

**Sul Ross State University**  
**Course Syllabus**  
**MATH 5301-001,MC1: Number Theory**  
**Fall 2018**

**Instructor:** Dr. Angela M. Brown

**Office Number:** ACR 107B

**Office Telephone Number:** (432)837-8223

**Email Address:** abrown4@sulross.edu

**Office Hours:** 10:00-11:00 MWR, 3:30-4:30 MTWR, others by appointment

**Time and Place of Class Meetings:** TR 5:00-6:15 pm ACR 206

**Course Prerequisites:** MATH 2414

**Mathematics Program Learning Objectives:** The graduating student should be able to

- Apply knowledge of basic mathematics principles.
- Identify and provide valid proofs or solutions for theorems or problems.
- Recognize and dispute invalid mathematical statements by using counter-examples.

**Course Objectives:**

- The student will be able to solve problems using divisibility rules and the Euclidean Algorithm.
- The student will apply their knowledge through the course to cryptography.
- The student will be able to apply different factoring techniques.
- The student will be able to recognize congruences.

**Required Textbooks:** *A Friendly Introduction to Number Theory* 4th ed, Silverman ISBN 978-0-13-468946-3.  
Homework will be assigned from the text.

**Other Equipment Needed:** paper and pencils.

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

**Grading Policy:** The grade weighting will be as follows:

Quizzes/Homework/in Class Assignments: 20%

Class Presentations 10%

Exams: 30%

Project: 15%

Final Exam: 25%

**Quizzes:** Quizzes will be given periodically. You will have advanced warning of most quizzes. Additional in class assignments will be given and counted the same as quiz and homework grades.

**Homework:** Homework will be assigned daily and homework will be taken up at the beginning of class on Tuesdays. Homework will be graded on completion and accuracy. Copying answers out of the back of the book is plagiarism and will be prosecuted. **For graduate credit, additional problems will be assigned beyond those of the undergraduates.**

**Class Presentations:** Throughout the semester students will be required to work out problems during class at the Document Camera. These problems will then be discussed and critiqued by the class as a whole. Most of these problems will have been assigned in the previous two class periods. Names will be randomly drawn for presenting problems in class, so it is extra important that you keep up with assigned problems.

**Project:** You will choose one of the topics not presented in class to complete a project over. The project format can be either a presentation format or a paper format.

**Exams:** No make-up exams will be given. If there is a valid reason for missing an exam, then the grade for the missed exam will be replaced by the grade on the final exam. Otherwise, a missed exam will be a zero. Exams will be closed notes, closed book, and no calculator will be allowed. Any restroom breaks need to be taken before an exam starts. You cannot leave the classroom in the middle of an exam under any circumstances.

Final Exam Date: Monday, December 10 at 6 pm

**Attendance Policy:** Students are expected to attend every class. If class must be missed, the student is expected to get the notes from a classmate, and to check with me or on Blackboard for announcements and updated assignments.

Students are expected to arrive to class on time. If a student is perpetually late, they will be asked to not attend class unless they arrive on time. If tardiness becomes a problem for the class as a whole, people who arrive late will not be permitted to enter the class. If this stricter policy becomes necessary, there will be an announcement made in class.

It is policy of the university to drop a student with a grade of "F" if 9 hours or more of class are missed. For this course that would be 9 or more class sessions missed.

**Cell Phone Policy:** Cell phones are not allowed in class. They can not be used as calculators on any assignment. Any phone ringing during class will be taken up until the end of class. If a phone rings during a test or quiz, the student will forfeit their right to finish said test or quiz.

**Americans With Disabilities Act:** Sul Ross State University is committed to equal access in compliance with the Americans With Disabilities Act of 1973. As an instructor I am required to give students reasonable accommodations in each course. It is the student's responsibility to initiate a request for accessibility services. Contact Mary Schwartze, the ADA Coordinator in Counseling and Accessibility Services Ferguson Hall, Room 112. Her phone number is 432-837-8203 or you can email her at mschwartz@sulross.edu.

## Important Dates:

|                |  |
|----------------|--|
| August 27      | First Day of Classes   |
| August 30      | Last Day for Late Registration and Schedule Changes                                  |
| September 3    | Labor Day Holiday  |
| September 12   | 12th Class Day   |
| November 16    | Last Day to Withdrawal from University or Drop Classes with a Grade of "W" (by 4 pm) |
| November 21-23 | Thanksgiving Holiday   |
| December 5     | Last Day of Classes  |
| December 6     | Dead Day   |
| December 7-12  | Final Exams  |
| December 14    | Commencement   |

| Tentative Schedule-Subject to Change |  |              |   |
|--------------------------------------|--|--------------|---|
| Tuesday                              |  | Thursday     |   |
| August 28                            | Intro, What is Number Theory                         | August 30    | Pythagorean Triples and the Unit Circle               |
| September 4                          | Sums of Higher Powers and Fermat's Last Theorem      | September 6  | Divisibility and GCDs, Linear Equations               |
| September 11                         | Fundamental Theorem of Arithmetic                    | September 13 | Congruences, Fermat's Little Theorem, Euler's Formula |
| September 18                         | Euler Phi Function and the Chinese Remainder Theorem | September 20 | Review/Catch up Day                                   |
| September 25                         | Exam 1   | September 27 | Primes and Counting Primes                            |
| October 2                            | Mersenne Primes and Perfect Numbers                  | October 4    | Powers Modulo M and Successive Squaring               |
| October 9                            | kth Root Mod m                                       | October 11   | Powers, Roots and Unbreakable codes                   |
| October 16                           | As easy as 1, 2, 3                                   | October 18   | Review/Catch up Day                                   |
| October 23                           | Exam 2   | October 25   | Square/Triangular Numbers Revisited                   |
| October 30                           | Pell's Equation                                      | November 1   | Diophantine Approximations                            |
| November 6                           | Imaginary Numbers                                    | November 8   | Gaussian Integers and Unique Factorization            |
| November 13                          | Irrational Numbers and Transcendental Numbers        | November 15  | Review/Catch up                                       |
| November 20                          | Exam 3   | November 22  | Thanksgiving Holiday                                  |
| November 27                          | Binomial Coefficients and Pascal's Triangle          | November 29  | Linear Recurrence Sequences                           |
| December 4                           | Continued Fractions, Generating Functions            | December 6   | Dead Day  |