San José State University  
Charles W. Davidson College of Engineering  
DEPARTMENT OF ELECTRICAL ENGINEERING  
EE120L - Microprocessor Based System Design Laboratory,  
Section 05, Spring 2021

Course and Contact Information

Coordinator: Prof. Binh Le  
Instructor(s): Naures Wagokh  
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Email: naures.wagokh@sjsu.edu  
Office Hours: Thursday, 4:15PM - 4:30PM  
Class Days/Time: Thursday, 1:30PM - 4:15PM  
Classroom: Online via Zoom: https://sjsu.zoom.us/j/87653492537

Prerequisites:  
EE 118 (with grade of “C-” or better)  
EE 120L (to be taken concurrently)  
Knowledge in computer programming and software development  
Good skills in C programming  
Advanced knowledge in number systems and basic logic components

Course Description

EE 120 Laboratory is part of the EE 120 course. Students taking EE 120 are required to register for one lecture section and one laboratory section. At the end of the semester, laboratory work will be integrated with the lecture one to determine EE 120 course grade. There will be no grade/pass/non-pass for the laboratory, but students must complete the laboratory in order to complete EE 120 course.  
Major activities of EE120 laboratory are listed as below:  
- Use of the software development tool to explore microprocessor architecture, addressing modes, instruction set, memory, and I/O.  
- Develop Assembly and C/C++ programs to control an embedded microprocessor-based system such as a robot.  
- Implement circuits (hardware and software) to interface a microcontroller-based system to an external device.

Course Format

This is an online course. Lectures will be delivered online at the dates/time specified above. Students are required to have a computer with internet access and a webcam.

Course Learning Outcomes (CLO)

Upon successful completion of this course, students will be able to:
• CLO1. Demonstrate an understanding of the microprocessor architecture, its instructions and addressing modes
• CLO2. Analyze a microprocessor program and develop an assembly language programs for applications.
• CLO3. Use development tool for exploring microprocessor architecture, software and hardware development.
• CLO4. Analyze experimental data and prepare technical reports and documents.

Required Texts/Readings

• Laboratory manual, documents, and assignments are available on class Canvas.
• Other Readings:

Lab Kits

Each student will be provided a Texas Instrument Robotics System Lab Kit Max (TI-RSLK MAX) to learn and demonstrate the microprocessor-based system. The TI-RSLK MAX is an embedded system based on MSP432P401R microcontroller that interfaces with peripherals such as sensors and motors. The MSP432 is a mixed-signal microcontroller family that is based on a 32-bit 48MHz ARM Cortex-M4F with floating-point operation unit. The Development Environment (IDE) for the TI-RSLK MAX is the Code Composer Studio (CCS) provided by Texas Instruments for use with TI microcontrollers and embedded processors.

Laboratory Exercise Reports

Each laboratory exercise report requires same information and sections as described below and with additional information as described in the lab assignment on Canvas. Each laboratory exercise report must be turned in as scheduled. Students may be asked to demonstrate their lab exercises anytime so please make sure that data and programs are always available. Each student is responsible for individual laboratory exercise reports and late reports will not be accepted.

Each lab report must be prepared neatly and professionally. The technical contents, format, completeness, and appearance of the report all contribute to the report's grade. Students are responsible to include all requested and necessary information in your reports. The report must have sections in order as listed below. Each section must start with the new page.

A cover page with information shown below (a cover page is available on class canvas):
• EE 120 Laboratory Section #, Semester (example: Spring 2020), Date
• Laboratory number and title
• Student full name (Last, first, middle)
• Lab instructor name
• Lab report due date (as shown on the last page of the syllabus)

And the remaining sections are listed as below. Each section must start on the new page. Figures and tables must be labeled separately and clearly.
• Introduction
• Lab procedure and results
• Conclusion

All reports must be submitted on Canvas in .pdf file and source codes (if required) must be in either in .c (for C), .cpp (for C++), or .asm (for assembly). No other file formats are accepted unless directed otherwise.
Final Evaluation

Laboratory work will be integrated with the lecture one to determine EE 120 course grade. There will be no grade/pass/non-pass nor final examination for laboratory.

Grading Information

The lab exercises together with the lecture exams, quizzes, homework assignments, etc. make-up EE 120 course grade (as stated in the EE120 lecture syllabus). Lab exercises (lab participations, reports and demos) cover 25% of the course grade. There are 10 lab exercises for the whole semester and each lab will be graded as 100 points. Schedule for lab exercises is shown below.

