

San José State University
Aerospace Engineering Department
AE 30, Computer Programming for Aerospace Engineers, Spring 2021

Course and Contact Information

Instructor(s):	Dr. Lucía Capdevila Dr. Radha Aravamudhan
Office Location:	Dr. Capdevila: Engineering Building 272 E Dr. Aravamudhan: Online
Email:	Dr. Capdevila: lucia.capdevila@sjsu.edu , Dr. Aravamudhan: radha.aravamudhan@sjsu.edu
Office Hours:	Dr. Capdevila: Tuesdays 10 - 11 am, Thursdays 3 - 4 pm Dr. Aravamudhan: Friday 1-2 pm
Class Days/Time:	Lecture (section 01): Tuesdays 9 - 9:50 am, Lab (section 02): Tuesdays 10 am - 11:50 am Lab (section 03): Tuesdays 1:30 pm - 4:20 pm
Classroom:	Canvas
Prerequisites:	None

Course Description

C language: Variables, data types, operators, functions, modular programming, input/output sequence, pointers and memory addressing, external libraries, dynamic memory allocation. MATLAB: Variables, scripts, operations, visualization, plotting and programming. Equation solving and curve fitting. Symbolics, Simulink and I/O building block.

Course Format

Technology Intensive, Hybrid, and Online Courses

This course adopts a synchronous online format. Access to a computer that can connect to the internet, a device that can scan written work, and a device with a camera are required to participate in classroom activities and/or submit assignments.

Faculty Web Page and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on [Canvas Learning Management System course login website](#) at <http://sjsu.instructure.com>. You are responsible for regularly checking with the messaging system through [Canvas](#) to learn of any updates. For help with using Canvas see [Canvas Student Resources page \(http://www.sjsu.edu/ecampus/teaching-tools/canvas/student_resources\)](http://www.sjsu.edu/ecampus/teaching-tools/canvas/student_resources) If the instructor cannot reach you via Canvas messaging, they will email you at

the address provided in [MySJSU](#). Please note that your email address listed in MySJSU may be different from your @sjsu.edu address.

Course Goals (Delete if not applicable)

Introduce students to:

1. Developing algorithms, pseudocode, and flowcharts
2. Writing, compiling, analyzing, and debugging computer programs in MATLAB and C
3. Applying computer programming in solving aerospace engineering problems

Course Learning Outcomes (CLO)

Upon successful completion of this course, students should be able to:

1. Develop algorithms, pseudocode, and flowcharts
2. Define and manipulate variables in MATLAB
3. Define, index, and manipulate vectors and matrices in MATLAB
4. Write, compile, analyze, and debug user-defined functions in MATLAB
5. Incorporate selection and loop statements in MATLAB
6. Utilize modular programming to write a program in MATLAB
7. Plot and interpret data in MATLAB
8. Define variables, data types, operators, and expressions in C
9. Define and utilize control flow in C
10. Write, compile, analyze, and debug programs in C
11. Work effectively in teams to define, propose, and solve an aerospace engineering problem utilizing MATLAB and/or C programming

Course Relationship to BSAE Program Outcomes:

CLOs	A	B	C	D	E	F	G	H	I
1, 4, 6, 8, 10-11, 14	**		***	X	X				**
2-3, 5, 7, 9, 12-13	**								
15	**		***	X	X	X	X	**	***

** : Skill level 3 or 4 in Bloom’s taxonomy
 *** : Skill level 5 or 6 in Bloom’s taxonomy
 X : Skill addressed but not assessed

[BSAE Program Outcomes](http://www.sjsu.edu/ae/programs/bsae/bsae_program_outcomes/) available at http://www.sjsu.edu/ae/programs/bsae/bsae_program_outcomes/
[Bloom's Taxonomy](https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/) available at <https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/>

Required Texts/Readings

Textbooks

1. [Attaway, S. \(2017\). MATLAB: A practical introduction to programming and problem solving \(Fourth ed.\). Amsterdam: Elsevier : Butterworth-Heinemann.](#)
 (ISBN: 0-12-804541-8)
2. [Kernighan, B., Ritchie, B., & Ritchie, Dennis M. \(1988\). The C programming language \(Second ed., Prentice-Hall software series\). Englewood Cliffs, N.J.: Prentice Hall.](#)
 (ISBN: 0131103709)

Availability: References listed above are available through the [SJSU Dr. Martin Luther King Jr. Library](#). The links above will take you to the SJSU MLK reference record, but **you must log on as an SJSU to access the textbooks**.

Other Readings

Class material posted on Canvas.

Other technology requirements / equipment / material

Access to a computer that can connect to the internet, a device that can scan written work, and a device with a camera are required to participate in classroom activities and/or submit assignments.

Course Requirements and Assignments

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

Final Examination or Evaluation

There will be a final examination and final project presentation and demonstration for this class. The final examination consists of a synchronous in-class exam administered during the lecture final exam slot for this class. The final project presentation and demonstration will take place during the lab final exam slot for the class. Please check the schedule for final exam slot dates and times.

