Mathematics 1332 – An Introduction to Contemporary Mathematics

**Meeting Time and Place**  
M-F Lake View High School, D127

**Instructor**  
Susan E. Whitaker

**Office**  
Lake View High School, D127

**Phone**  
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**E-Mail**  
Susan.whitaker@saisd.org

**Office Hours**  
M-W, 12:39-1:08, 3:30-4:00  
TR 3:30-4:00  
Others by appointment

**MyMathlab**  
This Course will require registration with MyMathlab, if that option was purchased by the school district.

**Honor Code**  
Angelo State University expects its students to maintain complete honesty and integrity in their academic pursuits. Students are responsible for understanding the Academic Honor Code, which is available on the web at [http://www.angelo.edu/forms/pdf/honorcode5.pdf](http://www.angelo.edu/forms/pdf/honorcode5.pdf).

**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.

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 at www.angelo.edu/ADA. 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

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

Quizzes
Some Fridays 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 will be held accountable for attendance and tardies in accordance with the SAISD Code of Conduct and the Lake View High School Student Handbook.

Grading
There will be eight major grades for this class. The major grades will consist of tests and projects. Four major grades and several daily grades will compose your nine week grades. Your semester average will be the average of the two nine week grades. Daily grades are homework, classwork and quizzes. Grading will be in accordance with the Advanced Academic grading policy of SAISD.

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. A TI-Nspire CX will be provided for you to use during class. If you prefer a different calculator, you must secure one for yourself and have it approved before use on any test or quiz. You will not be allowed to use a cell phone during an exam or a quiz.

Final Exam
The final exam will not be cumulative.

Cell Phones
Using a cell phone during class is both annoying and distracting. Don’t do it.

Course Topics
This is a tentative course schedule. I reserve the right to change the material or test dates or exchange projects for tests.

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<thead>
<tr>
<th>Week</th>
<th>Topics</th>
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<tr>
<td>1</td>
<td>Voting Methods</td>
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<td>2</td>
<td>Weighted Voting, Test 1</td>
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<td>3</td>
<td>Fair-Division Games</td>
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<td>Apportionment and Test 2</td>
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<tr>
<td>5</td>
<td>Apportionment (Hamilton’s and Jefferson’s methods)</td>
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<td>6</td>
<td>Graphs and Euler Paths, Test 3</td>
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<td>8</td>
<td>Spanning Trees Test 4</td>
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<td>9</td>
<td>Math of Finance</td>
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<td>10</td>
<td>Graphs, Charts, and Numbers, Test 5</td>
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<td>11</td>
<td>The Normal Curve</td>
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<td>12</td>
<td>The Fibonacci Sequence and Test 6</td>
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<td>13</td>
<td>The Basics of Probability</td>
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<td>14</td>
<td>Symmetry, Test 7</td>
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<td>15</td>
<td>Fractals</td>
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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

**Textbook:** *Excursions in Modern Mathematics 8th ed.* by Peter Tannenbaum, Prentice Hall

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

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16. **Normal Distributions**: Approximately Normal Distributions, Normal Curves, Distributions of Random Events, Statistical Inference.

**Core Curriculum Student Learning Objectives**

- **Core Objective (Critical Thinking):** Gather, analyze, evaluate, and synthesize information relevant to a question or issue. (CT1)
  - Course Student Learning Objective: Students will evaluate graphs to determine the presence of an Euler circuit or a spanning tree, and identify node degrees.
  - Assessment: Assessment exam that demonstrates CT1.

- **Core Objective (Communication):** Develop, interpret, and express ideas through effective visual communication. (CS3)
  - Course Student Learning Objective: Students will perform various rigid motion transformations on plane shapes.
  - Assessment: Assessment exam that demonstrates CS3.

- **Core Objective (Empirical and Qualitative Skills):** Manipulate and analyze numerical data and arrive at an informed conclusion. (EQS1)
  - Course Student Learning Objective: Students will use the facts, formulas, and techniques to compute various data measures and draw conclusions regarding data sets.
  - Assessment: Assessment exam that demonstrates EQS1.

**Additional Statements**

**Student Disability Services**
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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

Revised August 2017
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

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