Introduction to Engineering Design: Autonomous Rover
Summer 2023 Syllabus

Monday-Friday 9:00 am - 4:00 pm
Location: Boelter Hall 2808

Instructor of Record: Prof. Jacob Schmidt, Ph.D., schmidt@seas.ucla.edu

Group Tutors:

Name:	Disleiry Hernandez 1st year, Mechanical Engineering
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Name:	Issacc Chavez 1st year, Mechanical Engineer
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Course Description: Welcome to UCLA and what may be your first engineering class! This course will be vastly different from your other courses as we will be exploring engineering through hands-on projects while learning to utilize many of the resources available in the new Makerspace. Additionally, this class will be led by Group Tutors. Rather than focusing on any one specific engineering discipline, the projects in this course will draw from the fields of mechanical engineering, electrical engineering and computer science. Specific topics covered will include computer-aided mechanical design, programming (Arduino), and data collection/visualization.

Course Communication: Announcements, lecture slides, assignments, and other course materials will be posted on the Bruin Learn course website. Students are responsible for checking the site often and ensuring that they read all mass email announcements sent via the website. A unified Discord channel will also be created. This will be used to coordinate between classmates and instructors and serve as a forum to facilitate questions and discussion.

Tentative Course Outline and Schedule:

Class	Date	Topic	Key Dates/Assignments (tentative)
1	6/26	**Class Introduction** - Introduction of mentors and course expectations	**Complete Pre-Class survey**

		CAD Lecture - Computer-aided design in Solidworks - Fun CAD Design Practice	
2	6/27	**Intro to Electronic Components** **Visit MakerSpace** **Receive Materials** **Programming Lecture** **Intro to Tinkercad** **General WorkShop**	**TinkerCad Assignment** **Daily Reflection**
3	6/28	**Wiring and Programing Practice** - Physical activity as a class **Engineering Design Process** - Defining a problem, Test and Eval, Design iteration **Begin Preliminary Design CAD** - Individual and group brainstorm	**Wiring/Programming Projects** **Preliminary Rover Design** **Daily Reflection**
4	6/29	**Start Preliminary Design** - CAD **Preliminary Design Presentation Outline**	**Preliminary Design Review** **Preliminary Design Presentation** **Daily Reflection**
5	6/30	**Preliminary Design Presentations** - Feedback given to each team **Design Iteration** - Should be starting final design **Begin General Printing** - Makerspace work time	**Preliminary Presentations Due** **Daily Reflection**
6	7/3	**Start more Prints** **Laser Cutting Workshop** **General Manufacturing Lecture** **Work Time** - Should have final design done - Begin laser cutting your chassis and other needed components	**3D Printing** **Laser Cutting** **Daily Reflection**
7	7/4	**Soldering Workshop** - Hands-on practice and lecture **Work Time** - Solder motors/servos **Team Updates**	**Daily Reflection**
8	7/5	**Need Based Workshop** **Work Time** - Continue building or programming **Team Updates** **Check-up Point:** - Is the chassis laser cut? - Have you started placing your components?	**Daily Reflection**
9	7/6	**Mechanisms Lecture** - Lever, Pulleys, Wheel and Axle, etc.	**Daily Reflection**

		Work Time Team Updates	

10	7/7	**Progress-based feedback**
		Work Day
		   - Continue building or programming
		Team Updates
		Check-up Point:
		   - Has your grabbing mechanism been manufactured?
		   - Sensors/motors must be wired
			Daily Reflection

11	7/10	**Work Day** - Rover must be able to move, using sensors	**Daily Reflection**

12	7/11	**Work Day**
		   - Testing and adjustments to build and program
		   - Grabbing mechanism should be working
			Daily Reflection

13	7/12	**Work Day**
		   - Testing and adjustments to build and program
		Obstacle Course Trial
		   - Will allow for more adjustments and design iteration
		Check-up Point:
		   - Overall working rover
			Daily Reflection

