NAU NORTHERN ARIZONA UNIVERSITY

Course Title: MAT 226 Discrete Mathematics
Term: Winter 2023
Instructor: TBA
Course Credit: 3
Mode of Instruction: Online

Course Description:

Including topics from number theory and combinatorics with emphasis on problem solving, this course teaches the students techniques in how to think logically and mathematically and apply these techniques in solving problems. To achieve this goal, students will also learn logic and mathematical proofs, sets, functions, algorithms as well as number theory.

Course Prerequisites:

MAT 121 Finite Mathematics With Calculus; MAT 136 - Calculus I; MAT 136H - Calculus I - Honors;

Learning Outcomes:

By the end of the course, the student should be able to:

A. Demonstrate knowledge and understanding of the basic ideas and techniques of discrete mathematics;

B. Develop the ability to read, comprehend, and create mathematical arguments;

C. Know essential concepts in graph theory and related algorithms;

D. Understand the basic concepts in formal languages and computability;

E. Solve various real-world problems by using counting techniques and number theory.

Course Material:

Rosen, Kenneth H, ***Discrete Mathematics and its Applications***, 8th Edition, McGraw-Hill, 2019.

Evaluation:

- 2 Exercises [10%]
- 2 Quizzes [20%]
- Short Essay [15%]
- Mid-term Exam [20%]
- Final Exam [35%]

Description of the Evaluation tasks:

Assignment/ Essay/ ... : During the term, students will be required to finish several evaluation tasks within due date. All the tasks are linked with specific course topics/outcomes and will adequately assess students' competence and learning outcomes. Students are encouraged to meet with instructor about these tasks at any point.

Mid-term/ Final Exams/ Quiz/... : There may be periodic quizzes given at the beginning of lecture sessions; the feedback from these quizzes will monitor the progress of the learners and help to set learning priorities. There will be mid-term exam/ final exam for the course. They are the basic criteria for the evaluation of students' learning outcomes and final grade.

Grading Policy:

Students are supposed to finish each online lecture. Prior to each class, students should finish the required readings. During the class time, students are encouraged to make use of all relevant online course resources and communicate with the instructor. Students' grades are accumulated based on the cumulative evaluations.

Students' letter grade will be assigned according to the following scale:

A+ 90-100	A 85-89	A- 80-84
B+ 77-79	B 73-76	B- 70-72
C+ 67-69	C 63-66	C- 60-62
D+ 57-59	D 53-56	D- 50-52
F < 50		

Academic Integrity:

Students must strictly adhere to the university's academic integrity rule; and all essays, exams and any other form of academic assignments must adhere to these rules. Any form of plagiarism, cheating, or misappropriation of materials will be considered a violation of academic integrity and will be punishable by the university.

Withdrawal from the Course(s):

Students will be able to apply for a transfer or withdrawal within 3 days of the starting date of the course. If a withdrawal is applied for within 3 working days, the tuition fee will be fully refunded. After 3 days, the tuition fee will not be refunded. If a withdrawal is applied for in the first two weeks, it will be recorded as W (Withdraw) on the course transcript. After this initial two-week period, the class will be recorded as F (Fail).

Tentative Schedule:

Week 1	
1	The foundations: logic and proofs
2	Applications of Propositional Logic
3	Proof Methods and Strategy
4	Basic structures: sets, functions, sequences
5	Basic structures: sets, functions, sequences (Cont.) **Exercise 1**

Week 2	
6	Algorithms
7	Number Theory
8	Solving Congruences Applications of Congruences
9	Cryptography
10	Induction and recursion **Quiz 1**
Week 3	
11	Counting
12	Discrete Probability
13	**Mid-term Exam**
14	Advanced counting techniques
15	Relations **Exercise 2**
Week 4	
16	Graphs
17	Graphs (Cont.)
18	Trees
19	Boolean algebra
20	Boolean functions **Quiz 2**
Week 5	
21	Minimization of circuits
22	Modeling computation
23	Finite-State machines with output and no output
24	Turning Machines **Short Essay**
25	**Final Exam**