Course no. 1332.050
Meeting Time and Place
TR 9:30-10:45, MCS 210
Instructor Trey Smith
Office MCS 219A
Phone (325) 486 5441
E-Mail trey.smith@angelo.edu
Fax (325) 942 2503
Office Hours MTWRF 11:00-12:00, 2:00-3:00
Others by Appointment
MyMathlab This Course will require registration with MyMathlab. It is an online assignment system that you will purchase (with or without an actual textbook). You may purchase the access code at the ASU bookstore or directly from Pearson (the book company). There is a link under Assignments on Blackboard. To set up your account, go to Blackboard. You will need the following information:

• A valid email address (I recommend you use your angelo.edu email)

• Your student access code (purchased with your textbook or online)

You will need to pay for an access code. If you are unable to pay at the start of the semester, you may use the free 14-day trial. However, remember this free trial only lasts for 14 days! After that time, you will need to pay for the access code.

Homework Homework will be done on-line. Since MyMathLab will allow you to re-do any assignment, you will easily be able to maintain a homework average of 100.

Quizzes Some days there will be a quiz at the beginning of class. Each quiz grade will count as a single homework grade. You will generally be allowed to use your notes during the quiz.

Attendance Regular class attendance is expected. You are allowed one absence for each test period. After that, any absence will count against you in determining whether or not you are allowed to skip the test (see Grading below). If you are late to class or leave class early, you will be counted absent for that day.

Grading There will be three tests for this class. During each of the three test periods you will receive a homework/quiz grade worth 0 to 100 points. At the end of a test period you may skip the test and use your homework grade if
1) Your homework grade is 70 or better.
2) You have no more than one absence during that test period.
There are absolutely no exceptions. In the event that you do take a test, you will be given the test grade or the average of the homework grade for that period and the test grade...whichever is higher. Your overall grade will be the average of those three grades.

**Calculators**
Some of the material in this class requires the use of a calculator. You will be allowed to use a calculator on designated exams and quizzes. **You will not be allowed to use a cell phone during an exam or a quiz.**

**Final Exam**
The final exam will simply be the third of the three exams.

**Cell Phones and other Annoyances**
Using a cell phone during class is both annoying and distracting. Don’t do it. Additionally, talking during the lecture, or leaving during the middle of class are also distracting. If you engage in any of these types of behavior, you will be counted absent for that day. You have been warned.

**Course Topics**
This is a tentative course schedule. I reserve the right to change the material or test dates.

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<tr>
<th>Week</th>
<th>Topics</th>
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<tbody>
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<td>1</td>
<td>Voting Methods</td>
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<td>2</td>
<td>Weighted Voting</td>
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<tr>
<td>3</td>
<td>Fair-Division Games</td>
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<td>4</td>
<td>Apportionment</td>
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<tr>
<td>5</td>
<td>Apportionment and <strong>Test 1 (9.28)</strong></td>
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<tr>
<td>6</td>
<td>Euler Paths and Graphs</td>
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<td>7</td>
<td>The Traveling Salesman Problem</td>
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<td>8</td>
<td>Spanning Trees</td>
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<td>9</td>
<td>Math of Finance</td>
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<tr>
<td>10</td>
<td>Graphs, Charts and <strong>Test 2 (11.2)</strong></td>
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<td>11</td>
<td>The Normal Curve</td>
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<td>12</td>
<td>The Fibonacci Sequence</td>
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<td>13</td>
<td>The Basics of Probability</td>
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<td>14</td>
<td>Symmetry</td>
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<td>15</td>
<td>Fractals</td>
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<tr>
<td>16/17</td>
<td><strong>Test 3 (12.14 from 10:30 -12:30 AM)</strong></td>
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**Course Policies and Information**

- **Student Disability Services**
  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.

  The Office of Student Affairs is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable
accommodations based on a disability, and it is the student’s responsibility to initiate such a request by contacting:

Dallas Swafford  
Director of Student Disability Services  
Office of Student Affairs  
325-942-2047  
dallas.swafford@angelo.edu

- **Title IX**  
  Angelo State University is committed to the safety and security of all students. If you or someone you know experience sexual harassment, sexual assault, domestic or dating violence, stalking, or discrimination, you may contact ASU’s Title IX Coordinator:

  Michelle Boone  
  Director of Title IX Compliance  
  325-486-6357  
michelle.boone@angelo.edu

- **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. ([http://www.angelo.edu/opmanual/](http://www.angelo.edu/opmanual/) -- OP 10.19)

- **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. ([http://www.angelo.edu/opmanual/](http://www.angelo.edu/opmanual/) -- OP 10.19)

- **Student Conduct Policies**

  **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 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 via Turnitin. 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.

- **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

**Student Learning Outcomes**

1. **The students will demonstrate factual knowledge including the mathematical notation and terminology used in this course.** Students will read, interpret, and use the vocabulary, symbolism, and basic definitions used in a selection from the following topics: voting theory, apportionment, the mathematics of money, probability, statistics, graph theory, and geometry.

2. **The students will be able to describe generalizations of mathematics to real-world situations.** Students will be able to describe, for example, the role played by mathematics in the theory of voting. The students will be able to describe connections between mathematical concepts and natural and societal phenomena.

3. **The students will apply the course material along with techniques and procedures covered in this course to solve various problems and improve decision making.** The students will apply such topics related to statistics and probability to improve decision making through a broader understanding of mathematics. They will learn to analyze problems using mathematical ideas and symbolism and learn to obtain the appropriate resources required to better deal with such problems.
4. The students will develop specific skills, competencies, and thought processes sufficient to support further study or work in this field or related fields. Students will develop new approaches and algorithms for solving problems related to networking, scheduling and paths.

Course Content


1. **Mathematics of Voting**: Preference Ballots, Plurality, Borda, Runoff Voting, Pairwise Comparison, Rankings
2. **Weighted Voting**: The Banzhaf Power Index, The Shapley-Shubik Power Index
4. **Apportionment**: Various methods including Hamilton’s, Jefferson’s, Adam’s, and Webster’s; The Alabama Paradox
5. **Euler Paths and Circuits**: Euler Circuit Problems, Graphs, Euler’s Theorems, Fleury’s Algorithm, Eulerizing Graphs
6. **The Traveling Salesman Problem**: Hamilton Paths and Circuits, Complete Graphs, Greedy and Nearest Neighbor Algorithms
7. **Networks**: Trees, Spanning Trees, Kruskal’s Algorithm, Shortest Networks for Three or more points
8. **Scheduling**: Directed Graphs, Priority Lists, The Decreasing Time Algorithm, Critical Paths, Independent Tasks
9. **Fibonacci Numbers and the Golden Ratio**: Fibonacci Numbers, The Golden Ratio, Gnomons, Spiral Growth
10. **Math of Finance**: Percentages, Simple Interest, Compound Interest, Annuities
11. **Mathematics of Symmetry**: Rigid Motions, Reflections, Rotations Translations, Glide Reflections, Patterns
12. **Fractals**: The Koch Snowflake, The Sierpinski Gasket, Chaos, The Mandelbrot Set
13. **Collecting Data**: Sampling, Random Sampling, The Capture-Recapture Method, Clinical Studies
14. **Descriptive Statistics**: Graphical Methods, Variables, Data Summaries, Spread
15. **Probability**: Random Experiments, Sample Spaces, Permutations, Combinations, Equiprobable Spaces, Odds
16. **Normal Distributions**: Approximately Normal Distributions, Normal Curves, Distributions of Random Events, Statistical Inference.