, 24, 28, 30 – 33
3.1	Prime Numbers	2 – 8 even, 15, 20, 26 – 28
3.3	Greatest Common Divisors	2 – 10 even, 11 – 13, 17-19, 22, 24, 30
3.4	The Euclidean Algorithm	2, 3, 4, 6, 7, 8
---------- Test 1 ---------- Monday, February 15th ----------		
3.5	The Fundamental Theorem of Arithmetic	2 – 8 even, 29, 31, 32, 34, 36 – 39, 58
3.7	Linear Diophatine Equations	2 – 10 even, 13, 14, 18
4.1	Introduction to Congruences	2 – 16 even, 20, 22, 25, 27, 28, 32
4.2	Linear Congruences	2, 3, 8, 13, 14
4.3	The Chinese Remainder Theorem	2, 4, 6, 12, 33, 35
---------- Test 2 ---------- Monday, March 28th ----------		
4.4	Solving Polynomial Congruences	2 – 10 even
5.1	Divisibility Tests	2, 4, 19, 22, 23, 24
5.2	The Perpetual Calendar	2 – 8 even
6.1	Wilson's Theorem & Fermat's Theorem	2 – 24 even, 28, 30
7.1	Euler's Phi-Function	2, 4, 7, 8, 12, 14, 18
6.3	Euler's Theorem	2, 4, 6, 7, 8, 10, 15, 17
---------- Test 3 ---------- Monday, April 15th ----------		
11.1	Quadratic Residues & Nonresidues	2, 4, 6, 7, 13, 19, 20, 21
11.2	The Law of Quadratic Reciprocity	1 – 5
---------- Final Exam (Comprehensive) ---------- Monday, May 9th, 8:00a – 10:30a ----------		