NAU NORTHERN ARIZONA UNIVERSITY

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

Course Description:

This course covers elementary discrete mathematics for computer science and engineering. It emphasizes mathematical definitions and proofs as well as applicable methods. Topics include formal logic notation, proof methods; induction, well-ordering; sets, relations; elementary graph theory; integer congruences; asymptotic notation and growth of functions; permutations and combinations, and counting principles. In the end of the class, students will learn a set of mathematical facts and how to apply them. Most importantly, students will learn how to think logically and mathematically. To achieve these goals. this course covers mathematical reasoning and how problems are solved in different ways.

Course Prerequisites:

N/A

Learning Outcomes:

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

A. Demonstrate an understanding and apply the concepts and procedures for expressing mathematical ideas clearly, precisely and unambiguously;

B. Apply the logic of quantified statements and the precision of thought and language to achieve a mathematical certainty;

C. Further develop the mathematical concepts and technique which should serve as a preparation for more advanced quantitative courses;

D. Construct functions and apply counting techniques on sets in the context of discrete probability;

E. Apply algorithms and use definitions to solve problems to proof statements in elementary number theory.

Course Material:

Kenneth H. Rosen, ***Discrete Mathematics and Its Applications***, 8rd Edition, 2018.

Evaluation:

- 2 Projects [20%]
- 2 Assignment [20%]
- Mid-term Exam [25%]
- 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:

1	The Foundations: Logic and Proofs
2	Propositional Logic

3	Applications of Propositional Logic
4	Nested Quantifiers
5	Basic Structures: Sets, Functions, Sequences, Sums **Assignment 1**
6	Set Operations
7	Sequence and Summations
8	Algorithms
9	The Growth of Functions
10	Complexity of Algorithms **Project 1**
11	**Midterm Test**
12	Number Theory and Cryptography
13	Divisibility and Modular Arithmetic
14	Primes and Greatest Common Divisors
15	Induction and Recursion **Assignment 2**
16	Mathematical Induction
17	Strong Induction and Well-Ordering
18	Counting
19	Permutations and Combinations
20	Discrete Probability **Project 2**
21	Advanced Counting Techniques
22	Applications of Recurrence Relations
23	Relations and Their Properties
24	Modeling Computations

25	**Final Exam**