Instructor Information

**Instructor:** Dr. Susan Abernathy-Taylor  
**Office:** MCS 220i  
**Phone:** 325.486.5442  
**Office Hours:** MW: 8:30-9:00, 11:30-1:00, 2:30-3:30; TR: 3:15-4:30; F: 8:30-9:00, 11:30-12:30; 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  
- susan.taylor@angelo.edu  
- staylor28@angelo.edu

Class Time/Location

MWF 1:00-1:50pm in MCS 214

Textbook

*Discrete Mathematics: Lecture Notes, Yale University*, by Lovász, Pelikan, and Vesztergombi. Selected sections from Chapters 1-15 will be covered.

Grading System

Your grade in this class will be determined by your performance on three in-class exams, written homework, and a cumulative final exam.  
- Tests: 60%  
- Homework: 20%  
- Final Exam: 20%

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).

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, email the instructor.

Attendance

Students are expected to attend every class. Attendance will be taken daily, and excessive absences will be reported to the appropriate university authorities.

Homework

Homework will be assigned at least once a week. **Late homework will not be accepted.** If you know you will miss class, you may turn in your homework early. Your homework must be neat and legible, and you must show your work to receive credit. Your lowest two homework grades will be dropped.

Tests

There will be three in-class exams as well as a cumulative final exam. Tentative exam dates are listed below. In general, calculators will not be allowed during exams.  
- Test 1: Wednesday, February 13  
- Test 2: Friday, March 22  
- Test 3: Wednesday, April 24  
- Final Exam: Wednesday, May 8, 1:00-3:00pm
Make-up Policy
If you have a conflict with a test, you must talk to me about it beforehand if possible. If you miss one test, your final exam grade will replace the test grade. You will receive a grade of zero on any subsequent missed tests. Make-up exams will be given (or not) at the discretion of the instructor.

How to Get Help
You can get help the following ways:

- **Office Hours:** Ten hours of my week are set aside as office hours, when I will be in or near my office for the specific purpose of helping students. These times are listed on the first page of this syllabus. I am also potentially available at other times by appointment; email me to set up a time if you cannot meet during office hours.
- **Email:** Feel free to email me at any time with questions. I will respond as soon as possible, usually within 24 hours during the week and 48 hours on the weekend.
- **Math Lab:** Offers free help to mathematics students. It’s located on the third floor of the library (C302) and hours of operation are:
  - Monday-Thursday: 9am-8pm
  - Friday: 9am-12pm
  - Sunday: 4pm-8pm

Student Responsibilities
The student is solely responsible for:

- **Maintaining academic honesty.**
- **Completing each assignment by the specified due date.**
- **Obtaining assignments and other materials for classes missed.**
- **Positively contributing to the classroom environment.** Be courteous; don’t use your phone in class; be on time; don’t disrupt your fellow classmates.
- **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 textbooks, 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.

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 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. Sex discrimination, sexual misconduct, public indecency, interpersonal violence, sexual assault, sexual exploitation, sexual harassment, and stalking are not tolerated at ASU. As a faculty member, I am a Responsible Employee meaning that I will report any allegations I am notified of to the Office of Title IX Compliance in order to connect students with resources and options in addressing the allegations reported. You are encouraged to report any incidents to ASU’s Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator. You may do so by contacting:

Michelle Boone, J.D.  
Director of Title IX Compliance/Title IX Coordinator  
Mayer Administration Building, Room 200  
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.

The Office of Title IX Compliance also provides accommodations related to pregnancy (such as communicating with your professors regarding medically necessary absences, modifications required because of pregnancy, etc.). If you are pregnant and need assistance or accommodations, please contact the Office of Title IX Compliance utilizing the information above.

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

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 of 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:
- Angelo State University Student Handbook
- Angelo State University Catalog

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

1. Syllabus, Set Theory
2. Set theory
3. Set theory
4. Counting
5. Counting
6. Counting applications
7. Counting applications, Induction
8. Induction
9. Induction
10. Fibonacci sequence
11. Fibonacci sequence, Golden Ratio
12. Review
13. Test 1 (2/13)
14. Arithmetic Sequences
15. Geometric Sequences
16. Probability
17. Probability
18. Probability
19. Probability functions
20. Probability functions
21. Expectation and variance
22. Divisibility
23. Divisibility
24. Fundamental Theorem of Arithmetic
25. Review
26. Test 2 (3/22)
27. Euclidean Algorithm
28. Intro to Graph Theory
Mathematics 2305 – Discrete Mathematics I

Student Learning Outcomes

1. **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 methods related to weak and strong induction, algorithms, set theory, combinatorics, probability, and graph theory.

2. **Students will demonstrate knowledge of fundamental principles used in counting and problem solving.** Students will demonstrate the ability to read and comprehend combinatoric methods applied to problems in probability and counting. Students will also demonstrate the ability to apply combinatoric methods as well as weak and strong induction to develop algorithms and basic mathematical proofs.

3. **Students will apply course material along with techniques and procedures covered in this course to solve problems.** Students will use the knowledge gained in this course to determine appropriate techniques for specific problems in probability and graph theory and to develop and apply algorithms to those problems.

4. **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 graph theory, induction, probability, and combinatorics, at a level necessary for more advanced mathematics courses such as Discrete Mathematics 2, and Probability & Statistics.

Course Content


Ch1, Let’s Count Sets and Subsets, Sequences, Permutations.
Ch. 2, Combinatorial Tools Induction, Inclusion-Exclusion.
Ch. 3, Binomial Coefficients and Pascal’s Triangle Binomial Theorem.
Ch. 4, Fibonacci Numbers Identities, A formula for the Fibonacci numbers.
Ch. 6, Integers, Divisors, and Primes: Divisibility, The history of the primes, Factorization, Fermat’s Little Theorem, The Euclidean Algorithm, Primality testing.
Ch. 7, Graphs Paths and cycles, Hamilton Circuits.
Ch. 8, Trees How many trees are there? How to store a tree.
Ch. 9, Finding the Optimum Minimal spanning trees.
Ch. 10, Matchings in Graphs Matching Theorems.
Ch. 11, Combinatorics in Geometry Intersections, Counting Regions.
Ch. 12, Euler’s Formula Planar Graphs, Formula for Polyhedra.
Ch. 13, Coloring Maps and Graphs Four Color Theorem.
Ch. 14, Finite Geometries Finite Affine and Projective Planes.
Ch. 15, Cryptography Clasical Cryptography, Public Key Cryptography.
Additional Topics; Arithmetic and Geometric Sequences

i Observance of Religious Holy Days: http://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of
ii Grading Procedures: http://www.angelo.edu/content/files/14197-op-1011-grading-procedures
iii Academic Integrity: http://www.angelo.edu/student-handbook/community-policies/academic-integrity.php
iv ASU Writing Center: http://www.angelo.edu/dept/writing_center/academic_honesty.php
v University Catalog: http://www.angelo.edu/catalogs/