MATH 1332: Introduction to Contemporary Mathematics, Spring 2019

Contact Information

Instructor: Ashlee Fuchs
Office: MCS 220E
Office Phone: (325) 486-5433
e-mail: Ashlee.Fuchs@angelo.edu

Office Hours:
Monday: 12:15pm – 1:15pm; 1:45pm – 2:45pm (in the Math Lab – Lib C302)
Tuesday: 9:00am – 9:30am; 12:15pm – 1:15pm
Wednesday: 12:15pm – 1:15pm; 1:45pm – 2:45pm
Thursday: 9:00am – 9:30am; 12:15pm – 1:15pm
Friday: 9:00am – 11:00am; 12:15pm – 1:15pm
or by appointment

Textbook

Excursions in Modern Mathematics (9th ed.) by Peter Tannenbaum.

Blackboard

This course has an associated Blackboard page where you will have access to daily assignments, class notes, class handouts, and grades.

Course Content

Refer to the attached Student Learning Outcomes and Content sheet for information on the topics covered in this course.

Grading System

The final average will be determined according to the weights in the table that follows.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Date</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam I</td>
<td>Feb 7 (Thurs)</td>
<td>20%</td>
</tr>
<tr>
<td>Exam II</td>
<td>March 7 (Thurs)</td>
<td>20%</td>
</tr>
<tr>
<td>Exam III</td>
<td>April 11 (Thurs)</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>May 7 (Tues)</td>
<td>20%</td>
</tr>
<tr>
<td>Homework</td>
<td>Most Days</td>
<td>20%</td>
</tr>
</tbody>
</table>

Grading Policy

To determine the average needed to ensure that you obtain the grade that you want in this course, consult the table that follows.

<table>
<thead>
<tr>
<th>Average</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>89.5 and above</td>
<td>A</td>
</tr>
<tr>
<td>79.5 to 89.5</td>
<td>B</td>
</tr>
<tr>
<td>69.5 to 79.5</td>
<td>C</td>
</tr>
<tr>
<td>59.5 to 69.5</td>
<td>D</td>
</tr>
<tr>
<td>below 59.5</td>
<td>F</td>
</tr>
</tbody>
</table>
Exams
- There will be three mid-semester exams scheduled as shown above, which will account for 60% of your final grade. Each mid-semester exam will account for 20% of your final grade.
- In addition to these exams, there will be a non-comprehensive Final Exam on Tuesday, May 7th from 10:30 a.m. – 12:30 p.m. The Final Exam will account for 20% of your final grade.
- If you miss an exam, it is your responsibility to contact me immediately.

Homework Policy
- Homework sets will be assigned almost every day and will consist of exercises from the textbook and/or handouts. The Homework Guidelines for Written Homework included in this syllabus must be followed.
- Homework is due at the beginning of class and no late homework will be accepted. If you have trouble completing an assignment, see me for assistance before it is due.
- The lowest 2 homework grades will be dropped at the end of the semester when determining the homework average.

Homework Guidelines for Written Homework
- Use standard size paper with clean edges (no spiral paper).
- Write legibly in pencil. Clearly indicate the page number, problem number, and show all work in an organized manner. If your answer cannot be read, it will be counted wrong. Your homework assignment should not look like scratch paper.
- Box and/or highlight answers.
- You can use both sides of the paper. Staple your assignment before folding it vertically.
- Fold your homework in half vertically with your name and row number visible on the outside.

Attendance
- Attendance will be taken daily.
- Absences are reported to the administration and play an important role in suspension considerations.

Expectations of Students
YOU are expected to:
- Attend class consistently and in a timely manner.
- Foster a learning environment by practicing common courtesy at all times.
- Pay attention fully during class – remove distractions by keeping cell phones and other electronics silenced and out of sight.
- Complete each assignment by the specified due date.
- Maintain academic honesty.
- Work outside of class on homework and review materials to master concepts and adequately prepare for exams.
- Utilize, as needed, all available study-aid options (including visiting the math lab, meeting with the instructor, etc.) to resolve questions.
Drop Date
Thursday, March 28, 2019 is the last day to drop a course with a W or withdraw from ASU.

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/Title IX Coordinator
Mayer Administration Building, Room 220
325-942-2022
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. The full details can be found in ASU Operating Policy OP 10.19 Observance of Religious Holy Days.

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 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 to 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:
  o Angelo State University Student Handbook
  o Angelo State University Catalog

• In the event that the university is closed for a scheduled class time, whatever was scheduled for that day and/or whatever was due that day will be scheduled and/or due on the next scheduled class time.

• All electronic correspondence will be sent to your ASU e-mail account unless other arrangements are made.

• Feel free to come by my office at any time for help. I will definitely be near my office during my office hours (or there will be a note telling you when I will be back). If my office hours are not convenient for you, meet with me to arrange for another time that is more convenient.

• Good luck. I sincerely hope you do well in this course, and I strongly encourage you to use me as a resource outside of class to help you succeed
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

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.
Anticipated Schedule

The schedule listed below is tentative and subject to change. For updated information about course topics contact the instructor or see Blackboard.

<table>
<thead>
<tr>
<th>Week</th>
<th>Materials Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Syllabus, Basic Elements of an Election, Preference Schedules, Voting Methods</td>
</tr>
<tr>
<td>2</td>
<td>Voting Methods, Weighted Voting, Banzoff Power</td>
</tr>
<tr>
<td>3</td>
<td>Fair Division, Voting Review, Sealed Bids</td>
</tr>
<tr>
<td>4</td>
<td>Apportionment, Exam 1</td>
</tr>
<tr>
<td>5</td>
<td>Hamilton’s Method, Street-Routing Problems, Introduction to Graph Theory</td>
</tr>
<tr>
<td>6</td>
<td>Euler’s Theorem, Eulerizing Graphs, Traveling Salesman Problem</td>
</tr>
<tr>
<td>7</td>
<td>Hamilton Paths and Circuits, Brute Force Algorithm, Nearest Neighbor Algorithm</td>
</tr>
<tr>
<td>8</td>
<td>Networks, Exam 2</td>
</tr>
<tr>
<td>9</td>
<td>Spanning Trees, Kruskal’s Algorithm, Math of Finance</td>
</tr>
<tr>
<td>10</td>
<td>Math of Finance, Rigid Motion</td>
</tr>
<tr>
<td>11</td>
<td>Math of Finance, Exam 3</td>
</tr>
<tr>
<td>12</td>
<td>Math of Finance, Exam 3</td>
</tr>
<tr>
<td>13</td>
<td>Advanced Rigid Motions, Frequency Tables, Graphs and Charts</td>
</tr>
<tr>
<td>14</td>
<td>Statistics, Future Value Annuities</td>
</tr>
<tr>
<td>15</td>
<td>Probability, Review</td>
</tr>
<tr>
<td>16</td>
<td>FINAL EXAM</td>
</tr>
</tbody>
</table>

All items contained in this syllabus are subject to change as the semester progresses. Students will be notified in advance of any changes.

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1 Blackboard Link: [http://blackboard.angelo.edu](http://blackboard.angelo.edu)
2 Observance of Religious Holy Days: [http://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of](http://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of)
3 Grading Procedures: [http://www.angelo.edu/content/files/14197-op-1011-grading-procedures](http://www.angelo.edu/content/files/14197-op-1011-grading-procedures)
5 ASU Writing Center: [http://www.angelo.edu/dept/writing_center/academic_honesty.php](http://www.angelo.edu/dept/writing_center/academic_honesty.php)
7 University Catalog: [http://www.angelo.edu/catalogs/](http://www.angelo.edu/catalogs/)