Math 4091: Survey of Number Theory Topics

Disclaimer
This syllabus is current and accurate as of its posting date, but will not be updated. For the most complete and up-to-date course information, contact the instructor.

Instructor Information
Dr. Dionne T. Bailey
Office: MCS 220G
Phone: 325-486-5425
Email: Dionne.Bailey@angelo.edu

Office Hours

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
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<tbody>
<tr>
<td>Monday</td>
<td>10:00-12:00 in Math Lab</td>
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<tr>
<td>Tuesday</td>
<td>10:00-12:00</td>
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<td>Wednesday</td>
<td>10:00-12:00</td>
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<td>Thursday</td>
<td>10:00-12:00</td>
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<tr>
<td>Friday</td>
<td>10:00-12:00</td>
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• Feel free to contact me with any questions you may have. I will make an effort to answer emails within the hour that I first view them during normal business hours. I will check emails less frequently on weekends, so I cannot promise a prompt response, or maybe any response at all, on weekends.
• Contact your peers through the discussion board in Blackboard. We are a learning community, and you are encouraged to help one another.

Prerequisites
• Bachelor’s degree in mathematics
• General mathematical maturity
• Familiarity with Microsoft Word, Adobe Acrobat Reader, and Blackboard

Textbook

Course Content
The course topics are integers, primes and composites, multiples and divisors, prime factorization, divisor problems, special numbers, modular arithmetic, and linear congruences.
Course Progress
You may proceed through the course as quickly as you please and submit assignments and projects early. However, late assignments will not be accepted.

Homework Assignment
Homework assignments from the textbook will be assigned for Chapters 1, 2, 3, 4, 5, 6, 12, and 14, and they will account for 30% of the final grade. Please consult the Course Outline (below) to see each assignment’s due date. Late assignments will not be accepted.

Projects
There will be 8 projects in this course that will account for 70% of the final grade. You are expected to do a professional job on these projects, submitting typed final reports (where possible) that are neat, thorough, mathematically correct, and grammatically correct. If the mathematics becomes toocumbersome to type, then neat handwritten solutions are acceptable. If you have trouble completing a project, please get help before it is due. You can contact me for assistance or get help from your peers by posting your question on the discussion board in Blackboard. I will make an effort to answer emails within the hour that I first view them during normal business hours.

Grade Calculations
Your grade on the homework assignments will count for 30% and your projects will count for 70%. Graded items and grades for those items will be posted in blackboard as quickly as possible after they are due. Most grades should be posted within 24 to 48 hours after they are due.

The following grading scale is in use for this course:
- A = 90.00-100
- B = 80.00-89
- C = 70.00-79
- D = 60.00-69
- F = 0-59

Student Learning Outcomes

1. **Students will demonstrate factual knowledge of the mathematical notation and terminology used in this course.** Students will demonstrate the ability to read, interpret, and use the vocabulary, symbolism, and basic definitions of number theory, including divisors, greatest common divisor, prime factorization, and congruences.

2. **Students will be able to describe the fundamental principles, laws, and theorems arising from the basic definitions of probability theory.** Students will be able to identify and use the well-ordering principle, the principle of mathematical induction, the prime number test, the prime number theorem, Mersenne primes, and Euclid’s perfect number formula.

3. **Students will apply course material along with techniques and procedures covered in this course to solve problems.** Students will use the facts, formulas, and techniques
learned in this course to solve problems involving the divisor counting function and the Euclidean algorithm such as linear Diophantine equations and greatest common divisors.

4. **Students will develop specific skills, competencies, and thought processes sufficient to support further study or work in the field of education.** Students will acquire a level of proficiency in the fundamental concepts and applications necessary for further study or teaching mathematics.

## Course Schedule

The subject matter schedule listed below is tentative, and subject to change and adaptation. For current, updated information about course topics, contact the instructor.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Date Due (11:59 pm, CST)</th>
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<tbody>
<tr>
<td>1</td>
<td>Module 0: Orientation Worksheet and Self Introduction</td>
<td>Tuesday, January 21</td>
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<tr>
<td>2</td>
<td>Module 1: Chapter 1: Integers: The Basics Chapter 1 Homework and Project</td>
<td>Tuesday, January 28</td>
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<tr>
<td>3-4</td>
<td>Module 2: Chapter 2: Primes and Composites Chapter 2 Homework and Project</td>
<td>Tuesday, February 11</td>
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<tr>
<td>5-6</td>
<td>Module 3: Chapter 3: Multiples and Divisors Chapter 3 Homework and Project</td>
<td>Tuesday, February 25</td>
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<tr>
<td>7-8</td>
<td>Module 4: Chapter 4: Prime Factorization Chapter 4 Homework and Project</td>
<td>Tuesday, March 17</td>
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<tr>
<td>9</td>
<td>Module 5: Chapter 5: Divisor Problems Chapter 5 Homework and Project</td>
<td>Tuesday, March 24</td>
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<tr>
<td>10-11</td>
<td>Module 6: Chapter 6: Special Numbers Chapter 6 Homework and Project</td>
<td>Tuesday, April 7</td>
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<tr>
<td>12-13</td>
<td>Module 7: Chapter 12: Introduction to Modular Arithmetic Chapter 12 Homework and Project</td>
<td>Tuesday, April 21</td>
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<tr>
<td>14-15</td>
<td>Module 8: Chapter 14: Linear Congruences Chapter 14 Homework and Project</td>
<td>Tuesday, May 5</td>
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## Works Cited:


