

**Programming for Everyone: MATLAB and Its Possibilities****Instructor:** Junyuan (Joanne) Lin**Email:** [Junyuan.Lin@tufts.edu](mailto:Junyuan.Lin@tufts.edu)**Course Meetings Times:** Thursday: 6:00 pm – 9:00 pm**Location:** TBA

**Course Description:** Is programming the right thing for me? How should I start learning it? If you have these concerns, come to the class to explore the answers. In this course, you will be given assessment to learn your fortes in programming, understand how programming skills could be applied to solve problems from your own major(s). You will be introduced to MATLAB, an easy-to-learn and versatile programming language. It is popular among talents from the natural sciences, through all disciplines of engineering, to finance, and beyond, since it nicely combines calculation and graphic plotting. Starting from variables and basic operations, you will eventually learn how to handle data structures such as vectors and matrices. In the final section, you will dive deeper into the graphical capabilities of MATLAB, and create your own stunning data visualizations. (No programming background required!)

**Assignments and Grading:**

1. Students will take 5 short quizzes on basic programming knowledges graded by the instructor/TA. They will consist of True/False or multiple choices. Each will be worth 20 points.
2. There will be a midterm research paper on how programming can be applied to your major study/your future job. Paper will be judged by the instructor/TA on its clarity, thoroughness in citing resources and personally opinions. Max 100 points.
3. A final capstone project and presentation. Students need to work in groups of 2-3 and write a programming project to achieve some intended goals and present the results to the class. The completeness and complexity of the programming project will be criticized by the instructor/TA on a scale of 100 points and the presentation that is worth 100 points will be peer-reviewed by other students on its easiness to follow.

The final grade will be calculated as:

$$0.2 * \text{Quiz} + 0.3 * \text{Midterm Paper} + 0.3 * \text{Programming Project} + 0.2 * \text{Presentation}$$

**Attendance:** If you miss class, it is your responsibility to make up anything you may have missed. Confer with your classmates regarding announcements, lecture notes, and any other activities and information from class.

**Disability Services:** If you are requesting an accommodation due to a documented disability, you must register with the Disability Services Office at the beginning of the semester. To do so, call the Student Services Desk at 617-627-2000 to arrange an appointment with Linda Sullivan, Program Director of Disability Services.

Dates	Topic	Activity	Assignment
Week 1	How to you perceive programming?	An ice-breaker game relates to programming; discussions on experiences in programming	Download and set up MATLAB; read about latest applications of CS
Week 2	How is programming useful for you?	Discussions on current and future applications of computer programs; set personal goals for this course; start to plot midterm paper	Brainstorm ideas for the paper
Week 3	Basics of Programming: Variables	Lecture, write your first "Hello World" program	Review lecture and draft paper
Week 4	Basics of Programming: Arrays and Cells	Lecture; Quiz on Variables	Review lecture and refine midterm paper
Week 5	Basics of Programming: Loops and Conditions	Lecture; Paper due	Review
Week 6	Basics of Programming: Functions I	Lecture; Quiz on Loops and Conditions	Review
Week 7	Basics of Programming: Functions II	Lecture; Quiz on Functions I; Announcing the final project	Form groups for final project and brainstorm for project ideas
Week 8	Basics of Programming: Plotting	Lecture; Quiz on Functions II	Draft project proposal
Week 9	Project Discussion	Quiz on Plotting; Each group will share their project ideas in class and get peer reviews	Start on final project
Week 10	Techniques: How to debug?	Lecture; Debug codes for your programming project	Refine the project
Week 11	Techniques: How to write fast codes?	Lecture; Q&A	Accelerate your code if needed
Week 12	Techniques: How to present your results?	Lecture; Q&A	Project wrap up and write presentation slides
Week 13	Presentation	Listen and judge	

### Suggested reading materials:

Baxes, Gregory A. *Digital image processing: principles and applications*. New York: Wiley, 1994.

Danilo Šćepanović. *6.094 Introduction to MATLAB*. January IAP 2010. Massachusetts Institute of Technology: MIT OpenCourseWare, <https://ocw.mit.edu>. License: Creative Commons BY-NC-SA.

Getreuer, Pascal. "Writing fast MATLAB code." (2009). <http://www.mathworks.com/matlabcentral/fileexchange/5685> (2006).