

Spring 2020

CS 241-102: Foundations of Computer Science I

Jing Li

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CS 241 - Foundations of Computer Science I

Spring 2020



Class schedule:

Thursdays, 06:00 PM-08:50 PM, in CULM LECT 1

Instructor:

Jing Li, jingli@njit.edu, GITC 4106

Class Overview:

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 applications and analysis of algorithms. The course topics include sets and logic, proof techniques, proof by induction, functions and relations, analysis of algorithms, recursion, recurrence equations, divide-and-conquer design technique, counting methods (permutations and combinations), basic discrete probability, and if time permits, introduction to number theory and a brief introduction to graphs and trees.

Course Objectives (what you are expected to get out of this course):

1. Learn basic mathematical tools and terminologies used in computer science
2. Learn propositional logic, reasoning, and basic proof techniques
3. Learn induction, recursion, recurrence equations, and divide-and-conquer technique
4. Learn mathematical tools to analyze efficiency of algorithms
5. Learn permutations/combinations, basic discrete probability, and applications

Tentative schedule:

1. Sets (Ch. 1)
2. Logic
3. Proofs (Ch. 2 Skip 2.3: Resolution proofs)
4. Induction
5. Functions (Ch. 3)
6. Relations
7. Analysis of Algorithms (Ch. 4)
8. Midterm Exam: (Covers Sets to Relations)
9. Analysis of Algorithms cont.
10. Recursive Algorithms
11. Classes of Recurrences (Ch. 7)
12. Counting Methods (Ch. 6)
13. Probability (Ch. 6)
14. Probability cont. (If time permits, Number Theory Ch. 5)

Disclaimer: The schedule of the course is subject to change based on the progress of the class, including test dates after they are announced. These changes will be announced as early as possible.

Website:

You must check the course website on Canvas regularly for posting of syllabus, assignments, announcements, and other information.

Homework assignments:

Note that you must write your solutions by yourself, in your own words, but may work in groups of size up to three. You must cite all your collaborators (teammates) and any sources beyond the class materials that you consulted while working on a problem—for example, an "expert" consultant other than the teacher, or another text—must be given a proper scholarly citation, which you should include with your submission.

Assignments submitted on time (at the start of the class period on the due date) do not have penalty. Assignments submitted by a week late will be given a 50% penalty. Assignments submitted after a week late will not be given credit.

Class participation:

Students are encouraged to answer questions in class.

Midterm and final exams:

According to the NJIT policy, all final exams will be scheduled in the week 15 by the registrar (see the registrar's page: <http://www.njit.edu/registrar>). For the midterm and final exams, there will be no make up exams. You must plan your semester accordingly. If you should miss the exam(s) due to emergency, please go to the Dean of students and explain your situation as to why you had to miss. Dean's memo will be necessary but not sufficient to consider for handling your missed exam(s). This is the NJIT policy for missed exams. No other policy will be applied.

Course materials:

Textbook:

R. Johnsonbaugh, *Discrete Mathematics*, 8th Edition, Pearson Prentice Hall.

Recommend books:

Kenneth Rosen, *Discrete Mathematics and its Applications*, McGraw Hill Education.

Prerequisites:

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

If in doubt about the prerequisites, please consult the instructor for permission to take the class.

Grading:

Class Participation – 5 points

Homework Assignments – 30 points

Weekly Quizzes – 5 points

Midterm Exam – 25 points

Final Exam – 35 points

Final grades will be curved according to departmental policy.

Office Hours and Contact Information:

Wednesdays and Fridays, 2:00 pm - 5:00 pm

Please make appointments by email for other times.

Jing Li: jingli@njit.edu, GITC 4106

Teaching Assistant:

William (Joe) McCann, wjm9@njit.edu

Honor Code:

The NJIT Honor Code will be upheld, and any violations will be brought to the immediate attention of the Dean of Students. You are required to read the NJIT Policy on Academic Integrity: <https://www.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>

Modifications to syllabus:

The syllabus may be modified at the discretion of the instructor or in the event of extenuating circumstances. Students will be notified in class of any changes to the syllabus.