CS 101 (001, 005) Computer Programming & Problem Solving
Fall 2025

Instructors

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Teaching Assistant

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Description of Course

This is an introductory course in computer science and programming (using MATLAB) and its use in solving engineering and scientific problems. The emphasis is on the logical analysis of a problem and the formulation of a computer program leading to its solution. Topics include basic concepts of computer systems, algorithm design, programming languages and data abstraction. It is designed for students not specializing in computer science.

Specific Goals for the Course

- Be able to explain fundamental computing concepts related to processing, memory and data organization as related to engineering.
- Be able to formulate succinctly and correctly the input and output relationship of computational problems.
- Be able to provide a computer-based programming solution for technical problems using a high-level language such as MATLAB.
- Become familiar with the syntax and functionality of MATLAB.
- Be able to effectively use MATLAB for solving more complex problems arising in science or engineering.

Brief List of Topics to Be Covered

- High-level computer organization. Introduction to computing. Bits and Bytes.

- Data representation in memory. Integers and reals. Computational problems and input output relationship.
- The abstract data type: Matrix and Vector. Implementations using an array.
- The fundamental concepts of MATLAB. MATLAB basics. MATLAB as a calculator. Input and Output, M-files, Mat files, MATLAB diary.
- MATLAB vector/matrix functions and operations.
- MATLAB plotting functions.
- MATLAB branching statements.
- MATLAB iterative statements.
- MATLAB functions.
- Program design. MATLAB profiling and code optimization.
- Recursion. Tradeoffs. Searching and sorting in MATLAB.
- Advanced MATLAB features. complex numbers, sparse arrays, cell arrays, structure arrays.

Course Webpage

Submit the homework solution in Microsoft Word format to Canvas before the deadline. Absolutely, no late submission is accepted. Write the answers in your own words individually. Any plagiarism will post a "ZERO" score or cause a "FAIL" grade.

Textbook

S. J. Chapman, *MATLAB Programming for Engineers*, Seventh Edition, Cengage Learning, 2024, ISBN: 9798214001531.

Topics

1: Starting with MATLAB
2: Creating Arrays
3: Mathematical Operations with Arrays
4: Script Files
5: Two-Dimensional Plots
6: Functions and Function Files
7: Programming in MATLAB
8: Polynomials, Curve Fitting, and Interpolation
9: Three-Dimensional Plots
10: Applications in Numerical Analysis
11: Symbolic Math

Tentative HW/Exam Schedule

September:
11: HW1
25: HW2

October:
- 9: HW3
- 16: Exam 1
- 30: HW4

November:
- 13: HW5
- 20: Exam 2

December:
- 11: HW6
- Final Exam (See Schedule on NJIT Website)

Grading

Each midterm exam will be 80 minutes long, and the final exam will be 2.5 hours long. Your grade in the course will be determined by the following breakdown:

6 Homework	30%
Exam1	10%
Exam2	10%
Final Exam	30%
Quiz	20%

This course adopts "Canvas" for homework submission. Please submit your homework solution in Microsoft Word format to https://njit.instructure.com before each deadline.
There will be a total of 105 points. The grade assign is based on the following:

A: over 85 points
B+: 75 – 84 points
B: 65 – 74 points
C+: 60 – 64 points
C: 55 – 59 points
D: 45 – 54 points
F: 0 – 44 points

Course Policies

Punctuality and class attendance is mandatory. If you cannot attend some class, you must contact me beforehand. As a general rule, I do not give makeup exams, I do not allow students to take exams on alternate dates, nor do I allow students to turn in assignments late. Of course, if someone has a legitimate reason (e.g., jury duty, serious medical problem, sports tournament, conflict with a religious holiday), I will make allowances as long as you provide proper documentation. I will not accept excuses such as having too heavy a workload or having too many exams the same week. Also, I do not give out extra-credit assignments.

For all exams, be sure to bring a photo ID. All exams will be closed book and closed notes. For exams of 90 minutes or less, no one will be permitted to leave the room once an exam has started. If a student leaves before the exam period is concluded, his/her exam will be collected and not be returned. Students with special needs are advised to make arrangements with Disability Services for exam accommodations.

If upon getting back one of your exams you think that you deserve more points on a particular problem, I will regrade the entire exam. Thus, you may get more points on the one problem, but you may lose points on other problems. Also, any questions about the grading must be asked within 48 hours of when the exam or homework was returned back.

Unless you are otherwise instructed, all portable electronic devices, such as cell phones and laptops, must be turned off during class.

Students will be informed of any modifications or deviations from the syllabus throughout the course of the semester.

Honor Code

Academic integrity and honesty are of paramount importance. The NJIT Honor Code will be strictly upheld, and any violations will be brought to the immediate attention of the Dean of Students. Honor Code violations include, but are not limited to,

- communicating with others during exams
- using unauthorized materials during exams
- copying/giving a computer program from/to another person.