

Math 2305

Discrete Mathematics

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Office: MCS 209

Office Hours: MWF 10-11 AM, also 12 noon to 1PM ;T-Tr 9-11AM
or by appointment.

Course Information

Textbook

Discrete Mathematics:Elementary and Beyond by L. Lovász and K. Vesztergombi
ISBN 0-387-95585-2.

Assignments

You will be assigned daily homework assignments which are generally due the next class day. I will not accept late assignments; however, I will drop two of your lowest homework grades. If you miss a test (an excused absence) I will replace the missing test grade with the final exam grade. I will only do this for one exam. Any other missing exams will be given a zero grade. All exams are in class exams with no notes. Exam dates are: Feb 10, Mar 10 ,Apr 14, and the final on May 12. The final exam is mandatory.

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Class rules

This class is a face to face class, supplementary material will be posted in BlackBoard.

I keep a record of student attendance but your grade is not directly affected by absences, lateness, etc. Also, no cell phone use or eating is allowed in class.

Grading

Evaluation and Grades

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

Assessment	Percent of Total Grade
homework	20
EXAMS	80
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)

General Policies Related to This Course

All students are required to follow the policies and procedures presented in these documents:

- [Angelo State University Student Handbookⁱ](#)
- [Angelo State University Catalogⁱⁱ](#)

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: <https://www.angelo.edu/live/files/27603-student-handbook-2020-21#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 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](#).ⁱⁱⁱ 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](#)^{iv} for more information.

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](#)^v 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](#)^{vi}
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](#).^{vii}

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.

Information About COVID-19

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

Course Schedule

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

Course Content

Ch 1 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. 5, Combinatorial Probability Events and Probabilities, Independence, The Law of Large 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 Classical Cryptography, Public Key Cryptography.

Additional Topics; Arithmetic and Geometric Sequences

Schedule (subject to revision)

In particular, the COVID-19 pandemic may require significant changes in course delivery and content on potentially short notice.

Topic

Set Theory

Set Theory

Counting

Counting

Counting Applications

Induction

Induction

The Fibonacci Sequence

The Golden Ratio

Arithmetic Sequences

Geometric Sequences

Introduction to Probability

Test 1

Combinatorial Probability

Combinatorial Probability

Conditional Probability

The Law of Large Numbers

Probability Mass Functions

Cumulative Distribution Functions

Expectation and Variance

Divisibility

The Fundamental Theorem of Arithmetic

The Euclidean Algorithm

Test 2

Introduction to Graph Theory

Euler's Theorem

subgraphs

Trees

Trees

Graph Optimization Problems

Optimization (cont.)

Test 3

Bipartite Graphs

Graph Coloring

Modular Arithmetic

Affine Codes

RSA Public Encryption

Final Exam

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- i <https://www.angelo.edu/student-handbook/>
 - ii <https://www.angelo.edu/catalogs/>
 - iii <https://www.angelo.edu/services/disability-services/>
 - iv <https://www.angelo.edu/content/files/14197-op-1011-grading-procedures>
 - v <https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of>
 - vi <https://www.angelo.edu/incident-form>
 - vii <https://www.angelo.edu/title-ix>
 - viii <https://www.angelo.edu/covid-19/>