

MATH 3300-010

Intro. to Abstract Mathematics

MWF: 1:00pm - 1:50pm, MCS 216



Instructor: Dr. Simon Pfeil

Email: simon.pfeil@angelo.edu

Phone: (325) 486-5436

Office: MCS 219C

Office Hours:

Monday 2:00pm – 3:00pm

Tuesday 8:30am – 9:30am and 11:00am – 3:00pm

Wednesday 2:00pm – 3:00 pm

Thursday 8:30am – 9:30am

Friday 9:00am – 10:00am and 2:00pm – 3:00pm

...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 online components that students are expected to access in Blackboard.¹

Required Texts and Materials

Proofs and Concepts: the fundamentals of abstract mathematics, v0.92 by Dave Witte Morris and Joy Morris. This will be provided via pdf in Blackboard.

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

Technology Requirements

To successfully complete this course, students will need to be able to access Blackboard. Students must also have access to a webcam and computer microphone to attend online office hours.

If the course transitions to online delivery, Blackboard Collaborate will be used to provide lectures. Interaction with the lecture will require a microphone or webcam.

Communication

Faculty 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.

Virtual communication: Office hours and/or advising may be done with the assistance of the telephone, Collaborate, etc.

Grading

Evaluation and Grades

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

Assessment	Percent of Total Grade
Three in-class exams	65
Homework	30
Attendance	5
Final Presentation	+ or – one letter grade
Total	100%

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, three in-class exams, and a final presentation. 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 15% 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.

The final presentation will be held in class on Wednesday, May 11 from 1:00pm – 3:00pm. It will not be an exam, but rather a group poster presentation. Groups will be chosen and topics will be assigned mid-semester.

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](#)²
- [Angelo State University Catalog](#)³

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](#)⁴ (Page 97).

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 Hart 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](#).⁵ The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dr. Dallas Swafford
Director of Student Disability Services
Office of Student Affairs
325-942-2047
dallas.swafford@angelo.edu
Houston Hart University Center, Room 112

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](#)⁶ for more information.

Plagiarism

Plagiarism is a serious topic covered in ASU's [Academic Integrity Statement](#)⁷ 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. Resources to help you understand this policy better are available at the [ASU Writing Center](#).⁸

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](#)⁹ for more information.

Title IX at Angelo State University

Angelo State University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from sex discrimination of any kind. In accordance with Title VII, Title IX, the Violence Against Women Act (VAWA), the Campus Sexual Violence Elimination Act (SaVE), and other federal and state laws, the University prohibits discrimination based on sex, which includes pregnancy, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination and unwelcome behavior of a sexual nature. The term includes sexual harassment, nonconsensual sexual contact, nonconsensual sexual intercourse, sexual assault, sexual exploitation, stalking, public indecency, interpersonal violence (domestic violence or dating violence), sexual violence, and any other misconduct based on sex.

You are encouraged to report any incidents involving sexual misconduct to the Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator, Michelle Miller, J.D. You may submit reports in the following manner:

Online: [Incident Reporting Form](#)¹⁰

Face to Face: Mayer Administration Building, Room 210

Phone: 325-942-2022

Email: michelle.miller@angelo.edu

Note, as a faculty member at Angelo State, I am a mandatory reporter and must report incidents involving sexual misconduct to the Title IX Coordinator. Should you wish to speak to someone in confidence about an issue, you may contact the University Counseling Center (325-942-2371), the 24-Hour Crisis Helpline (325-486-6345), or the University Health Clinic (325-942-2171).

For more information about resources related to sexual misconduct, Title IX, or Angelo State's policy please visit the [Title IX website](#).¹¹

Information About COVID-19

Please refer to ASU's [COVID-19 \(Coronavirus\) Updates](#)¹² web page for current information about campus guidelines and safety standards as they relate to the COVID-19 pandemic.

Modifications to the Syllabus

This syllabus, including grade evaluation and course schedule, is subject to modification on potentially short notice based on developing circumstances.

Course Schedule (Tentative)

Week	Topic or Activity
Week 1	Introduction, Logic and Deduction
Week 2	Propositional Logic and Truth Tables
Week 3	Two Column Proofs
Week 4	Contradiction, Set Theory, Exam 1
Week 5	Set Theory
Week 6	Power Set, Quantification, Negation
Week 7	Counterexamples, Proofs using Quantifiers
Week 8	Functions
Week 9	Bijections, Exam 2
Week 10	Function Proofs, Inverse Functions
Week 11	Function Composition
Week 12	Cardinality
Week 13	Divisibility and Congruence
Week 14	Infinite Sets and Countability, Exam 3
Week 15	Cantor's Theorem, Collections of Sets
Week 16	Final Presentation on Wednesday, from 1:00pm – 3:00pm

¹ <https://blackboard.angelo.edu/>

² <https://www.angelo.edu/current-students/student-handbook/>

³ <https://www.angelo.edu/academics/catalog/>

⁴ <https://www.angelo.edu/live/files/27603-student-handbook-2020-21#page=97>

⁵ <https://www.angelo.edu/current-students/disability-services/>

⁶ <https://angelo.policystat.com/policy/10659448/latest/>

⁷ <https://www.angelo.edu/live/files/27603-student-handbook-2020-21#page=97>

⁸ https://www.angelo.edu/current-students/writing-center/academic_honesty.php

⁹ <https://angelo.policystat.com/policy/10659368/latest/>

¹⁰ <https://www.angelo.edu/incident-form>

¹¹ <https://www.angelo.edu/title-ix>

¹² <https://www.angelo.edu/covid-19/>