

Spring 2023

## CS 241: Foundations of Computer Science I

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## CS 241 COURSE SYLLABUS – SPRING 2023

**NJIT ACADEMIC INTEGRITY CODE:** All Students should be aware that the Department of Mathematical Sciences takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the instructor.

### **CS 241: Foundations of Computer Science I (Discrete Mathematics for CS)**

**Number of Credits: 3**

**Course Description:** This course provides the mathematical and analytical foundations of computer science and its applications to various areas in CS. The course covers the material traditionally known as “discrete mathematics”, with special emphasis on CS theoretical concepts. The course topics include sets and logic, proof techniques, proof by induction, functions and relations, asymptotic running time of algorithms, recursion, recurrence equations, counting methods (permutations and combinations), basic discrete probability, introduction to number theory, and a brief introduction to graphs and trees. Prerequisites: *Prerequisites:* CS 114: Intro to Computer Science; Math 112: Calculus II.

Course Objectives (what you are expected to know to complete this course)

1. Know basic mathematical tools and terminologies used in computer science
2. Know set algebra, propositional logic, reasoning, and basic proof techniques
3. know induction, recursion, recurrence equations, and how they are interrelated
4. Know the mathematical tools used to analyze efficiency of algorithms
5. Learn permutations/combinations, basic discrete probability, and applications
6. Learn to use binary and hexadecimal number systems

**Textbook:** Textbook: R. Johnsonbaugh, "*Discrete Mathematics*," Pearson, 8<sup>th</sup> Ed

**Grading Policy:** The final grade in this course will be determined as follows:

▪ <b>Quizzes:</b>	21%
▪ <b>Homework:</b>	14%
▪ <b>Midterm:</b>	30%

▪ **Final Exam:**

35%

**Drop Date:** The last day to withdraw with a **W** is **April 3rd**. The deadline will be strictly enforced.

**Homework Policy:** Homework problems will be published on canvas. Please notice that the homework assignments are a significant part of the learning process. There are 7-9 homework assignments, all mandatory. Lowest grade assignment is dropped. Assignments will be submitted on canvas. Students can work in groups; however, individual work needs to be submitted and names of collaborators mentioned at top of the paper. Unexplained answers will not receive credit.

**Quizzes policy:** There are 4 quizzes throughout the semester. All quizzes will be announced in advance and will take place in the first 10-20 minutes of lecture. There will be no make-up quizzes without documentation from the office of the dean of students. Lowest quiz will be dropped. Please make sure to have a fully charged laptop / tablet that you can use in the quiz. The device must have a LockDown browser installed. If you do not have a device, it is possible to borrow a device from the library.

**Attendance:** Attendance at all classes will be recorded and is **mandatory**. Please make sure you read and fully understand the Department's Attendance Policy. This policy will be **strictly** enforced. Absences from class will inhibit your ability to fully participate in class discussions and problem-solving sessions and, therefore, affect your grade. Tardiness to class is very disruptive to the instructor and students and will not be tolerated. Each student should have contact information of several fellow students to get homework assignments and class notes when absent. You are responsible for everything that happens in class whether you are present or not.

**Makeup Exam Policy:** There will be NO MAKE-UP EXAMS during the semester. In the event the Final Exam is not taken, under rare circumstances where the student has a legitimate reason for missing the final exam, a makeup exam will be administered by the math department. In any case the student must notify the **Dean of Students and the Instructor** that the exam will be missed and present written verifiable proof of the reason for missing the exam, e.g., a doctor's note, police report, court notice, etc., clearly stating the date AND time of the mitigating problem.

**Further Assistance:** Office hours will be announced. Tutoring for this class is available, the tutoring schedule is available in

<https://computing.njit.edu/undergraduate-tutoring-1>

**Cellular Phones:** The use of cell phones is not permitted during class time. If there is an issue you must addend to, please do so outside the class room.

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**Accommodation of Disabilities:** Office of Accessibility Resources and Services (ORAS) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT. If you need accommodations due to a disability, please contact Scott Jans, Associate Director of ORAS at **973-596-5417** or via email at [spj6@njit.edu](mailto:spj6@njit.edu) . The office is in Fenster Hall Room 260. For further information regarding self-identification, the submission of medical documentation and additional support services provided please visit the ORAS office website at: <https://www.njit.edu/accessibility/>

Please notice, if you are eligible of extra time and would like to use it in the midterm or the final, please notify instructor and ORAS at least two weeks prior to the exam so that accommodations can be made.

### Course schedule

Week	Topic	Chapter
Week 1	Sets	1.1
Week 2 -3	Propositions	1.2-1.4
Week 4	Predicates	1.5 – 1.6
Week 5 - 6	Proofs	Chapter 2
Week 7 - 8	Relations and functions	Chapter 3
Week 8	Midterm	
Week 9	Infinite sets, Integer representations	Chapter 5
Week 10	Asymptotic running time	Chapter 4
Week 11	Graphs	Chapter 8
Week 12	Counting methods	Chapter 6
Week 13	Recursive relations	Chapter 7
Week 14	Review	

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