E96A - Introduction to Engineering Design: Planes

Summer 2023 Syllabus

Lecture: Monday - Friday 9pm - 4pm

Class: Boelter 2730D (DBF Lab)

Instructor of Record: Prof. Jacob Schmidt, Ph.D. schmidt@seas.ucla.edu, Engineering V 5121G

Group Tutors:

Name:	**Email:**	**Major:**
Aniket Verma	aniketverma04@g.ucla.edu	Electrical Engineering
Saul Escobedo	sauesc76@g.ucla.edu	Mechanical Engineering

Course Description:

This course is designed to introduce students to the basics of plane engineering. The goal is to have student teams design and construct a foam and 3D-printed fixed wing aircraft and fly the aircraft.

We will teach the basics of plane engineering and the various techniques and tools that we use to design and build a plane. This includes knowing the basic physics of aerodynamics, applications of computer aided design (CAD) software, the use of figure of merit (FOM) charts to make design decisions, and appropriate manufacturing techniques to safely build the plane. Students will also learn the basics of Arduino.

Throughout the course, students will be divided into teams of 5 and will compete in two test flights during the last two weeks of the course. The first flight will be a proof of flight demonstration where the prototype plane will complete 3 laps of the flight course and land safely. The second flight will be the upgraded and revised final demonstration where the plane

will complete 3 laps and land safely. Students have the option to fly their own plane if they complete training with a flight simulator. Each team will also complete a 10 minute presentation at the end of the course, which will describe their design decisions, testing process, and results at competition.

Catalog Description

Introduction to basics of plane engineering. Students will work in teams to design and construct a foam and 3D-printed fixed wing aircraft to complete two missions at the end of the course. Students will learn the basic physics of aerodynamics, applications of CAD software, how to use FOM charts to make design decisions, and manufacturing techniques. Students will also be taught how to create additional functionality in their aircraft using resources like Arduino. Study led by experienced undergraduate members of Design Build Fly at UCLA. No prior experience or coursework necessary.

Course Outline and Schedule:

Week	Topic
1	Introductions, Rubber Band Gliders, Basic Aerodynamics, Parts of a Plane, Introduction to CAD, FOM Charts, Manufacturing and Prototyping
2	Manufacturing, Control Surfaces, Electronics, Flight Demonstration 1
3	Manufacturing, Flight Demonstration 2, Course Reflections, Project Presentation

Course Communication:

Announcements, lecture slides, assignments, and other course materials will be posted on the UCLA Bruin Learn course website: https://bruinlearn.ucla.edu/courses/165111

Grading Policy:

Grades are based on participation, assignments, and teamwork. Justified absences are allowed. Before an absence, the student must contact one of the Group Tutors before the date of the lecture.

The breakdown is as follows:

- **Attendance** - 10%
    - -2% for every unexcused absence
    - Three tardies is one unexcused absence
- **Assignments** (30% total)
    - *Final Presentation* - 10%
    - *Miscellaneous Assignments* (FOM Charts, CAD, Airfoil selection) - 20%
- **Project Participation** - 50%
- **Group Evaluation** - 10%
- *Extra Credit*: Winning a competition category: +2%

A	90%-100%+
B	80%-89.99%
C	70%-79.99%
D	60%-69.99%
F	59.99% & below
P	> 70%
NP	< 70%

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:

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.

Syllabus subject to change without notice. Class subject to cancellation.