14	7/13	**Obstacle Course Practice** **Final Work Day** - Semi-last minute touches **Start final presentation**	**Finish Rovers**
15	7/14	**Some Work Time** - Last minute touches (presentation & rover) **Final Project Presentations** **Final Project Competition** **Class Reflection**	**Final Presentations Due!**

Grading Policy:
- Since this is a letter-graded course, much of what you get out of this course depends on the amount of work you put in. It's early in your engineering studies/career, so we understand that robots may end up not being something you are passionate about. However, there is a minimum standard that all students will be held to. Requirements are reflected in the grading scheme and include the following: attendance

and active participation at <u>every</u> class session, active participation in your project groups, completion of smaller assignments, and participation in group project presentations.

- The grading has been designed to both reward extra effort and account for missing requirements. Bonus points will be awarded to students who challenge themselves with innovative rover designs and exceed the expectations of the course. Each student will begin with 95 points and deductions and additions will be made as follows. Additionally, a portion of your grade will be determined by a peer evaluation completed by each member of all project groups.

Course Point Opportunities

- **Enrollment +95**
- **Videos, Tasks, Assignments**
  - > 4 Unattempted = -10
- **Final Project**
  - Each Unattempted = -10
  - Bonus Points = up to +15 (TBD)
- **Engineering Notebook**
  - Each missing entry = -5

Letter Grade Rubric

A+:	≥ 100
A:	≥ 90 and < 100
B:	≥ 80 and < 90
C:	≥ 70 and < 80
D:	≥ 60 and < 70
F:	< 60

- Course attendance is *extremely important*. If you need to miss a class, please contact an instructor at least a day in advance. Excused absences will be given to those with acceptable excuses.

—UCLA Policies—

Academic Integrity:

- UCLA expects and requires all of its students to act with honesty and integrity, and respect the rights of others in carrying out all academic assignments and projects.
- Working in groups is allowed and encouraged. However, submitting the work of others, cheating, and plagiarism are unacceptable. The key to working in an effective group is compiling input from all members and making equal contributions.
- In accordance with UCLA policy, any cases of suspected cheating or academic dishonesty will be reported to the Dean of Students Office and the Department of Student Affairs. Sanctions may include zero credit on an assignment or a no-pass. If warranted, a student may be disqualified, suspended, or expelled from the School of Engineering. It is your responsibility to know and understand the University Academic Integrity Policy and the UCLA Student Code of Conduct (http://www.deanofstudents.ucla.edu/).

Additional Information:

- Counseling and Psychological Services (CAPS) exists to support your mental health needs as you pursue your academic goals. CAPS services are designed to foster the development of healthy well-being necessary for success in a complex environment. A variety of services are available including: crisis counseling by phone 24/7, emergency intervention, Individual counseling and psychotherapy, group therapy, psychiatric evaluation and treatment, educational programs and workshops, campus mental health and wellness promotion. Visit https://www.counseling.ucla.edu/ for more information or call 310-825-0768. For emergencies, please contact 911.
- Students requesting accommodations for a disability, including additional time or resources for taking exams, must be registered with the UCLA Center for Accessible Education (CAE; http://www.cae.ucla.edu/) and must submit appropriate documentation from the CAE.
- Title IX prohibits gender discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking. If you have experienced sexual harassment or sexual violence, you can receive confidential support and advocacy at the CARE Advocacy Office for Sexual and Gender-Based Violence, 1st Floor Wooden Center West, CAREadvocate@caps.ucla.edu, (310) 206-2465. In addition, Counseling and Psychological Services (CAPS) provides confidential counseling to all students and can be reached 24/7 at (310) 825-0768. You can also report sexual violence or sexual harassment directly to the University's Title IX Coordinator, 2241 Murphy Hall, titleix@conet.ucla.edu, (310) 206-3417. Reports to law enforcement can be made to UCPD at (310) 825-1491.
    - Faculty and Group Tutors are required under the UC Policy on Sexual Violence and Sexual Harassment to inform the Title IX Coordinator should they become aware that you or any other student has experienced sexual violence or sexual harassment.