**General Policies Related to This Course**

All students are required to follow the policies and procedures presented in these documents:

- [Angelo State University Student Handbook](#)
- [Angelo State University Catalog](#)

**Academic Integrity**

Students are expected to maintain complete honesty and integrity in all work. Any student found guilty of any form of dishonesty in academic work is subject of disciplinary action and possible expulsion from ASU.

The College of Science and Engineering adheres to the university’s [Statement of Academic Integrity](#).

**Plagiarism**

Plagiarism is a serious topic covered in ASU’s [Academic Integrity policy](#) in the Student Handbook. Plagiarism is the action or practice of taking someone else’s work, idea, etc., and passing it off as one’s own. Plagiarism is literary theft.

In your discussions and/or your papers, it is unacceptable to copy word-for-word without quotation marks and the source of the quotation. It is expected that you will summarize or paraphrase ideas giving appropriate credit to the source both in the body of your paper and the reference list.

Papers are subject to be evaluated for originality. Resources to help you understand this policy better are available at the [ASU Writing Center](#).
Copyright Policy

Students officially enrolled in this course should make only one printed copy of the given articles and/or chapters. You are expressly prohibited from distributing or reproducing any portion of course readings in printed or electronic form without written permission from the copyright holders or publishers.

Accommodations for Students with Disabilities

ASU is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs or activities of the university, or be subjected to discrimination by the university, as provided by the Americans with Disabilities Act of 1990 (ADA), the Americans with Disabilities Act Amendments of 2008 (ADAAA) and subsequent legislation.

Student Disability Services is located in the Office of Student Affairs, and is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability. It is the student’s responsibility to initiate such a request by contacting an employee of the Office of Student Affairs, in the Houston Harte University Center, Room 112, or contacting the department via email at ADA@angelo.edu. For more information about the application process and requirements, visit the Student Disability Services website. The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dallas Swafford
Director of Student Disability Services
Office of Student Affairs
325-942-2047
dallas.swafford@angelo.edu
Houston Harte University Center, Room 112

Incomplete Grade Policy

It is policy that incomplete grades be reserved for student illness or personal misfortune. Please contact faculty if you have serious illness or a personal misfortune that would keep you from completing course work. Documentation may be required. See ASU Operating Policy 10.11 Grading Procedures for more information.

Student Absence for Observance of Religious Holy Days

A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. See ASU Operating Policy 10.19 Student Absence for Observance of Religious Holy Day for more information.

Title IX at Angelo State University

Angelo State University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from sex
discrimination of any kind. The University prohibits discrimination based on sex, which includes pregnancy, sexual orientation, gender identity, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination including: sexual assault, sex-based discrimination, sexual exploitation, sexual harassment, public indecency, interpersonal violence (domestic violence and/or dating violence), and stalking. As a faculty member, I am a Responsible Employee meaning that I am obligated by law and ASU policy to report any allegations I am notified of to the Office of Title IX Compliance. This is done in order to connect students with resources and options in addressing the allegations reported. As a student, are encouraged to report any incidents of sexual misconduct directly to ASU’s Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator. You may do so by contacting:

**Michelle Boone, J.D.**  
*Director of Title IX Compliance/Title IX Coordinator*  
Mayer Administration Building, Room 210  
325-942-2022  
michelle.boone@angelo.edu

You may also file a report online 24/7 at [www.angelo.edu/incident-form](http://www.angelo.edu/incident-form).

If you are wishing to speak to someone about an incident in confidence you may contact the *University Health Clinic and Counseling Center* at 325-942-2173 or the *ASU Crisis Helpline* at 325-486-6345.

The Office of Title IX Compliance also provides accommodations related to pregnancy (such as communicating with your professors regarding medically necessary absences, modifications required because of pregnancy, etc.). If you are pregnant and need assistance or accommodations, please contact the Office of Title IX Compliance utilizing the information above.

For more information about Title IX in general you may visit [www.angelo.edu/title-ix](http://www.angelo.edu/title-ix).

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1. [https://www.angelo.edu/student-handbook/](https://www.angelo.edu/student-handbook/)
2. [https://www.angelo.edu/catalogs/](https://www.angelo.edu/catalogs/)
5. [http://www.angelo.edu/dept/writing_center/academic_honesty.php](http://www.angelo.edu/dept/writing_center/academic_honesty.php)
6. [https://www.angelo.edu/services/disability-services/](https://www.angelo.edu/services/disability-services/)
7. [https://www.angelo.edu/content/files/14197-op-1011-grading-procedures](https://www.angelo.edu/content/files/14197-op-1011-grading-procedures)
8. [https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of](https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of)