Math 6305.D10
Foundations of Math for Educators

Instructor: Dr. Susan Abernathy-Taylor
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Office: MCS 220i

Office Hours: MW 10am-1pm, TR 2-4pm. All office hours will be held online through Blackboard Collaborate. Links can be found in Blackboard.

Course Information

Course Description

This course is a survey of ideas from the foundations of mathematics. Topics will include propositional logic, quantifiers, naive set theory and paradoxes, functions, infinite sets and cardinals, well-ordered sets, and the axiom of choice.

Prerequisite and Co-requisite Courses

- Bachelors degree in mathematics
- General mathematical maturity

Course Delivery

This is an online course that will be delivered via Blackboard. If you choose, you can complete the course without visiting ASU’s campus. There are no class meetings.

Required Texts and Materials

How to Prove It: A Structured Approach (3rd edition) by Daniel J. Velleman

Note: You need the actual third edition. Exercises and sections from previous editions do not necessarily match the third edition.
Technology Requirements

Required:

- A computer (desktop/laptop) or mobile device (phone/tablet) that can access the internet.
- Access to a stable internet connection.
- Speakers/earbuds/headphones for listening to videos.
- Internet browsing software (such as Mozilla Firefox\textsuperscript{1} or Google Chrome\textsuperscript{2}).
- PDF-viewing software (such as Adobe Acrobat Reader\textsuperscript{3}).
- Device with a microphone for chatting with the professor during online office hours and Oral Exams through Blackboard Collaborate (a phone is fine).

Communication

Faculty will usually respond to email and/or telephone messages within 24 hours during working hours Monday through Friday. Weekend messages may not be returned until the next work day.

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.

Student Responsibilities and Tips for Success:

- Maintain academic honesty. Don’t cheat.
- Be prepared to devote time to this class – if this class were in-person, you would spend three hours a week in class, plus extra to work on homework.
- Keep up with due dates. All homework due dates and test dates are set from the time they are posted in Bb. Make a calendar or set reminders on your phone.
- Take notes as if you were in class while watching videos and reading the book.
- Organize your notes in a notebook or binder.
- Be proactive about your grade in this course. You are not given a grade in a graduate course; you EARN your grade, based on completion of the course requirements and how well you demonstrate your understanding of the material to the professor. You may want or need a particular grade to graduate, maintain a scholarship, etc. \textbf{It is your responsibility to put in as much effort as it takes to earn your desired grade.}

Grading

Grading System

Your grade will be determined by your performance on written assignments and two oral exams. The assignments may vary in nature - some will be typical problem-based assignments from the textbook, and some will be writing assignments. They will
account for 70% of your overall grade. The oral exams will be conducted individually via Blackboard Collaborate and will each account for 15% of your total overall grade.

The following grading scale is in use for this course:

- A = 89.5-100 points
- B = 79.5-89.49 points
- C = 69.5-79.49 points
- D = 59.5-69.49 points
- F = 0-59.49 points

**Oral Exams**

Oral exams will be conducted over video conferencing software such as Blackboard Collaborate or Zoom. You are NOT required to use video, but you will need to use audio. Oral exams will give you a chance to demonstrate your knowledge of the material by answering specific questions, discussing your past homework assignments, etc. You can expect Oral Exam 1 to take place during Week 8 of the semester (March 15-19) and Oral Exam 2 to take place during Finals Week (May 10-13). More detailed information and a list of pre-determined questions will be posted in Blackboard as exam time nears.

**Homework Assignments**

Homework will be assigned and turned in through Blackboard. Writing assignments will be submitted via TurnItIn. More information on specific assignments and due dates can be found in Blackboard.

**Course Schedule**

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

Week 1 – Orientation, Introductory assignments
Week 2 – Textbook intro and logic puzzles
Week 3 – Deductive reasoning and logical connectives
Week 4 – Set theory
Week 5 – Conditionals and biconditionals
Week 6 – Quantifiers
Week 7 – More set theory and quantifiers
Week 8 – Proofs, Oral Exam 1
Week 9 – Proofs
Week 10 – Relations
Week 11 – Functions
Week 12 – More functions
Week 13 – Infinity
Week 14 – More infinity, Continuum Hypothesis
Week 15 – Axiom of Choice
Week 16 – Oral Exam 2

Student Learning Outcomes

1. Students will demonstrate factual knowledge including the mathematical notation and terminology used in this course. Students will demonstrate the ability to read, interpret, and use the vocabulary, symbolism, and basic definitions of foundations of mathematics, including logical connectives, quantifiers, set theory, and functions.

2. Students will describe the fundamental principles including the laws and theorems arising from concepts covered in this course. Students will be able to identify and use theorems from logic and set theory. Students will demonstrate an understanding of the Continuum Hypothesis and the Axiom of Choice.

3. Students will apply course material along with procedures and techniques covered in this course to solve problems. Students will apply definitions, theorems, and techniques from logic, set theory, and functions to solve problems in logic and set theory including cardinality.

4. Students will develop specific skills, competencies, and thought processes sufficient to support further study or work in the field of education. Students will acquire a level of proficiency in the fundamental concepts and applications necessary for further study or teaching mathematics.

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

Required Use of Masks/Facial Coverings by Students

As a member of the Texas Tech University System, Angelo State University has adopted the mandatory Facial Covering Policy to ensure a safe and healthy classroom experience. Current research on the COVID-19 virus suggests there is a significant reduction in the potential for transmission of the virus from person to person by wearing a mask/facial covering that covers the nose and mouth areas. Therefore, in compliance with the university policy students in this class are required to wear a mask/facial covering before, during, and after class. Faculty members may also ask you to display your daily screening badge as a prerequisite to enter the classroom. You are also asked to maintain safe distancing practices to the best of your ability. For the safety of everyone, any student not appropriately wearing a mask/facial covering will be asked to
leave the classroom immediately. The student will be responsible to make up any missed class content or work. Continued non-compliance with the Texas Tech University System Policy may result in disciplinary action through the Office of Student Conduct.

**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](mailto: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:

Dallas Swafford  
Director of Student Disability Services  
Office of Student Affairs  
325-942-2047  
dallas.swafford@angelo.edu  
Houston Harte 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](#) 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 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](#).

**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 Miller, J.D.
Special Assistant to the President and Title IX Coordinator
Mayer Administration Building, Room 210
325-486-6357
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.

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i Mozilla Firefox browser: https://www.mozilla.org/en-US/firefox/new/
ii Google Chrome browser: https://www.google.com/chrome/
iii Adobe Acrobat Reader: https://get.adobe.com/reader/
iv https://www.angelo.edu/current-students/student-handbook/
v https://www.angelo.edu/academics/catalog/
vi http://www.texastech.edu/downloads/ttus-policy-face-coverings.pdf
viii https://www.angelo.edu/current-students/disability-services/
ix https://www.angelo.edu/content/files/14197-op-1011-grading-procedures
x https://www.angelo.edu/live/files/27603-student-handbook-2020-21#page=96
xi https://www.angelo.edu/current-students/writing-center/academic_honesty.php
xii https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of