EE120L - Microprocessor-Based System Design Laboratory, Spring 2021

Course Schedule (Tentative)

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics, Readings, Assignments, Deadlines</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/28/2021</td>
<td>No labs</td>
</tr>
<tr>
<td>2</td>
<td>2/4/2021</td>
<td>Discussion of laboratory syllabus, lab kits, equipment, safety, rules, lab</td>
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<tr>
<td></td>
<td></td>
<td>laboratory report preparation and report submissions</td>
</tr>
<tr>
<td>3</td>
<td>2/11/2021</td>
<td>Instructor lectures lab 1</td>
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<tr>
<td></td>
<td></td>
<td>Students work on lab 1</td>
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<tr>
<td>4</td>
<td>2/18/2021</td>
<td>Students submit lab 1 report. Instructor lectures lab 2</td>
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<td></td>
<td></td>
<td>Students work on lab 2</td>
</tr>
<tr>
<td>5</td>
<td>2/25/2021</td>
<td>Students submit lab 2 report. Instructor lectures lab 3</td>
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<td></td>
<td>Students work on lab 3</td>
</tr>
<tr>
<td>6</td>
<td>3/4/2021</td>
<td>Students demo lab 3 and submit lab 3 report. Instructor lectures lab 4</td>
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<td></td>
<td>Students work on lab 4</td>
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<tr>
<td>7</td>
<td>3/11/2021</td>
<td>Students demo lab 4 and submit lab 4 report. Instructor lectures lab 5</td>
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<td></td>
<td>Students work on lab 5</td>
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<tr>
<td>8</td>
<td>3/18/2021</td>
<td>Students demo lab 5 and submit lab 5 report. Instructor lectures lab 6</td>
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<td></td>
<td>Students work on lab 6</td>
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<tr>
<td>9</td>
<td>3/25/2021</td>
<td>Students demo lab 6 and submit lab 6 report. Instructor lectures lab 7</td>
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<td></td>
<td>Students work on lab 7</td>
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<tr>
<td>10</td>
<td>4/1/2021</td>
<td>Students demo lab 7 and submit lab 7 report. Instructor lectures lab 8</td>
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<td></td>
<td>Students work on lab 8</td>
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<tr>
<td>11</td>
<td>4/8/2021</td>
<td>Students demo lab 8 and submit lab 8 report. Instructor lectures lab 9</td>
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<td></td>
<td>Students work on lab 9 (2-week lab)</td>
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<td>12</td>
<td>4/15/2021</td>
<td>Students continue to work on lab 9 (2-week lab)</td>
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<tr>
<td>13</td>
<td>4/22/2021</td>
<td>Students demo lab 9 and submit lab 9 report. Instructor lectures lab 10</td>
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<tr>
<td></td>
<td></td>
<td>Students work on lab 10 (2-week lab)</td>
</tr>
</tbody>
</table>
### Week 14
**Date:** 4/29/2021  
**Topics, Readings, Assignments, Deadlines:** Students continue to work on lab 10 (2-week lab)

### Week 15
**Date:** 5/6/2021  
**Topics, Readings, Assignments, Deadlines:** Students demo lab 10 and submit lab 10 report

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### Additional Rules for Spring 2021 EE Laboratories

#### Code of conduct while in labs on campus
- Students attending in-person labs are required to wear face coverings, regularly sanitize/wash hands, and maintain 6 feet (about 2 arms' length) distance between each other at all times while in the building. Check SJSU Health Advisories website for updated information about university requirements and rules [https://www.sjsu.edu/healthadvisories/](https://www.sjsu.edu/healthadvisories/)
- Students need to check with the lab instructor about the process to get on campus.
- Students must only work in designated stations at all times.
- Disposable masks will be provided if forgotten.
- If attending in person lab 2 days in a row, washed/clean cloth masks or new disposable masks must be worn each day.
- Disinfecting wipes are provided in each lab, and students are expected to wipe down their stations before and after each use.
- Students are strongly encouraged to bring a personal mouse or keyboard to avoid using shared devices.
- Please keep in mind drinking fountains are not available, so plan accordingly.

#### Component Pickup Procedure
- Necessary components and devices will be provided to students by the department.
- Students living within a 60-mile radius from campus will receive a designated time to pick up their components.
- Those living further than 60-mile can have their components and/or devices mailed in which a return label will be included.
- Prior to picking up or mailing, students must fill out the DocuSign form including the designated receiver’s information.
- If a student would like to designate someone else to pick up on behalf of them, there will be an option on the DocuSign.
- In the case components are lost or broken, students must contact the department as soon as possible to avoid an incomplete grade and/or registration hold.
- Students will have to come on campus a second time to pick up the ADALM 2000 should a course requires it. Unfortunately, the shipment for the devices will arrive sometime after school has begun.

#### Dropping Course after Receiving Components
- Students must return components to the EE department either in person or through mail using the provided return label.
- Components and devices must be in the office by September 8th to avoid an incomplete grade and/or registration hold.
Adding a Course

- If a student has completed a DocuSign form for a course, but components have not been picked up/mailed yet, and they choose to add another course, an email can be sent to ee-techsupport-group@sjsu.edu to amend their previous form.
- If a student has their components or devices already, an additional DocuSign form will need to be submitted prior to adding a new course.
- If multiple courses need to be added, students need to wait until enrolled before submitting one DocuSign for all the courses.
- Please submit these forms prior to September 8th to receive new components or devices.

Returning Components and Devices

- Detailed instructions on returning procedure will be provided to students later in the semester.
- Students need to return components and devices in working condition to avoid an incomplete grade and/or registration hold.
- Course of action will be discussed on a case by case basis for any broken or missing components at the time of return.
- Components and devices need to be returned no before the end of the semester.
- Please plan to drop off or mail components at an appropriate time, as those returned past the deadline will not be accepted and will result in an incomplete grade and/or registration hold.