CMPE 118[218]/L:
Introduction to Mechatronics

Gabriel Hugh Elkaim
Introduction to Mechatronics

- T-Th 9:50 – 11:25 AM, E2-280 Simularium
- Lab: JBE 111, 113, and 115, 24/7 access

- Instructor: Prof. Gabriel Hugh Elkaim
- TA’s: Jordan Liss and Kyle Cordes
- Tutors: Daniel Bazor, Gilberto Barrios, Pierre Baudin, Sierra Catelani, Kevin Johnson, Aaron Storrs, Michael Suinn, Pavlo Vlastos
Lab Sections

- Times when TA’s and Tutors are guaranteed to be in the labs:

- These will be posted as soon as we know them.

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
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<tbody>
<tr>
<td>M</td>
<td>4:30p - 10:30p</td>
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<tr>
<td>T</td>
<td>1:30p - 5:30p</td>
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<tr>
<td>W</td>
<td>9:30 - 10:30pm</td>
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<td>Th</td>
<td>3:30 - 7:30p</td>
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<td>F</td>
<td>8-10pm</td>
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Textbooks


Optional Textbooks (good references):

- "Mechanical Devices for the Electronics Experimenter," by Britt Rorobaugh
- "The Cartoon Guide to Computer Science" by Larry Gonick
# Syllabus/Readings

**University of California, Santa Cruz**  
**Board of Studies in Computer Engineering**  
**CMPE-118(218)/L: Introduction to Mechatronics**

## Lecture/Lab Calendar

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Reading (to be completed before the lecture)</th>
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| -2 late September | CKO Ch. 9, 10,11- Basic Electronics  
BasicCircuitsI, BasicCircuitsII, BasicOpAmps |  
| -1 late September | CKO Ch. 1,2,3,4-Intro, microprocessors, C code  
CKO Ch. 31 – Troubleshooting |  
| 0 Course Introduction | CKO Ch. 5 – Event Driven Programming, event checkers, State Machines |  
| 0.5 ES Framework/HSM for Lab 0 | CKO Ch. 6 – Software Design, abstraction, architecture, testing |  
| 1 Event Driven Programming, State Machines | CKO Ch. 13 – Sensors  
H+H Section 15.02 – Light levels  
15.05 – Hall effect + magnetic field |
Personal Responsibility

Personal Responsibility in the Classroom

Over several years of teaching, we (the instruction staff) have come to the conclusion that we need to give you (the students) a concrete set of expectations both in terms of what we expect from you, and what you can expect from us. While this document is certainly incomplete and will not be able to cover all possible scenarios, we hope that you will use it as a set of guidelines to properly set your expectations, and thus endeavor to meet them.

1. You are an adult, and we expect you to behave like one. Your success (or failure) is your own responsibility.
   a. It is your responsibility to learn the material covered in the class
   b. It is your responsibility to adequately prepare for the class, e.g.: reading and pre-labs.
   c. It is your responsibility to turn in assignments on time, in the right
Grading

COURSE: 67% Labs and Projects
33% Quizzes, and Exams

QUIZZES, EXAMS: 20% Midterm (Take home)
12% Quizzes (weekly)
1% Participation

LABS AND PROJECT: 8% Lab 0
8% Lab 1
8% Lab 2
8% Lab 3
35% Project
Class Website

- [https://classes.soe.ucsc.edu/cmpe118/Fall16/](https://classes.soe.ucsc.edu/cmpe118/Fall16/)
Piazza (1.2)

- https://piazza.com/ucsc/fall2016/cmpe118l/home

CMPE 118/L: Introduction to Mechatronics

Description

Mechatronics is the synergistic combination of mechanical engineering ("mecha" for mechanisms), electronic engineering ("tronics" for electronics), and software engineering. The purpose of this interdisciplinary engineering field is the study of automatics from an engineering perspective and serves the purposes of controlling advanced hybrid-systems such as production systems, synergy-drives, planetary-rovers, automotive subsystems such as anti-lock systems, spin-assist and every day equipment such as autofocus cameras, video, hard disks, cd-players, washing machines, lego-matics etc.

Mechatronics is centered on mechanics, electronics and computing which, combined, make possible the generation of simpler, more economic, reliable and versatile systems.

The word "mechatronics" was first coined by Mr. Tetsuro Morita, a senior engineer of a Japanese company. Yaskawa, in 1969. Mechatronics may alternatively be referred to as "electromechanical systems," or as "smart products."

Personal Responsibility Document

9/9/16 2:01 PM

Hi Class,

Please take the time to read the Personal Responsibility document on the website and take the time to understand it. It is what we expect of you, and what you can expect of us.

I will ask you all to sign a copy of it on the first day of class. Note that signing it does not mean you agree with it, only that you have read it and understood it. I don’t plan on spending any time in class on it, unless you have questions about it.

--G

Announcements

Welcome to Mechatronics, video lectures to watch before first class
Piazza (2.2)

- https://piazza.com/ucsc/fall2016/cmpe118l/home

Welcome to Mechatronics, video lectures to watch before first class

Welcome to the Fall 2016 CMPE 118L Intro to Mechatronics.

I hope you have all had a good, productive, and restful summer.

As you may or may not yet realize, this class will be the most work you have put into anything in your life, to date. Also some of the most fun. The class is overloaded with work, and we are always behind and running. I will go over this in detail at the first lecture.

In order to try to give you a bit more time to get comfortable with the material, and not falling behind in the lecture, we want you to review your basic electronics and microcontrollers in the following linked lectures. This is an essential part of the class, and we expect you to have watched these carefully before we start.

Please read (carefully) the class information and syllabus and note the reading:
https://classes.soecs.ucsd.edu/cmpe118/Fall16/LectureNotes/CMP118_info.pdf
https://classes.soecs.ucsd.edu/cmpe118/Fall16/LectureNotes/CMP118_Syllabus.pdf

Before the class starts, watch the following:
Lecture (-1.1) - (-1.2): Microprocessors (Very relevant material for your first lab and a partial review of CE12 and CE121)
Lecture (-2.1), (-2.2), (-2.3): Basic Electronics I, II, and Basic OpAmps.

Yes there will be a quiz. Yes you will be doing things the first day. Get ready to hit the ground running; we will see you in a few weeks.

You can download all the videos here:
- 1.1: https://classes.soecs.ucsd.edu/cmpe118/Fall16/Videos/Lecture_1_MicroControllers_Part1.mp4
- 1.2: https://classes.soecs.ucsd.edu/cmpe118/Fall16/Videos/Lecture_1_MicroControllers_Part2.mp4
- 2.1: https://classes.soecs.ucsd.edu/cmpe118/Fall16/Videos/CMP118_BASICcircuits1.mp4
- 2.2: https://classes.soecs.ucsd.edu/cmpe118/Fall16/Videos/CMP118_BASICcircuits2.mp4
- 2.3: https://classes.soecs.ucsd.edu/cmpe118/Fall16/Videos/CMP118_BASICcircuits3.mp4
Lab Work (and what is expected)

• You will spend 20+ hours/week in the lab outside of the lecture
• This will go up for the last five weeks of class during the project
• “Prep work” is much more time efficient than trying to learn it on the fly
• Read (do NOT skim) everything we tell you
• Twice (maybe three times)
Lab Work (tips and hints)

- Do not attempt to “divide and conquer”
  - It is never faster
  - You never learn the parts you don’t do
  - The work is shoddy
- Proper preplanning prevents p***-poor performance
  - Pay attention to the prelabs
- You will make mistakes: it is expected
Academic Integrity

• Presenting someone else’s work as your own.

• Do NOT do it, not worth it
Questions?