MATH 3300-010
INTRODUCTION TO
ABSTRACT MATHEMATICS

Instructor: Dr. Simon Pfeil
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Office: MCS 219C

Office Hours: MWF: 1pm – 3pm
TR: 10am – 11am and 1pm – 2pm
…or by appointment via email.

Course Information

Course Description
Logic, set operations, equivalence relations, properties of the real number system, cardinality of sets, and related topics, with an emphasis throughout on developing the necessary skills to read and construct formal mathematical arguments.

Prerequisite and Co-requisite Courses
MATH 2413.

Prerequisite Skills
The most important prerequisite skills are perseverance and the willingness to seek help when it is needed. Also, some college level mathematics and the ability to navigate Google and Blackboard for information and supplemental materials will be useful.

Student Learning Outcomes
Upon completion of this course:

- Students will demonstrate factual knowledge of the mathematical notation and terminology used in this course. Students will demonstrate the ability to read, interpret, and use the vocabulary and symbolism of propositional calculus, proof methods, set theory, functions, cardinality, and discrete structures.
• **Students will demonstrate knowledge of fundamental methods of proof and problem solving.** Students will demonstrate the ability to read and comprehend mathematical arguments utilizing direct and indirect proof, case analysis, and mathematical induction.

• **Students will apply course material along with techniques and procedures covered in this course to prove theorems and solve problems.** Students will use the knowledge gained in this course to determine appropriate methods of proof for specific problems and to develop and write formal mathematical arguments.

• **Students will develop specific skills, competencies, and thought processes sufficient to support further study or work in this field or related fields.** Students will acquire proficiency in the fundamental concepts of set theory, logic, functions, properties of the real number system, and methods of proof, at a level necessary for more advanced mathematics courses such as linear and abstract algebra, real and complex analysis, and topology.

**Course Delivery**

This is a face-to-face course with learning resources and supplemental materials posted in Blackboard.

**Required Texts and Materials**

*Proofs and Concepts: the fundamentals of abstract mathematics, v0.92* by Dave Witte Morris and Joy Morris.

A packet will be provided via Blackboard outlining the course content and exercises.

**Technology Requirements**

To successfully complete this course, students need to access course materials via Blackboard.

**Communication**

Email is a great way to contact me. I will respond to email and/or telephone messages within 24 hours during working hours Monday through Friday. Weekend messages may not be returned until Monday.

**Written communication via email:** All private communication will be done exclusively through your ASU email address. Check frequently for announcements and policy changes. In your emails to faculty, include the course name and section number in your subject line.
Grading

Evaluation and Grades
Course grades will be determined as indicated in the table below.

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Percent of Total Grade</th>
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<tbody>
<tr>
<td>Three in-class exams</td>
<td>70</td>
</tr>
<tr>
<td>Homework</td>
<td>25</td>
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<tr>
<td>Classroom participation</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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</table>

Grading System
Course grades will be dependent upon completing course requirements and meeting the student learning outcomes.

The following grading scale is in use for this course:
- A = 90.00-100 points
- B = 80.00-89.99 points
- C = 70.00-79.99 points
- D = 60.00-69.99 points
- F = 0-59.99 points (Grades are not rounded up)

Assignment and Activity Descriptions
The final grade in the course will consist of the weighted sums of homework scores, classroom participation points, and three in-class exams. The third in-class exam will be given during our final exam time but will not be cumulative. The two highest exam scores will be weighted at 25% of the final score, and the lowest exam will be weighted at 20% of the final score.

Classroom Participation: Each student is expected to be present in class each day and to participate in classroom and group discussion. Sufficient lack of participation may be considered as an absence, according to the instructor’s judgement.

Submission Information: Homework will always be due at the beginning of the class after which it was assigned. There is a five-minute grace period from the beginning of class during which homework may be submitted. All homework submitted after the grace period will be considered late.
Policy on Late Work: Late homework will not be accepted for credit.

Missed Assignments: Missed assignments cannot be submitted for credit, barring exceptional circumstances or university approved absences. A student is afforded three absences without penalty to their grade. A student’s two least homework scores will be dropped.

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

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 university’s Statement of Academic Integrity.

Accommodations for Students with Disabilities
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.

The employee charged with the responsibility of reviewing and authorizing accommodation requests is:
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.

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. This includes the ideas of your peer collaborators.

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. See ASU Operating Policy 10.19 Student Absence for Observance of Religious Holy Day for more information.

Title IX at Angelo State University
The University prohibits discrimination based on sex, which includes pregnancy, sexual orientation, gender identity, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination including: sexual assault, sex-based discrimination, sexual exploitation, sexual harassment, public indecency, interpersonal violence (domestic violence and/or dating violence), and stalking. As a faculty member, I am a Responsible Employee meaning that I am obligated by law and ASU policy to report any allegations I am notified of to the Office of Title IX Compliance.
Students are encouraged to report any incidents of sexual misconduct directly to ASU’s Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator at:

Michelle Boone, J.D.
Director of Title IX Compliance/Title IX Coordinator
Mayer Administration Building, Room 210
325-942-2022
michelle.boone@angelo.edu

You may also file a report online 24/7 at www.angelo.edu/incident-form.

If you are wishing to speak to someone about an incident in confidence you may contact the University Health Clinic and Counseling Center at 325-942-2173 or the ASU Crisis Helpline at 325-486-6345.

For more information about Title IX in general you may visit www.angelo.edu/title-ix.

Course Schedule (Tentative)

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic or Activity</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Introduction, Logic and Deduction</td>
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<tr>
<td>Week 2</td>
<td>Propositional Logic and Truth Tables</td>
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<td>Week 3</td>
<td>Two Column Proofs</td>
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<td>Week 4</td>
<td>Contradiction, Set Theory</td>
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<td>Week 5</td>
<td>Set Theory, Review, EXAM 1 on Feb. 14th</td>
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<td>Week 6</td>
<td>Power Set, Quantification, Negation</td>
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<td>Week 7</td>
<td>Counterexamples, Proofs using Quantifiers</td>
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<td>Week 8</td>
<td>Functions</td>
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<td>Week 9</td>
<td>SPRING BREAK: No Class</td>
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<td>Week 10</td>
<td>Bijections</td>
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<td>Week 11</td>
<td>Function Proofs, Inverse Functions</td>
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<tr>
<td>Week 12</td>
<td>Function Composition, Review, EXAM 2 on Apr. 4th</td>
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<tr>
<td>Week 13</td>
<td>Cardinality</td>
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<td>Week 14</td>
<td>Divisibility and Congruence</td>
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<td>Week 15</td>
<td>Infinite Sets and Countability</td>
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<tr>
<td>Week 16</td>
<td>Cantor’s Theorem, Collections of Sets, Review (DEAD WEEK)</td>
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<tr>
<td>Week 17</td>
<td>EXAM 3 on Monday from 10:30am – 12:30pm</td>
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1 https://www.angelo.edu/student-handbook/