

Spring 2023

CS 506: Foundations of Computer Science

Niloofar Aghaieabiane

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CS506 - SYLLABUS & EVALUATION

Spring 2023

Instructor:	Niloofar AghaieAbiane	Time:	F 13:00 – 15:50
Email:	na396@njit.edu	Place:	KUPF 108

Course Information:

- **Course Number:** CS506
- **Course Name:** Foundation Of Computer Science, aka Discrete Mathematics
- **Instructor:** Niloofar AghaieAbiane
- **Website:** canvas.njit.edu
- **Office Hours:** Webex Live Sessions, By appointment.
- **Webex Room:** <https://njit.webex.com/meet/na396>

Text Book: R. Johnsonbaugh, Discrete Mathematics, 7th Edition, Pearson Prentice Hall, 2009. ISBN-13: 978-0-13-159318-3; ISBN-10: 0-13-159318-8.

Course Description: Foundation of Computer Science, aka Discrete Mathematics, also known as the "Foundation of Computer Science", is a branch of mathematics that deals with discrete objects and structures, rather than continuous ones. This course covers a wide range of topics, including set theory, logic, combinatorics, graph theory, and discrete probability. Students will learn how to apply mathematical reasoning and proof techniques to solve problems in computer science and other related fields. The course emphasizes logical rigor and critical thinking, making it an essential foundation for students pursuing a career in computer science, mathematics, or any field that involves the manipulation of discrete structures. Additionally, the course provides students with a solid background in the mathematical concepts and methods that are used in theoretical computer science, algorithms and complexity theory, coding theory, and other areas of computer science. This course is a prerequisite for many advanced courses in computer science and mathematics, as well as many other fields such as engineering and physics.

Course Objective: By the end of this course, students will be able to understand and apply the fundamental concepts and techniques of discrete mathematics, including set theory, logic, combinatorics, graph theory, and discrete probability. They will also be able to develop critical thinking and problem-solving skills, and apply mathematical reasoning and proof techniques to solve problems in computer science and related fields. Additionally, they will have a solid foundation in the mathematical concepts and methods that are used in theoretical computer science, algorithms, complexity theory, coding theory, and other areas of computer science.

Grading Policy: Homework and Quizzes: 30% Midterm: 35% Final Exam: 35%

Class Policy:

- Regular attendance is essential and expected.
- Submit all assignments on [Canvas](https://canvas.njit.edu) by the due date.
- Pictured NJIT ID required for all exams. All exams are on campus, closed books/notes.
- Please take the time to familiarize yourself with the NJIT Honor Code, available at <http://integrity.njit.edu>. It is important to understand that any instance of academic dishonesty will be taken very seriously and will be reported to the Dean of Students for proper action.

Week	Topic	Book Chapter
1	Sets: Set Theory	1.1
2	Logic: Propositions Conditional Proposition Arguments Quantifiers	1.2 - 1.5
3	Counting Methods: Basic Principals, Permutations and Combinations, Generalized Permutation	6.1 - 6.3
4	Discrete Probabilities & Pigenhole Theory	6.5 - 6.6, 6.8
5	Proofs: Direct Proofs, Counterexamples, induction	2.1 - 2.2, 2.4
6 - 7	Function, Sequence, & Relations: Function, Sequence and Strings, Relations, Equivalence Relations, Matrices Of Relations	3.1 - 3.5
8	Midterm	
9 - 10	Algorithms: Algorithms, Flowcharts, Analysis Of Algorithms	4.1 - 4.3
11 - 12	Graph Theory: Introduction, Path& Cycles, Hamilton Cycle, Traveling Salesperson, A Shortest-Path Algorithm & Representation Of Graph, Isomorphism Of Graphs	8.1 - 8.6
13 - 14	Trees: Introduction, Terminology and Characterization of Trees, Spanning Tree, Minimal Spanning Tree, Binary Trees, Tree Traversals,	9.1 - 9.7

Table 1: CS506 - Course Syllabus