Grading Information

- Grade Scale:
 - 100 to 97% A plus
 - less than 97% and above or equal to 93% A
 - less than 93% and above or equal to 90% A minus
 - less than 90% and above or equal to 87% B plus
 - less than 87% and above or equal to 83% B
 - less than 83% and above or equal to 80% B minus
 - less than 80% and above or equal to 77% C plus
 - less than 77% and above or equal to 73% C
 - less than 73% and above or equal to 70% C minus
 - less than 70% and above or equal to 67% D plus
 - less than 67% and above or equal to 63% D
 - less than 63% and above or equal to 60% D minus
 - less than 60% F

- Grade Components Weight:
 - In-Class Activities: 5 %
 - Laboratory reports: 40 %
 - Examinations: 40 %
 - Project: 15 %

- Assignments:
 - Assignments will be posted on and submitted via Canvas.

- Check assignment details on Canvas for exact due date and time.
 - Submissions are not accepted after submission is closed on Canvas without a valid reason and proof.
 - **Lab attendance is required to receive credit for laboratory reports. No credit will be awarded for labs submitted without lab attendance. If you cannot attend lab on a specific day, please make arrangements with your instructor ahead of time.**
- Exams:
 - All examinations must be taken in order to receive a passing grade.
 - No make-up examinations will be granted without a valid reason and proof.
 - Course Project:

Students will be working in teams to provide computer-programming support, utilizing MATLAB and/or C, to one of our senior design teams (aircraft or spacecraft teams depending on their interest and the availability of senior projects). Details will be announced during class throughout the semester.
 - Grading/Regrades:

Students may request that their work be re-graded if they believe there to be a mistake in the original grading. To do so, please use the “Re-grade Request Form” available on Canvas, and follow the instructions on the form. Please note that a grade change is not guaranteed and that the grade may increase or decrease.

Classroom Protocol

It is expected that everyone will treat each other and themselves with the highest respect at all times. It is also expected that students will share video during online meetings whenever possible to make the online class environment as personable as possible. We all benefit from each other’s contributions to the class, so everyone’s timely attendance and participation are also expected.

University Policies

Each student is responsible for understanding the following information and let me know if you have any questions:

- [Academic Integrity Policy F15-7](https://www.sjsu.edu/senate/docs/F15-7.pdf) at <https://www.sjsu.edu/senate/docs/F15-7.pdf>
- [Student Conduct and Ethical Development](https://www.sjsu.edu/studentconduct/) at <https://www.sjsu.edu/studentconduct/>
- [AE Program Policies](http://www.sjsu.edu/ae/programs/policies/) at <http://www.sjsu.edu/ae/programs/policies/>
- Accessibility: If you need course adaptations or accommodations because of a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with [AEC](#) to establish a record of their disability.

AE 30 / Computer Programming for Aerospace Engineers, Spring 2021, Course Schedule

The following is an *approximate* course schedule that is subject to change with fair notice given during class and/or via email and/or Canvas messaging.

Course Schedule

Week	Date	Lecture	Lab
2	Tuesday, February 2, 2021	Module 1: Intro to Programming & MATLAB	Lab 1
3	Tuesday, February 9, 2021	Module 2: Arrays in MATLAB	Lab 2
4	Tuesday, February 16, 2021	Module 3: Plotting, User Controlled Input & Output in MATLAB	Lab 3
5	Tuesday, February 23, 2021	Module 4: User-Defined Functions in MATLAB	Lab 4
6	Tuesday, March 2, 2021	Module 5: Logical Operators, Selection Structures in MATLAB and Flowcharts	Lab 5
7	Tuesday, March 9, 2021	Module 6: FOR Loops, WHILE Loops, BREAK, & CONTINUE in MATLAB	Lab 6
8	Tuesday, March 16, 2021	Exam 1	Project PROPOSAL Presentations
9	Tuesday, March 23, 2021	Module 7: Nested Loops in MATLAB	Lab 7
10	Tuesday, March 30, 2021	Spring Recess - No Classes	Spring Recess - No Classes
11	Tuesday, April 6, 2021	Module 8: Intro to C	Lab 8
12	Tuesday, April 13, 2021	Module 9: Conditional Statements in C	Lab 9
13	Tuesday, April 20, 2021	Exam 2	Project PROGRESS Presentation & Demo
14	Tuesday, April 27, 2021	Module 10: Loop statements in C	Lab 10
15	Tuesday, May 4, 2021	Module 11: Functions in C	Lab 11
16	Tuesday, May 11, 2021	Module 12: Arrays & Pointers in C (Extra Credit)	Lab 12
FINALS	Thursday, May 20, 2021	7:15-9:30 Lecture - section 1: Final Exam	12:15-14:30, Lab - section 3: Project FINAL Presentations & Demo
FINALS	Monday, May 24, 2021	N/A	09:45-12:00, Lab - section 2: Project FINAL Presentations & Demo