

San José State University
School/Department
AE 30, Computer Programming for Aerospace Engineers, Spring, 2020

Course and Contact Information

Instructor(s):	Dr. Lucia Capdevila
Office Location:	Engineering building 272 E
Telephone:	(408) 924 - 3126
Email:	lucia.capdevila@sjsu.edu
Office Hours:	Wednesdays 16:30 – 18:30, Fridays 10:00 – 12:00
Class Days/Time:	Lecture (section 1): 10:30 – 11:20 Wed. Lab (section 2): 12:00 – 14:50 Fri. Lab (section 3): 14:00 – 16:50
Classroom:	Lecture (section 1): Engineering building 329 Wed. & Fri. Lab (sections 2 & 3): Engineering building 407
Prerequisites:	None

Course Description

Introduction to the fundamentals of programming in MATLAB and C. Topics in MATLAB programming include variables, characters and encoding, vectors and matrices, inputs and outputs, user-defined functions, selection and loop statements, modular programming, debugging, and plotting techniques. Topics in C programming include variables, data types, operators, expressions, statements, inputs and outputs, arrays, functions, arguments, control flow, and program structure.

Course Format

Technology Intensive, Hybrid, and Online Courses

This course adopts a flipped classroom delivery format.

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](http://sjsu.instructure.com) at <http://sjsu.instructure.com>. You are responsible for regularly checking with the messaging system through Canvas and MySJSU on [Spartan App Portal](http://one.sjsu.edu) <http://one.sjsu.edu> 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)

Course Goals

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

The following texts can be accessed through the SJSU library:

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)

Other Readings

Class material posted on Canvas.

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

The final examination consists of a practical examination during lab final exam slot. Refer to schedule for time and date.

Grading Information

Grade Components

<u>Course Component</u>	<u>% of Course Grade</u>
Quizzes:	5 %
Laboratory reports:	40 %
Examinations:	40 %
Project:	15 %

Letter Grade Scale

≥ 95 %: A+, ≥ 90 %: A, ≥ 85 %: A-, ≥ 80 %: B+, ≥ 75 %: B, ≥ 70 %: B-, ≥ 67 %: C+, ≥ 65 %: C, ≥ 63 %: C-, ≥ 60 %: D, < 60 %: F

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.

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.

Academic Integrity:

Collaboration is required for team assignments only. Outside of team assignments, all work submitted for grading should be the original work of the student submitting it. Plagiarism and cheating are not tolerated in this class, please inform yourself about [SJSU Academic Integrity Policies](#) and consequences for violating such policies. If you are unsure about how to work appropriately with others, please ask, Dr. Capdevila is happy to talk to you about this.

Accessible Education Center (AEC):

If a student needs course adaptations or accommodations because of a disability, or if a student needs special arrangements in case the building must be evacuated, please make an appointment with Dr. Capdevila as soon as possible, or see her 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.” Academic Senate Policy F06-2

University Policies

Per [University Policy S16-9](http://www.sjsu.edu/senate/docs/S16-9.pdf) (<http://www.sjsu.edu/senate/docs/S16-9.pdf>), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo) (<http://www.sjsu.edu/gup/syllabusinfo>), which is hosted by the Office of Undergraduate Education. Make sure to visit this page to review and be aware of these university policies and resources. [SJSU AE Program Policies](#) can be found at <http://www.sjsu.edu/ae/programs/policies/>

AE 30 / Computer Programming for Aerospace Engineers, Spring 2020, Course Schedule

Approximate Course Schedule

Dates	Lecture (section 1)	Lab (sections 2 & 3)
Week 1 F: 1/24/20	N/A	Office Hours
Week 2 W: 1/29/20 F: 1/31/20	Quiz 1 Lecture 1: Intro. to programming & MATLAB	ECS Director, Lee Andersen Lab 1
Week 3 W: 2/5/20 F: 2/7/20	Quiz 2 Lecture 2: Arrays in MATLAB	Lab 2
Week 4 W: 2/12/20 F: 2/14/20	Quiz 3 Lecture 3: Plotting, User Controlled Input & Output in MATLAB	Lab 3
Week 5 W: 2/19/20 F: 2/21/20	Quiz 4 Lecture 4: User Defined Functions in MATLAB	Lab 4
Week 6 W: 2/26/20 F: 2/28/20	Quiz 5 Lecture 5: Logical Functions, Selection Structures in MATLAB & Flowcharts	Lab 5
Week 7 W: 3/4/20 F: 3/6/20	Quiz 6 Lecture 6: FOR Loops, WHILE Loops, BREAK, & CONTINUE in MATLAB	Lab 6
Week 8 W: 3/11/20 F: 3/13/20	Exam 1 Q&A	Exam 1
Week 9 W: 3/18/20 F: 3/20/20	Quiz 7 Lecture 7: Nested Loops in MATLAB	Lab 7
Week 10 W: 3/25/20 F: 3/27/20	Quiz 8 Lecture 8: Intro. to C	Project Proposal Presentations Lab 8
Week 11 W: 4/1/20 F: 4/3/20	Spring Recess (No Classes)	Spring Recess (No Classes)

Dates	Lecture (section 1)	Lab (sections 2 & 3)
Week 12 W: 4/8/20 F: 4/10/20	Quiz 9 Lecture 9: Conditional statements in C	Lab 9
Week 13 W: 4/15/20 F: 4/17/20	Exam 2 Q&A	Exam 2
Week 14 W: 4/22/20 F: 4/24/20	Quiz 10 Lecture 10: Loop statements in C	Project Prototype Demo Lab 10
Week 15 W: 4/29/20 F: 5/1/20	Quiz 11 Lecture 11: Functions in C	Lab 11
Week 16 W: 5/6/20 F: 5/8/20	Quiz 12 Lecture 12: Arrays & Pointers in C	Final Project Demo Lab 12
Week 17-18 (Finals) Section 1: 5/15/20 9:45 Section 3: 5/18/20 12:15 Section 2: 5/19/20 9:45	(Nothing)	Exam 3