Syllabus MATH 2305(Discrete Math) Fall 2017

Instructor: Mario Barrientos
Office: MCS 209
Phone (325) 486-5427
Email: mario.barrientos@angelo.edu

**Office Hours:** M-F 10AM-11AM, also T-TR 9-11AM and 1-2PM or by appointment.

**Grading**

Homework: 10% of your grade  
Quizzes: 10% of your grade  
Exams: 80% of your grade (there will be four exams, each 20% of your total grade).

**Grade Determination Criteria:**

90-100 A; 80-89 B; 70-79 C; 60-69 D; 59 or below F

**Attendance**

I keep a record of student attendance but your grade is not directly affected by absences, lateness, etc.

**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. Exam dates are: Sep 19, Oct 17, Nov 14, and the final on Dec 12. Final exam is mandatory.

**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**

Angelo State University is committed to the safety and security of all students. If you or someone you know experience sexual harassment, sexual assault, domestic or dating violence, stalking, or discrimination, you may contact ASU’s Title IX Coordinator:
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. ([http://www.angelo.edu/opmanual/ -- OP 10.19](http://www.angelo.edu/opmanual/ -- OP 10.19))

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 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. ([http://www.angelo.edu/opmanual/ -- OP 10.19](http://www.angelo.edu/opmanual/ -- OP 10.19))

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

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


Ch 1, *Let’s Count* Sets and Subsets, Sequences, Permutations.


Ch. 3, *Binomial Coefficients and Pascal’s Triangle* Binomial Theorem.

Ch. 4, *Fibonacci Numbers* Identities, A formula for the Fibonacci numbers.


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
<table>
<thead>
<tr>
<th>Topic</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Theory</td>
<td>Expectation and Variance</td>
</tr>
<tr>
<td>Set Theory</td>
<td>Divisibility</td>
</tr>
<tr>
<td>Counting</td>
<td>The Fundamental Theorem of</td>
</tr>
<tr>
<td>Counting</td>
<td>Arithmetic</td>
</tr>
<tr>
<td>Counting Applications</td>
<td>The Euclidean Algorithm</td>
</tr>
<tr>
<td>Induction</td>
<td>Test 2</td>
</tr>
<tr>
<td>The Fibonacci Sequence</td>
<td>Introduction to</td>
</tr>
<tr>
<td>The Golden Ratio</td>
<td>Graph Theory</td>
</tr>
<tr>
<td>Arithmetic Sequences</td>
<td>Euler’s Theorem</td>
</tr>
<tr>
<td>Geometric Sequences</td>
<td>subgraphs</td>
</tr>
<tr>
<td>Introduction to Probability</td>
<td>Trees</td>
</tr>
<tr>
<td>Test 1</td>
<td>Trees</td>
</tr>
<tr>
<td>Combinatorial Probability</td>
<td>Graph Optimization</td>
</tr>
<tr>
<td>Combinatorial Probability</td>
<td>Problems</td>
</tr>
<tr>
<td>Conditional Probability</td>
<td>Optimization (cont.)</td>
</tr>
<tr>
<td>The Law of Large Numbers</td>
<td>Test 3</td>
</tr>
<tr>
<td>Probability Mass Functions</td>
<td>Bipartite Graphs</td>
</tr>
<tr>
<td>Cumulative Distribution</td>
<td>Graph Coloring</td>
</tr>
<tr>
<td>Functions</td>
<td>Modular Arithmetic</td>
</tr>
<tr>
<td></td>
<td>Affine Codes</td>
</tr>
<tr>
<td></td>
<td>RSA Public Encryption</td>
</tr>
<tr>
<td></td>
<td>Final Exam</td>
</tr>
</tbody>
</table>