

**San José State University**  
**Aerospace Engineering Department**  
**AE 30, Computer Programming for Aerospace Engineers, Fall 2022**

**Course and Contact Information**

Instructor(s): Dr. Radha Aravamudhan

ISA(Grader): Katherine Legg

Office Location: ENG 272 and Online through Zoom. Zoom link will be posted on canvas module.

Email: [radha.aravamudhan@sjsu.edu](mailto:radha.aravamudhan@sjsu.edu)

Office Hours: Mondays 12:15- 1:15 pm, Wednesday, 12:15 pm- 1:15 pm

Class Days/Time: Lecture (section 01): Mondays 1:30 pm - 2:20 pm (ENGR 335)  
Lab (section 03): Mondays 9:00 am - 11:50 am (ENGR 395)  
Lecture (section 02): Wednesdays 1:30 pm - 2:20 pm (ENGR 335)  
Lab (section 04): Wednesdays 9:00 am - 11:50 am (ENGR 395)

Classroom: <http://sjsu.instructure.com>  
Select *FA22: AE-30 Sec 01 & 03 - Program. for AEs/ FA22: AE-30 Sec 02 & 04 - Program. for AEs* under the courses tab.

Prerequisites: None

**Course Description**

C language: Variables, data types, operators, functions, modular programming, input/output sequence, pointers and memory addressing, external libraries. MATLAB: Variables, scripts, operations, visualization, plotting and programming. Equation solving and curve fitting.

**Course Format**

This course will adopt a in person Module format in ENGR 335. 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. Labs will be in person in ENGR 395.

**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](#) to learn of any updates. *For help with using Canvas see [Canvas Student Resources page](#).* 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**

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 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	++		+++	✓	✓				++
2-3, 5, 7, 9	++								

- ++: Skill level 3 or 4 in Bloom’s taxonomy
- +++: Skill level 5 or 6 in Bloom’s taxonomy
- ✓: Skill addressed but not assessed

[BSAE Program Outcomes](https://www.sjsu.edu/ae/programs/bsae/program_outcomes/) available at [https://www.sjsu.edu/ae/programs/bsae/program\\_outcomes/](https://www.sjsu.edu/ae/programs/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 student to access the books.

### **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**

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

### **Grading Information**

- Grade Scale:

<i>Grade</i>	<i>Percentage</i>
<i>A plus</i>	<i>96 to 100%</i>
<i>A</i>	<i>93 to 95.9%</i>
<i>A minus</i>	<i>90 to 92.9%</i>
<i>B plus</i>	<i>87 to 89.9 %</i>
<i>B</i>	<i>83 to 86.9%</i>
<i>B minus</i>	<i>80 to 82.9%</i>
<i>C plus</i>	<i>77 to 79.9%</i>
<i>C</i>	<i>73 to 76.9%</i>
<i>C minus</i>	<i>70 to 72.9%</i>
<i>D plus</i>	<i>67 to 69.9%</i>
<i>D</i>	<i>63 to 66.9%</i>
<i>D minus</i>	<i>60 to 62.9%</i>
<i>F</i>	<i>&lt; 60%</i>

- Grade Components Weight:

Component	%
In- Class Activities	5
Laboratory Reports	40
Examinations- 3	40
Project- Total	15
<b>Total</b>	<b>100</b>

- **Laboratory Assignments:**
  - All lab assignments will be posted on and submitted via Canvas. Assignments will typically be posted on Canvas after Modules.
  - Assignment details including due dates and time will be posted on Canvas.
  - Canvas submissions will close on the exact due date and time. All submissions are final after the deadline and **NO LATE SUBMISSIONS** will be accepted without a valid reason and proof.
  - All lab assignments are individual-effort (unless specifically stated). Any form of cheating/plagiarism such as copied/shared answers or code will result in a zero.
- **Exams:**
  - All examinations are individual-effort and must be taken in order to receive a passing grade.
  - No make-up examinations will be granted without a valid reason and proof.
  - Any form of cheating/plagiarism such as copied/shared answers or code will result in a zero.
- **Course Project:**
  - Students will be working in teams to provide computer-programming support, utilizing MATLAB and/or C, to one of our AE senior design teams (aircraft or spacecraft teams depending on their interest and the availability of senior projects). Details will be announced during class.
  - The final presentation must include a working demo demonstrating the functionality of the code using test cases.
  - Each team must submit a zipped folder which contains all the presentation slides and MATLAB/C files to Canvas. The final project submission must include all working code.
- **Grading/Regrades:**

Students may request that their work be re-graded if they believe there is an error in the original grading. Please use the link available on Canvas, and follow the instructions on

the link. Please note that a grade change is not guaranteed and that the grade may increase or decrease.

