

CSE191: DISCRETE STRUCTURES (4 Credits, Required)

Catalog Description

Foundational material for further studies in computer science. Topics include logic, proofs, sets, functions, relations, recursion, recurrence relations, mathematical induction, graphs, trees, and some basic counting theory. CSE191 is required for computer science and computer engineering majors.

Prerequisites

Prerequisite: CSE113 or CSE115 or knowledge of introductory computer science/computer programming.
Corequisites: None

Textbooks(s) and/or other required material

Rosen, Kenneth H. (2007). Discrete Mathematics and Its Applications, 6th Edition (New York: McGraw-Hill)

Grossman, Jerrold. (2007). Student Solutions Guide to Accompany Discrete Mathematics and Its Applications, 6th Edition (New York: McGraw-Hill)

Course Objectives

Mathematical Reasoning: The ability to construct a sound logical argument is essential for computer scientists, not only because proofs are important in certain areas of computer science, but also because the same basic thought process is used in constructing a proof and in writing a program.

Discrete Structures: These are the abstract mathematical structures used to represent discrete objects and relationships between those objects. Discrete structures include sets, permutations, relations, and graphs. These structures form the conceptual basis for many of the data structures that we use as programmers.

Algorithmic Thinking: Certain classes of problems are solved by the specification of an algorithm which can be implemented in a program. The mathematical portions of this activity (which will interest us most) include the specification of the algorithm, the verification that it works properly, and the analysis of the computer memory and time required to perform it.

Applications and Modeling: Discrete math has applications to almost every conceivable area of study including (of course) computer science, chemistry, botany, zoology, linguistics, geography, business, etc. Modeling with discrete math is an extremely important problem-solving skill.

Topics Covered

Logic and Proofs
Sets, Sequences and Number Systems
Relations and Their Properties
Functions
Algorithms, Euclidean Algorithm
Counting Methods
Recurrence Relations
Graph Theory

Class / Lab Schedule

Three 50-minute lectures per week

One 50-minute recitation per week

Contribution of course to professional component/criterion 5

Math and Basic Sciences: 4 credits

Relationship of course to program outcomes

This course is required of all computer engineering students and has a significant relationship with the following program objectives for computer engineering:

- (a) An ability to apply knowledge of mathematics, probability & statistics, computer science, and electrical engineering as it applies to the fields of computer software and hardware

Persons who prepared this description and date of preparation

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