

Sul Ross State University
Course Syllabus
MATH 5301-001: Number Theory & Cryptography
Spring 2020

Instructor: Dr. Angela M. Brown

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Office Hours: M 9:30-11:30, W 10:00-11:00 and 2:00-3:00, TR 3:30-5:00, others by appointment

Time and Place of Class Meetings: TR 9:30-10:45 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.

Marketable Skills:

- Logical and Analytical Skills
- Problem-Solving Using Analytic and Algebraic Methods
- Use of Technology in Problem-Solving and Presentation
- Communication and Pedagogical Skills

Required Textbooks: *Elementary Number Theory* 2nd ed, Dudley ISBN 9780486469317. Homework will be assigned from the text and other sources.

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: 15%

Class Presentations: 10%

Project: 20%

Exams: 30%

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.

Project: Students will have the opportunity to complete a project over a chosen Number Theory topic. The project will be the choice of a presentation or a paper. More details will be given as the semester progresses.

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.

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, May 4 at 8 am

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 (SRSU) is committed to equal access in compliance with Americans with Disabilities Act of 1973. It is SRSU policy to provide reasonable accommodations to students with documented disabilities. It is the Student's responsibility to initiate a request. Please contact me, Ms. Rebecca Greathouse Wren, M.Ed., LPC-S, Director/Counselor, Accessibility Services Coordinator, Ferguson Hall (Suite 112) at 432.837.8203; mailing address is P.O. Box C-122, Sul Ross State University, Alpine, Texas 79832. Students should then contact the instructor as soon as possible to initiate the recommended accommodations.

Important Dates:

- January 13 First Day of Classes
- January 16 Last Day for Late Registration and Schedule Changes
- January 20 Martin Luther King, Jr. holiday
- January 29 12th Class Day
- March 9-13 Spring Break
- April 3 Last Day to Withdrawal from University or Drop Classes with a Grade of "W" (by 4 pm)
- April 29 Last Day of Classes
- April 30 Dead Day
- May 1, 4-6 Final Exams
- May 8 Commencement

Tentative Schedule (subject to change)

Tuesday		Thursday	
Jan 14	Syllabus and Intro	Jan16	Integers
Jan 21	Integers	Jan 23	Unique Factorization
Jan 28	Diophantine Equations	Jan 30	Congruences
Feb 4	Congruences	Feb 6	Linear Congruences
Feb 11	Fermat's and Wilson's Theorems	Feb 13	Exam 1
Feb 18	Divisors	Feb 20	Perfect Numbers
Feb 25	Euler's Theorem	Feb 27	Primitive Roots
Mar 3	Quadratic Congruences	Mar 5	Reciprocity
Mar 17	Other Bases	Mar 19	Duodecimals
Mar 24	Pythagorean Triangles	Mar 26	Exam 2
Mar 31	Fermat's Conjecture	Apr 2	Fermat's Conjecture
Apr 7	Sums of Squares	Apr 9	Sums of Square
Apr 14	Special Quadratics	Apr 16	Bounds for $\pi(x)$
Apr 21	Cryptography	Apr 23	Cryptography
Apr 28	Exam 3		