AE 030: Computer Programming for Aerospace Engineers

Course Instructor: Dr. Lucia Capdevila

Contact:
- Email: lucia.capdevila@sjsu.edu
- Canvas messaging
- Office Phone: 408-924-3126

Credit: 2 units

Class Times & Locations:
- Section 07 (Lecture): Thursday 13:30 – 14:20, Engineering Building 339
- Section 08 (Lab): Thursday 15:00 – 17:45, Engineering Building 407
- Section 09 (Lab): Tuesday 9:00 – 11:45, Engineering Building 407

Office Hours & Location: Tuesdays 13:00 – 15:00 & Thursday 10:00 – 12:00, Engineering Building 272E

Pre-requisites: None

Textbooks:
1. MATLAB for Engineers (5th Edition) by Moore
2. C Programming Language (2nd Edition) by Kernighan & Ritchie

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 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 Objectives:
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 programming  

Grade Components:  

<table>
<thead>
<tr>
<th>Course Component</th>
<th>% of Course Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes (12):</td>
<td>5 %</td>
</tr>
<tr>
<td>Laboratory reports (12):</td>
<td>40 %</td>
</tr>
<tr>
<td>Examinations (3):</td>
<td>40 %</td>
</tr>
<tr>
<td>Course project (Proposal, Prototype, Final):</td>
<td>15 %</td>
</tr>
</tbody>
</table>

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.  
- No late submissions will be accepted.  

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, I’ll be 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 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.” Academic Senate Policy F06-2
Approximate Class Schedule:

<table>
<thead>
<tr>
<th>Module</th>
<th>Module Content</th>
<th>Section 07 - Lecture, 13:30-14:20, ENG 339</th>
<th>Section 08 - LAB, 15:00-17:45, ENG 407</th>
<th>Section 09 - LAB, 9:00-11:45, ENG 407</th>
<th>Lecture</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td></td>
<td>Tuesday, August 21, 2018</td>
<td>Lab Cancelled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Intro. to programming &amp; MATLAB</td>
<td>Thursday, August 23, 2018</td>
<td>Thursday, August 23, 2018</td>
<td>Tuesday, August 28, 2018</td>
<td>Lecture 1</td>
<td>Lab 1</td>
</tr>
<tr>
<td>2</td>
<td>Arrays in MATLAB</td>
<td>Thursday, August 30, 2018</td>
<td>Thursday, August 30, 2018</td>
<td>Tuesday, September 4, 2018</td>
<td>Lecture 2</td>
<td>(Lab 1 Due)</td>
</tr>
<tr>
<td>3</td>
<td>Plotting, User Controlled Input &amp; Output in MATLAB</td>
<td>Thursday, September 6, 2018</td>
<td>Thursday, September 6, 2018</td>
<td>Tuesday, September 11, 2018</td>
<td>Lecture 3</td>
<td>(Lab 2 Due)</td>
</tr>
<tr>
<td>4</td>
<td>User Defined Functions in MATLAB</td>
<td>Thursday, September 13, 2018</td>
<td>Thursday, September 13, 2018</td>
<td>Tuesday, September 18, 2018</td>
<td>Lecture 4</td>
<td>(Lab 3 Due)</td>
</tr>
<tr>
<td>5</td>
<td>Logical Functions, Selection Structures in MATLAB &amp; Flowcharts</td>
<td>Thursday, September 20, 2018</td>
<td>Thursday, September 20, 2018</td>
<td>Tuesday, September 25, 2018</td>
<td>Lecture 5</td>
<td>(Lab 4 Due)</td>
</tr>
<tr>
<td>6</td>
<td>FOR Loops, WHILE Loops, BREAK, &amp; CONTINUE in MATLAB</td>
<td>Thursday, September 27, 2018</td>
<td>Thursday, September 27, 2018</td>
<td>Tuesday, October 2, 2018</td>
<td>Lecture 6</td>
<td>(Lab 5 Due)</td>
</tr>
<tr>
<td>7</td>
<td>Nested Loops in MATLAB &amp; Project proposal</td>
<td>Thursday, October 4, 2018</td>
<td>Thursday, October 4, 2018</td>
<td>Tuesday, October 9, 2018</td>
<td>Lecture 7</td>
<td>Project proposal</td>
</tr>
<tr>
<td>N/A</td>
<td>Midterm 1</td>
<td>Thursday, October 11, 2018</td>
<td>Thursday, October 11, 2018</td>
<td>Tuesday, October 16, 2018</td>
<td>Midterm 1</td>
<td>(Lab 6 Due)</td>
</tr>
<tr>
<td>N/A</td>
<td>Intro. to C</td>
<td>Thursday, October 18, 2018</td>
<td>Thursday, October 18, 2018</td>
<td>Tuesday, October 23, 2018</td>
<td>Lecture 8</td>
<td>(Lab 7 Due)</td>
</tr>
<tr>
<td>9</td>
<td>Conditional statements in C</td>
<td>Thursday, October 25, 2018</td>
<td>Thursday, October 25, 2018</td>
<td>Tuesday, October 30, 2018</td>
<td>Lecture 9</td>
<td>(Lab 8 Due)</td>
</tr>
<tr>
<td>10</td>
<td>Loop statements in C</td>
<td>Thursday, November 1, 2018</td>
<td>Thursday, November 1, 2018</td>
<td>Tuesday, November 6, 2018</td>
<td>Lecture 10</td>
<td>(Lab 9 Due)</td>
</tr>
<tr>
<td>11</td>
<td>Functions in C &amp; Project prototype demo</td>
<td>Thursday, November 8, 2018</td>
<td>Thursday, November 8, 2018</td>
<td>Tuesday, November 13, 2018</td>
<td>Lecture 11</td>
<td>Project prototype demo</td>
</tr>
<tr>
<td>N/A</td>
<td>Midterm 2</td>
<td>Thursday, November 15, 2018</td>
<td>Thursday, November 15, 2018</td>
<td>Tuesday, November 20, 2018</td>
<td>Midterm 2</td>
<td>(Lab 10 Due)</td>
</tr>
<tr>
<td>N/A</td>
<td>Thanks Giving Holiday</td>
<td>Thursday, November 22, 2018</td>
<td>Thursday, November 22, 2018</td>
<td>Tuesday, November 27, 2018</td>
<td>No class</td>
<td>No Lab/ Lab Cancelled</td>
</tr>
<tr>
<td>12</td>
<td>Arrays &amp; Pointers in C</td>
<td>Thursday, November 29, 2018</td>
<td>Thursday, November 29, 2018</td>
<td>Tuesday, December 4, 2018</td>
<td>Lecture 12</td>
<td>(Lab 11 Due)</td>
</tr>
<tr>
<td>N/A</td>
<td>Announcements, Project time, and Q &amp; A</td>
<td>Thursday, December 6, 2018</td>
<td>Thursday, December 6, 2018</td>
<td>Tuesday, December 11, 2018</td>
<td>Announcements, Project time, and Q &amp; A</td>
<td>(Lab 12 Due)</td>
</tr>
</tbody>
</table>

Final Exams Weeks Schedule:

<table>
<thead>
<tr>
<th>Module</th>
<th>Module Content</th>
<th>Section 07 - Lecture, 12:15-14:30, ENG 339</th>
<th>Section 08 - LAB, 14:45-17:00, ENG 407</th>
<th>Lecture</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Exams</td>
<td>Midterm 3 &amp; Final Project Demo</td>
<td>Thursday, December 13</td>
<td>Thursday, December 13</td>
<td>Monday, December 17</td>
<td>Midterm 3</td>
</tr>
</tbody>
</table>

Schedule Notes:
Please see this semester’s academic calendar for important SJSU deadlines

L. Capdevila
8/23/18