CS 241 COURSE SYLLABUS – SPRING 2025

NJIT ACADEMIC INTEGRITY CODE: All Students should be aware that the Department of Computer Science 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

Instructor: Ayelet Zaidenberg

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Office hours: Thursdays and Fridays: 10:00 am – 11:20 am. GITC 4321C

Prerequisites: CS 114: Intro to Computer Science; Math 112: Calculus II.

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, introduction to number theory, proof techniques, proof by induction, functions, asymptotic running time of algorithms, recursion, recurrence relations, introduction to graphs and trees, cardinality of infinite sets and diagonalization (if time permits), equivalence and order relations (if time permits).

Course Objectives:

1. Understand basic concepts of sets, propositions and predicates.
2. Use basic proof techniques, including mathematical induction.
3. Know basic concepts of functions, bijections.
4. Understand basic concepts of graphs.
5. Use non-decimal number systems, as binary and hexadecimal.
6. Use asymptotic notation to evaluate common run time functions.
7. Solve some types of recursive relations.

Textbook: Textbook: R. Johnsonbaugh, "*Discrete Mathematics*," Pearson, 8th Ed .

Available at the publisher: https://www.pearson.com/en-us/subject-catalog/p/discrete-mathematics/P200000006219/9780137848577

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

▪ **Quizzes:**	21%
▪ **Homework:**	14%
▪ **Midterm:**	30%
▪ **Final Exam:**	35%

A	B+	B	C+	C	F
90	80	70	65	60	< 60

Drop Date: The last day to withdraw with a **W** is April 7th. This is a university deadline, and will be strictly enforced.

Homework: In CS 241, the homework problem sets are a significant part of the learning process, giving learners the opportunity to interact with the topics shown in lectures. Problem sets have different exercises, in ranging difficulty levels, to make sure learners practice both syntax and semantics of units introduced.

Homework assignments are published on canvas, and are due about one week afterwards. One assignment grade (the lowest) will be dropped. No more than one assignment grade will be dropped. Please upload a pdf file with your answers to canvas by the due time. Grade will be given on Canvas by pre-chosen set of questions from the assignment to be graded.

Late assignments will lose 20% for every day or part of the day it is late. An assignment not submitted will get 0 marks. Students can, and should, work with peers; however, individual work must to be submitted and names of collaborators mentioned at top of the paper. **Unexplained answers will not receive credit**.

Quizzes: 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. A quiz not taken will get 0 marks. Lowest quiz grade will be dropped. No more than one quiz grade will be dropped, so if you had to miss one quiz for any reason, the other 3 will be considered. Please make sure to have a fully charged laptop / tablet that you can use for 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.

Midterm: Midterm will take place during class time and will be announced in advance. Unexcused absence will result in 0 marks on the midterm. In case of excused absence, a grade for the midterm will be inputted from final exam and quizzes. If extra time is needed, please contact the OARS office in advance to schedule the midterm.

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. 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 CS 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.

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 classroom.

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 OARS via email at OARS@NJIT.EDU. The office is in Kupfrian Hall Room 201. For further information 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 (Approx)	Topic	Chapter
Week 1 -2	Sets	Chapter 1
Week 2 –3	Propositions	Chapter 1, 5
Week 3	Predicates, Quantifiers	Chapter 1
Week 4 - 6	Proofs	Chapters 2, 5
Week 7	Functions, bijections	Chapter 3
Week 8	Midterm	
Week 9	Integers, sequences	Chapters 5, 3
Week 10 -11	Recursive relations	Chapter 7
Week 11 - 12	Asymptotic run time	Chapter 4
Week 13	Graphs	Chapter 8
Week 14	Review	