

MATH 4043: Number Theory

Fall Semester, 2017

Instructor: Dr. Abdollah Khodkar

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Office Hours: Monday and Wednesday 11am-12noon and 1pm-3pm.

If you would like to talk to me but cannot make it during one of these times, please call first or make an appointment.

Prerequisites: Math 2853, Elementary Linear Algebra and Math 3003, Transition to Advanced Mathematics

Hours Credit: 3 hours

Class Time and Place: Monday and Wednesday 3:30pm-4:45pm Boyd 307

Textbook: Elementary Number Theory by James K. Strayer, Lock Haven University

Courses Description: An in-depth study of selected topics in number theory

Learning Outcomes: The student will be able

1. to compute the Euclidean Algorithm
2. to compute linear Diophantine equations
3. to understand prime numbers and the Fundamental Theorem of Arithmetic
4. to understand linear congruences and the Chinese Remainder Theorem
5. to understand Fermat's little theorem and Wilson's Theorem
6. to understand Number-Theoretic functions such as Möbius functions, Euler's phi-function
7. to understand Möbius Inversion Formula, Euler's Theorem
8. to understand Primitive roots
9. to improve logical thinking and to prove theorems in mathematics

Topics include:

<u>Sections</u>	<u>Title</u>
1.1	Divisibility
1.2	Prime Numbers
1.3	Greatest Common Divisor
1.4	The Euclidean Algorithm
1.5	The Fundamental Theorem of Arithmetic
2.1	Congruences
2.2	Linear Congruences in One Variable
2.3	The Chinese Remainder Theorem
2.4	Wilson's Theorem
2.5	Fermat's Little Theorem; Pseudoprime Numbers
2.6	Euler's Theorem
3.1	Arithmetic Functions; Multiplicativity
3.2	The Euler Phi-Function
3.3	The Number of Positive Divisors Function
3.4	The Sum of Positive Divisors Function
3.5	Perfect Numbers
3.6	The Möbius Inversion Function
4.1	Quadratic Residues
4.2	The Legendre Symbol
4.3	The Law of Quadratic Reciprocity
5.1	The Order of an Integer; Primitive Roots
5.2	Primitive Roots for Prime Numbers
5.3	Index Arithmetic; nth Power Residues

Calculators: You are not allowed to use “**advanced**” calculators such as TI-84 or better in your tests or final exam.

Attendance Policy: If you miss a class, you are responsible for obtaining any information that you missed. If you miss four classes or more without a *university-approved excuse*, you may get an F in this course.

Rescheduling tests/Final: If you have a *university-approved excuse* for missing a test or final, you may be allowed to reschedule, but you must make arrangements with me in advance.

Homework: I will assign homework problems that are not to be turned in and graded but that are meant to reflect the sort of questions you can expect on tests and exams. I encourage you to use my office hours if you have any questions about them.

Tests: There will be three online tests. Each will be worth 25%.

Test 1: Wednesday September 6, 2017

Test 2: Wednesday October 4, 2017

Test 3: Wednesday November 1, 2017

The dates for tests are subject to change.

Final exam: The final exam will be on Wednesday, December 6, 2:00pm-4:00pm, The final exam will be worth 25%.

Grading Scale:

- A= 90-100%
- B= 80-89%
- C= 70-79%
- D= 60-69%
- F= 0-59%

Grading: Your final grade will be determined as follows:

Test one: 25%, Test two: 25%, Test three: 25%, final exam 25%.

Students, please carefully review the following information at this link

http://www.westga.edu/assetsDept/vpaa/Common_Language_for_Course_Syllabi.pdf.

It contains important material pertaining to your rights and responsibilities in this class. Because these statements are updated as federal, state, university, and accreditation standards change, you should review the information each semester.