ENGR 96A - Introduction to Engineering Design: Go-karts

Lecture: Monday 2:00 pm - 4:50 pm | Boelter 1805 | Alex G./Christian H.

Faculty Advisor:

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Th, F 2:00-4:00 PM
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Course Description:

Welcome to UCLA and one of your first engineering classes! This course is designed to serve as an introduction to basic engineering principles and to get you excited about the future engineering challenges you'll be facing. This course is going to be very different from many of the classes you'll be taking. It revolves around a single project: the design and construction of a functioning Go-Kart. During this course, you'll be introduced to engineering design tools and practices, along with basic machining and, most importantly, the thought process that goes on behind solving any engineering problem. This course will also be led by student mentors, upper level undergraduate students who have experienced much of what you'll be experiencing as you go through UCLA. You'll be divided into teams of five, each team tasked with constructing a Go-Kart, with the goal of presenting their production model and competing with the other teams at the end of the quarter.

Introduction to multi-discipline, end-to-end engineering design and teamwork through design and production of a Go-kart. Basic engineering principles, Solidworks, basic machining, rapid

prototyping, and documentation. Chassis, driver interface, steering, and braking subsystem design. Technical presentations and engineering design cycle. Letter Grading.

Course Communication:

Assignments, general announcements, lecture slides, and other resources will be provided through the UCLA CCLE course website: (https://ccle.ucla.edu/course/view/18F-ENGR96A-1). Students are responsible for checking the site often and ensuring they're receiving the automated mass emails the site sends out for announcements. Additionally, this syllabus may be updated as needed during the quarter. Finally, feel free to email your instructors with any questions or concerns you may have. We will endeavour to reply swiftly.

Course Resources:

Students will be given access to the SEASNET Computing resources, the UCLA Engineering Maker Space, and conditional access to various on campus engineering machine shops to design, manufacture, assemble, and test their vehicles.

For new engineering students, SEASnet accounts will be required to access computing resources such as Solidworks. If students do not have a SEASnet account, they should apply for one through the web at: https://seas.ucla.edu/acctapp/

SEASnet Applications take approximately 1 business day to process.

Course Schedule:

Week	Lecture (3 Hr)	HW
1	Project Overview. CAD: Solidworks introduction CAD: Introduction to sketching and 3D Features	Machine Shop Safety Training. CAD Training HW
2	Assembly, Drawings. Physics of Forces. CAD: FEA Good Design Practices Documentation Designing for Waterjet. Aluminum extrusions and fasteners.	Complete CAD Training FEA and Assembly. CAD Chassis. Begin Machining Project

3	Go Kart Systems Mechanical Design: Gears, Sprockets, etc. Chassis Feedback	Complete Machining Project. Revise Chassis. Begin CAD subsystems
4	In depth on subsystems. CAD Subsystem. Subsystem mounting. Chassis Machining	CAD Mechanical subsystems continued Chassis Machining and Assembly.
5	Overall systems review with mentor. Chassis Assembly Integration. **CHASSIS COMPLETE** by this class	Fix Integration issues CAD Subsystems w/ revisions Prepare for Design Review
6	In Class Machining	Design Review Prep
7	Overall Design Review **Design Freeze**	Design Revision (If design fails to meet minimum requirements) Final subsystem manufacture
8	Assembly and Testing **Rolling CHASSIS by this class**	Complete all Machining
9	Assembly, Integration, and Testing How to do a Technical Presentation **Driving Chassis by this class**	Assembly and Testing cont. Work on Presentation
10		Final Presentation and Competition

Grading:

This course is a two unit, letter graded course. Your success in it will be heavily determined by the amount of effort your put in. At the same time, this course is designed to serve as an introduction to basic engineering practices for incoming Freshmen, and building cars may not be something you'll be interested in going forward. As such, the grading scheme is designed to work with your transition into the college environment, rewarding extra effort while accounting for missing requirements. That being said, there is a minimum standard all students will be held to.

Each student begins with 90 points, with additions, deductions, and resulting final grade described below:

Course Point Opportunities

- Enrollment: +90 points
- Attendance
  - < 9 classes: -10
  - < 8 classes: -30
- Assignments/Project Deadlines
  - > 3 missing: -10
- Presentations:
  - Design Presentation: +10
  - Final Presentation: +20
- Final Gokart
  - Fails minimum safety standards: -30
  - Extra Effort: up to +20

Letter Grading Rubric

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

Note that course attendance is extremely important, due to the limited number of class periods a quarter. If you need to miss a class, contact your instructor at **least 3 days in advance**. Explained absences will be excused.

Also, safety is paramount when designing these vehicles, because you'll be the ones driving them at the end of the quarter. If you're worried about meeting the minimum safety standards, **contact your instructors ahead of the deadline**. We want you to succeed and will help you in your design process.

If you are concerned about your level of participation in the class and whether this may result in a failing grade, please approach any of the instructors and talk about it before dropping the course. We understand it can be a difficult transition to college and want to be able to support you. Please *do not wait* until the last minute to bring up any concerns.

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.