

King Saud University
College of Computer and Information Sciences
Department of Computer Science

CSC 281 – Discrete Mathematics for Computer Science (3-0-1) - Core Course

Instructor: Moncef Bouaziz
email: mbouaziz@ksu.edu.sa

Semester: First Semester 2026-2027.

Credit Hours: 3 (3–0–1)
Course Level: 7th level
Prerequisite: MATH151 - STAT 101

Course Description

This course introduces the fundamental discrete structures that form the foundation of computer science. Topics include propositional and predicate logic, proof techniques, sets, relations, functions, number theory, counting methods, and recursion. Emphasis is placed on applications in computer science, such as algorithm analysis and cryptography, and the development of formal reasoning and problem-solving skills.

Course Textbook

Kenneth H. Rosen, Discrete Mathematics and Its Applications, 8th Edition, McGraw-Hill, 2018.
ISBN: 125967651X

Supplementary References:

- Susanna S. Epp, Discrete Mathematics with Applications, 5th Edition, Cengage, 2018
- Richard Johnsonbaugh, Discrete Mathematics, 8th Edition, Pearson, 2020

Course Learning Outcomes (CLOs)

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

1. Apply propositional and predicate logic, including rules of inference and quantifiers, to formally represent and reason about computational problems.
2. Use sets, relations, and functions to model discrete structures and solve problems relevant to computer science applications.
3. Construct and evaluate mathematical proofs using techniques such as direct proof, contradiction, contrapositive, and mathematical/structural induction.
4. Solve problems in number theory, including primes, greatest common divisors, and congruences, and explain their relevance to computing applications such as cryptography.

5. Analyze and solve problems involving counting techniques, including permutations, combinations, binomial coefficients, and advanced counting methods, with applications in algorithm analysis.

Course Topics

1. Propositional Logic
2. Predicates and Quantifiers
3. Rules of Inference
4. Introduction to Proofs
5. Sets
6. Functions
7. Primes and Greatest Common Divisors
8. Solving Congruences / Applications of Congruences
9. Recursive Definitions and Structural Induction
10. The Basics of Counting
11. Permutations and Combinations
12. Binomial Coefficients and Identities