### **Classroom Protocol**

Students are expected to attend all Modules and labs and participate actively.

### **University Policies**

- Per [University Policy S16-9](#), 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](#). Make sure to visit this page to review and be aware of these university policies and resources.
- [AE Program Policies](#) are posted 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 \[pdf\]](#) requires that students with disabilities requesting accommodations register with the [Accessible Education Center](#) (AEC) to establish a record of their disability. AEC will contact the instructor with further details, if needed.

## AE 30: Computer Programming for Aerospace Engineers, Tentative 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.

Week	Dates	Lecture Sec 1 Monday	Lecture Sec 2 Wednesday	Lab Section 3 Monday	Lab Section 4 Wednesday
2	Aug 22/24	Module 1: Introduction to MATLAB (Ch 1)	Module 1: Introduction to MATLAB (Ch 1)	No Lab	No Lab
3	Aug 29/31	Module 2: Vectors and Matrices (Ch 2)	Module 2: Vectors and Matrices in MATLAB (Ch 2)	Lab 1	Lab 1
4	Sep 5/7	<b>No Lecture – Labor Day</b>	Module 3: Introduction to MATLAB Programming (Ch 3)	<b>No Lab - Labor Day</b>	Lab 2
5	Sep 12/14	Module 3: Introduction to MATLAB Programming (Ch 3)	Module 4: Selection Statements in MATLAB (Ch 4) and Flowcharts	Lab 2	Lab 3
6	Sep 19/21	Module 4: Selection Statements in MATLAB (Ch 4) and Flowcharts	Module 5: Loop Statements and Vectorizing Code in MATLAB (Ch 5)	Lab 3	Lab 4
7	Sep 26/28	Module 5: Loop Statements and Vectorizing Code in MATLAB (Ch 5)	<b>Exam 1 – Modules 1- 4</b>	Lab 4	<b>Project Proposal Presentation</b> Lab 4 cont.
8	Oct 3/5	<b>Exam 1 – Modules 1- 4</b>	Module 6: MATLAB Programs and Plotting Techniques (Ch 6)	<b>Project Proposal Presentation</b> Lab 4 cont.	Lab 5
9	Oct 10/12	Module 6: MATLAB Programs and Plotting Techniques (Ch 6)	Module 7: User Defined Functions in MATLAB (Ch 6)	Lab 5	Lab 6
10	Oct 17/19	Module 7: User Defined Functions in MATLAB (Ch 6)	Module 8: Introduction to C Programming	Lab 6	Lab 7
11	Oct 24/26	Module 8: Introduction to C Programming	Module 9: Conditional Statements in C	Lab 7	<b>Exam 2 –Modules 5-7</b> <b>Project Progress Due</b> Lab 8
12	Oct 31/Nov 2	Module 9 and 10: Conditional and Loop Statements in C	Module 10: Loop Statements in C	<b>Exam 2 – Modules 5-7</b> <b>Project Progress Due</b> Lab 8	Lab 8 Cont.
13	Nov 7/9	Review of C Programming concepts	Review of C Programming concepts	Lab 8 Cont.	Lab 9 & 10
14	Nov 14/16	Module 11: Functions & Modular Programming in C	Module 11: Functions & Modular Programming in C	Lab 9 & 10	Lab 9 & 10 Cont.
15	Nov 21/23	Thanksgiving– No Lecture	Thanksgiving– No Lecture	Thanksgiving week– No Lab	Thanksgiving week– No Lab
16	Nov 28/30	Review and Extra Credit Module	Review and Extra Credit Module	<b>Final Project Presentation</b> Lab 11	<b>Final Project Presentation</b> Lab 11
17	Dec 5	Review	- (Non-Instructional Day)	Lab 11 Cont.	- (Non-Instructional Day)
<b>FINALS</b>	<b>Dec 13</b>	<b>Tuesday Dec 13 - 12:15 – 2:30 PM, Extra Credit Lab Due</b>			