Math 1332.D10 – Contemporary Mathematics (online) – Fall 2017

Instructor: Dr. Susan Abernathy(-Taylor)
Office: MCS 220i
Phone: 325.486.5442
Office Hours: MWF: 9-11am
   MW: 12-1pm
   Th: 3:15-4:15pm
   or by appointment

Email: All of the following addresses work.
       They all go to the same inbox; you need only
       send an email to one of them.
       susan.abernathy@angelo.edu
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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.

Note: You must purchase a MyMathLab access code, which will also provide access to an electronic copy of
the textbook. Purchasing a hard copy of the textbook is optional.

Format: There are no regular class meetings. We will use the time listed in the course schedule only for
the four tests. All homework for this course will be done online using MyMathLab.

Grades: Grades will be determined as follows:
   Tests: 60% (15% each)
   Online Homework: 40%

Final grades will be based on a standard 10-point grading scale (A is 90+, B is 80-89.99, C is 70-79.99, D is
60-69.99, F is below 60).

Tests: Tests will be administered in MCS 214 and will be conventional pencil and paper exams. Test dates
and locations are listed below. If you are not in the San Angelo area, you must make arrangements with a
testing center to take the tests there (usually this is a nearby community college or university).

<table>
<thead>
<tr>
<th>Test 1</th>
<th>Tuesday, September 19 at 5:30pm in MCS 214</th>
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<tbody>
<tr>
<td>Test 2</td>
<td>Tuesday, October 17 at 5:30pm in MCS 214</td>
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<tr>
<td>Test 3</td>
<td>Tuesday, November 14 at 5:30pm in MCS 214</td>
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<tr>
<td>Test 4</td>
<td>Tuesday, December 12 at 6pm in MCS 214</td>
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Tests are not cumulative and there is no cumulative final exam (the fourth test will take place during the
final exam timeslot). If you have a conflict with an exam, please let me know as soon as possible. If you
miss one test, the average of your other three test grades will replace it. If you miss a second test, you will
receive a zero for that test grade. Make-up tests are given only under extreme circumstances at the
discretion of the instructor.
**Homework:** Homework will be assigned online through MyMathLab. Late homework is not accepted, but you may work ahead if you wish. Your lowest three homework grades will be dropped.

Directions for how to register for MyMathLab can be found our Blackboard course (“How to Register for MyMathLab” in the lefthand navigation). You will also access MyMathLab itself through our Blackboard course (“Access MyMathLab” in the lefthand navigation).

You will need to pay for an access code (bundled with your textbook or purchased directly from MyMathLab without a hard copy of the book). You may access MyMathLab for free for 14 days from the time that you register. After this free trial ends, you will be required to pay for access. Not having an access code does not warrant an extension on homework. The first homework assignment is due Wednesday, August 30th.

**Student Responsibilities:** The student is solely responsible for:

- *Maintaining academic honesty.* Angelo State University expects its students to maintain complete honesty and integrity in their academic pursuits. It is never acceptable to pass off someone else’s work as your own. 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).

- *Completing each assignment by the specified due date.*

- *Being proactive about their grade in this course.* You are not given a grade in a college course; you EARN your grade. You may want or need a particular grade to graduate, maintain a scholarship, or stay in athletics, for instance. **It is your responsibility to put in as much effort as it takes to earn this grade.** This includes utilizing (as needed) all available study aid options (going to office hours and/or Math Lab, reading outside texts, meeting with the instructor, etc.) to resolve any questions or concerns you might have about any aspect of the course.

**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](http://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
**Student Absence for Observance of Religious Holy Day:** A student who intends to observe a religious holy day should make that intention known in writing (email is fine) to the instructor prior to the absence. (http://angelo.edu/opmanual/ - OP 10.19)

**Weekly Schedule:** This subject matter listed below is tentative and subject to change. For current information about course topics, please contact the instructor.

Week 1 – Voting Theory  
Week 2 – Voting Theory  
Week 3 – Weighted Voting, Fair Division  
Week 4 – **Test 1 (Tues. Sept. 19)**, Fair Division  
Week 5 – Fair Division  
Week 6 – Fair Division, Intro to Graphs  
Week 7 – Graphs, Traveling Salesman Problems  
Week 8 – **Test 2 (Tues. Oct. 17)**, Networks & Trees  
Week 9 – MST’s, MaxST’s, Brute Force Algorithm, Percentages  
Week 10 – Math of Finance  
Week 11 – Reflections, Translations, Rotations  
Week 12 – **Test 3 (Tues. Nov. 14)**, Glide Reflections  
Week 13 – Fibonacci Numbers  
Week 14 – Graphs, Charts, and Statistics  
Week 15 – Probability  
Week 16 – **Test 4 (Tues. Dec. 12)**

**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* 9th ed. by Peter Tannenbaum, Prentice Hall

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

Core Curriculum Student Learning Objectives - MATH 1332

- **Core Objective (Critical Thinking):** Gather, analyze, evaluate, and synthesize information relevant to a question or issue. (CT1)
  - **Course Student Learning Objective:** Students will collect, analyze, and evaluate the fundamental fairness criteria of a variety of voting methods.
  - **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 create and interpret Hamiltonian and/or Eulerian graphs and draw conclusions about the associated networks.
  - **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 learned in this course to solve problems involving the mathematics of finance.
  - **Assessment:** Assessment exam that demonstrates EQS1.