

ARIZONA WESTERN COLLEGE
SYLLABUS

MAT 227 DISCRETE MATHEMATICS/GE

Credit Hours: 3 Lec 3

PREREQUISITE: MAT 150, 151, or 187

COURSE DESCRIPTION

An introduction to formal proof techniques, propositional logic, set theory, relations and functions, combinatorics, elementary number theory, graph theory, algorithms, and applications

1. COURSE GOAL

Provide the student with the opportunity to use non-continuous approaches (including digital) to solve problems in the areas of mathematics, engineering, and computer science

2. OUTCOMES

Upon satisfactory completion of this course, students will be able to:

- 2.1 construct and evaluate arguments using axioms, definitions, previous theorems, and logical operators and quantifiers in the following kinds of proofs: direct, by contraposition, by contradiction, by case break-up, by inductive methods, and by counterexample
- 2.2 use appropriate logic techniques such as Venn diagrams, logic connectors and quantifiers, binary arithmetic, Boolean algebra, and truth tables
- 2.3 perform operations to solve problems with discrete structures such as sets and their cardinalities, relations (including equivalence relations, partially ordered sets, and recurrence relations), functions (both recursive and closed-form), sequences, and series
- 2.4 construct, program, and prove algorithms, and analyze their order of growth and data structures
- 2.5 understand and apply basic counting principles (including the Pigeonhole Principle, multiplication vs. addition of options, replacement vs. non-replacement, and correcting for double counting) in arrangements, permutations, combinations, and bags
- 2.6 gain proficiency with divisibility tests and their proofs, modular arithmetic and its applications, and prime number concepts (Fundamental Theorem of Arithmetic, greatest common factors, least common multiples, and Diophantine equations)
- 2.7 use graphs (including trees and digraphs) and their matrix representations to visualize problems and understand Turing machines and stochastic processes

3. AWC GENERAL EDUCATION (GE) CATEGORY & CRITERIA

QUANTITATIVE REASONING

- Mathematical, statistical, and/or logical techniques and methods, and then how to use those methods to understand and solve meaningful problems
- How to express quantitative information symbolically, graphically and/or in written or oral language
- How to interpret, analyze and critique information or a line of reasoning
- How to ask critical thinking questions, develop critical thinking skills and mathematical reasoning, and follow logical procedures step by step

4. METHODS OF INSTRUCTION

- 4.1 Lecture style
- 4.2 Visual aid instruction such as overheads, computer and graphing calculator demonstrations
- 4.3 Labs and manipulatives where appropriate
- 4.4 Software applications where appropriate

5. LEARNING ACTIVITIES

- 5.1 Solving problems and applications in the areas of math, science, engineering, and computers
- 5.2 Participation in classroom lectures
- 5.3 Using computers and/or graphing calculators
- 5.4 Projects, reports, labs, and programs where appropriate

6. EVALUATION

Grade may be based on any or all of the following: tests, homework assignments, lab assignments, programs, reports, class participation and a final

7. STUDENT RESPONSIBILITIES

- 7.1 Under AWC Policy, students are expected to attend every session of class in which they are enrolled.
- 7.2 If a student is unable to attend the course or must drop the course for any reason, it will be the responsibility of the student to withdraw from the course. Students who are not attending as of the 45th day of the course may be withdrawn by the instructor. If the student does not withdraw from the course and fails to complete the requirements of the course, the student will receive a failing grade.
- 7.3 Americans with Disabilities Act Accommodations: Arizona Western College provides academic accommodations to students with disabilities through AccessABILITY Resource Services (ARS). ARS provides reasonable and appropriate accommodations to students who have documented disabilities. It is the responsibility of the student to make the ARS Coordinator aware of the need for accommodations in the classroom prior to the beginning of the semester. Students should follow up with their instructors once the semester begins. To make an appointment call the ARS front desk at (928) 344-7674 or ARS Coordinator at (928) 344-7629, in the College Community Center (3C) building, next to Advising.
- 7.4 Academic Integrity: Any student participating in acts of academic dishonesty—including, but not limited to, copying the work of other students, using unauthorized “crib notes”, plagiarism, stealing tests, or forging an instructor’s signature—will be subject to the procedures and consequences outlined in AWC’s Student Code of Conduct.
- 7.5 Texts and Notebooks: Students are required to obtain the class materials for the course.
- 7.6 Arizona Western College students are expected to attend every class session in which they are enrolled. To comply with Federal Financial Aid regulations (34 CFR 668.21), Arizona Western College (AWC) has established an Attendance Verification process for “No Show” reporting during the first 10 days of each semester.
Students who have enrolled but have never attended class may be issued a “No Show” (NS) grade by the professor or instructor and receive a final grade of “NS” on their official academic record. An NS grade may result in a student losing their federal financial aid.
For online classes, *student attendance in an online class is defined as the following* (FSA Handbook, 2012, 5-90):
 - Submitting an academic assignment
 - Taking an exam, an interactive tutorial or computer-assisted instruction
 - Attending a study group that is assigned by the school
 - Participating in an online discussion about academic matters
 - Initiating contact with a faculty member to ask a question about the academic subject studied in the course