

## COURSE SYLLABUS

CLASS HOURS: TuWThF: 2:00-4:00PM, Wickersham 218 (CRN 1738)  
 INSTRUCTOR: Dr. Zhigang Han  
 OFFICE: Wickersham 216  
 OFFICE HOURS: TuWThF 1:30-2:00PM  
 OFFICE PHONE: (717) 871-7310  
 EMAIL ADDRESS: Zhigang.Han@millersville.edu

**Textbook:** *Elementary Number Theory*, 6th edition, by Kenneth Rosen

**Grading:** You can see your grades on D2L (**Assessment** → **Grades**). Coursework will be weighted as follows:

Problem sets	Projects	Test 1	Test 2	Final exam
20%	10%	20%	20%	30%

The letter grade will be assigned as follows:

A: 93% - 100%	A-: 90% - 93%	B+: 87% - 90%	B: 83% - 87%	B-: 80% - 83%
C+: 77% - 80%	C: 73% - 77%	C-: 70% - 73%		F: 0% - 70%

**Tentative Schedule:** The schedule may need to be adjusted in the event of unforeseen circumstances.

Dates	Lectures	Due dates
06/06 M	No class	
06/07 T	1.2 Sums and Products, 1.3 Mathematical Induction	
06/08 W	1.4 Fibonacci Numbers, 1.5 Divisibility	
06/09 R	3.1 Prime Numbers, 3.3 Greatest Common Divisors	PS 1 due
06/10 F	3.4 The Euclidean Algorithm, 3.5 Fundamental Theorem of Arithmetic	
06/13 M	3.6 Factorization Methods, 3.7 Linear Diophantine Equations	PS 2 due
06/14 T	4.1 Introduction to Congruences, 4.2 Linear Congruences	
06/15 W	4.3 Chinese Remainder Theorem, 4.5 Systems of Linear Congruences	PS 3 due
06/16 R	No class	PS 4 due (2PM)
06/17 F	<b>Test 1</b>	
07/04 M	No class	
07/05 T	5.1 Divisibility Test, 6.1 Wilson's Theorem and Fermat's Little Theorem	
07/06 W	6.3 Euler's Theorem	
07/07 R	7.1 Euler's $\phi$ -function, 7.2 The Sum and Numbers of Divisors	PS 5 due
07/08 F	7.3 Perfect Numbers and Mersenne Primes	
07/11 M	No class	
07/12 T	8.1 Character Ciphers, 8.2 Block Ciphers	PS 6 due
07/13 W	8.3 Exponentiation Ciphers, 8.4 Public Key Cryptography	
07/14 R	11.1 Quadratic Residues	PS 7 due
07/15 F	11.2 The Law of Quadratic Reciprocity	PS 8 due (Sunday, 2PM)
07/18 M	No class	
07/19 T	<b>Test 2</b>	
07/20 W	12.1 Decimal Fractions, 12.2 Finite Continued Fractions	
07/21 R	Final review	PS 9 due
07/22 F	<b>Final Exam</b>	

- Please note that for week 2, we are meeting MTuWF so that you can use Thursday to prepare for Test 1 on Friday.

**Course Description and Objectives:** Math 693 is an introduction to the theory of numbers. Upon successful completion of this course, the student will be able to:

1. Demonstrate an understanding of the elementary arithmetic properties of the integers, including divisibility, congruences, modular arithmetic, and the Fundamental Theorem of Arithmetic.
2. Solve some Diophantine equations, congruences, and systems of congruences.
3. Demonstrate an understanding of fundamental results in elementary number theory, including the Euclidean algorithm, Wilson's theorem, Fermat's theorem, and Euler's theorem, the Chinese Remainder Theorem, quadratic residues, quadratic reciprocity, and continued fractions.
4. Apply number theory to areas such as calendars, computer science, and cryptography.
5. Write proofs in the context of elementary number theory.

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**Attendance:** Attendance is required if you are healthy.

**D2L:** All course documents will be posted on D2L (**Resource** → **Content**).

**Problem Sets:** There will be nine problem sets. Your lowest problem set score will be dropped.

You are encouraged to work with other students. **However, you must write your own solutions, and you must name all your collaborators. Failure to do so may result in disciplinary action.**

**Projects:** There will be 3-4 projects for Math 693 students.

**Exams:** There will be two tests and one (cumulative) final exam.

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**Academic Honesty:** The university's academic honesty policies can be found in the undergraduate catalog. I have zero tolerance for any academic dishonesty, and will report all violations to appropriate school authorities.

**Special Accommodations:** It is a university policy to provide reasonable accommodations to students with learning disabilities. Please contact the office of learning services for details: 352 Lyle Hall, 717-871-5554.

**Exam Make-up Policy:** Make-up exams will be given for reasons described in the undergraduate catalog. These reasons include: personal illness, death or critical illness in the family, participation in a university-sponsored activity, jury duty, military duties, or religious holidays. In any case, you will be asked to provide documentation to justify your absence. **One week notice** is required in the case of foreseeable absences.

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**Title IX Responsibilities for Faculty:** Millersville University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to comply with the requirements of Title IX of the Education Amendments of 1972 and the University's commitment to offering supportive measures in accordance with the new regulations issued under Title IX, the University requires faculty members to report to the University's Title IX Coordinator incidents of sexual violence shared by students. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. Faculty members are obligated to report to the person designated in the University Protection of Minors policy sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred.

Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is set forth at: [www.millersville.edu/titleix](http://www.millersville.edu/titleix).

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**COVID-19 Plan:** The following plan will be in place if someone in the class is required to quarantine due to COVID-19.

1. If the instructor is required to quarantine due to COVID-19, the instructor plans to continue teaching the class remotely using a combination of asynchronous recorded videos and synchronous zoom classes for the duration of quarantine.
2. If a student is required to quarantine due to COVID-19, they should contact the instructor as soon as possible. The instructor will provide class videos/notes and set up zoom meetings if needed so that the student can learn remotely for the duration of quarantine.