Engineering 1RK: Introduction to Engineering
Summer 2026 Syllabus

Instructor of Record:
Prof. Brett T. Lopez, Ph.D., btlopez@ucla.edu, Engineering IV 14-118

Course Dates/Hours: June 22 - July 10, 2026 (9 am - 4 pm PT, Monday-Friday)

Student Instructors:

Name: TBD
Contact: TBD
Office Hours: TBD

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Contact: TBD
Office Hours: TBD

Course Description:

Led by experienced undergraduate students, this course is built to introduce new students to rocketry concepts and applications in preparation for clubs and careers. Students will gain confidence in their innovative decision-making skills, project-based teamwork skills, and problem-solving skills in this new student course. Students will, by the completion of ENGR 96R, have designed, built, and tested 2 projects: a small 3D printed rocket and a larger solid motor rocket. Class curriculum will cover the aerodynamics, propulsion and electronics systems, design, manufacturing, and integration processes of low and high powered rocketry. Students *may* utilize Computer Aided Design (CAD) software, Finite Element Analysis (FEA), RasAero, heavy machinery, Arduino, 3D printers, laser cutters, and various materials and manufacturing methods to complete small rockets in groups. In order to assure appropriate safety knowledge, students will engage in online and, possibly, in person safety training modules. At the end of the course, students will have a chance to launch their rockets at either a local park, the Santa Fe Dam, or the Mojave Desert. Students should have gained a solid foundation in rocket engineering that can be applied to further studies or careers in aerospace engineering or related fields by completion of this course. Note that this class is geared towards students who are completely new or have limited experience with rocketry.

Course Communications:

All materials will be posted on BruinLearn. Instructors can be reached by email (found above) and you can expect to receive a reply within a day. You are encouraged to connect with your peers and expected to communicate with your team members through your preferred method.

Course Outline:

Week	Topics/Content	Supplemental Content	Assignments
1	***Class Overview and Rocketry Intro*** - Get excited about rockets and the space industry! - Introduce overall class structure and adaptations - Fundamentals of rocket design and Rocket Project (Open Rocket Tutorial) - Tour of Lab and Q&A	-OpenRocket Tutorial -Introduction and Open Rocket Tutorial Slides	- Download software (CAD, OpenRocket) - Ensure class communication (Slack, groupme, etc.) - Form partners for 3DPR -Online Safety Training
2	***Computer Aided Design (CAD)*** - CAD tutorial Lecture - Intro to CAD Work Session	-Rocket CAD tutorial (SolidWorks) -CAD Tutorial slides **Video:** SolidWorks 3DPR	-CAD Assignment (submit CAD file during class) - CAD Assignment (submit 3DPR CAD Draft) - optional Solidworks-based FEA intro
3	**Competition and Flight Testing** - Review launch materials - Finish rocket integration - Launch 3DPR!	- Recovery parachute, motor, guide rail launch lugs **Video:** 3D Printing & tolerancing	- Brief launch review - Form GHPR groups - Start GHPR brainstorming
4	***Vehicle Engineering & Manufacturing*** - VE / Aerodynamics Lecture - Fundamentals of material selection - Manufacturing techniques and considerations - Makerspace tool and machine demonstrations - GHPR Work session	-VE and Aerodynamics slides	- Work on GHPR OpenRocket - Work on GHPR CAD design (Fins and Nose one) - Start PDR
5	***GHPR Manufacturing*** - Solidworks CAD Modeling - Basic Laser cutting Techniques - Basic/Intermediate layup/cure techniques for optimized structures	- Laser cutting - Fiberglass Layup - Epoxy Layup	- Finish GHPR airframe design - Start airframe manufacturing -Laser cut fins -Print nose cone
6	***Electronics***	- Arduinos - Altimeters	- Manufacture GHPR - Manufacture switchbox

	- Electronics Lecture - GHPR Work session	- Switchbox	
7	***Propulsion*** - Propulsion Lecture - GHPR Work session	- Intro to rocket propulsion slides - Different propulsion methods	- Manufacture GHPR - Manufacture switchbox
8	***Integration*** - Integration Lecture - GHPR Work Session	-Integration slides	- Manufacture GHPR
9	***Launch Preparation*** - GHPR and Final Presentation Work session - GHPR Feedback - Finalize Rockets		- Finish GHPR Manufacturing
10	***Final Presentations*** - Final Presentations - Mentor Advice - Rocket Project Q&A - Party!		- Join Prometheus

Grading Policy:
Attendance is the most important aspect of this course and you are expected to show up on time to class each week. Tardiness after 10 minutes without prior notice will count as an absence. Note that it is not possible to pass this course if you are absent more than twice. Please reconsider taking this course another quarter if you are unable to attend.

- *Attendance: 80% of grade*
  - 1 or 2 unexcused absences: -10% of total course grade
  - More than 2 absences: -40% of total course grade
- *3DPR Assignments: 10% of grade (based on completion, not performance)*
- *GHPR Assignments: 10% of grade (based on completion, not performance)*

Grading Scale:

98-100%	A+
90-97.99%	A
80-89.99%	B
70-79.99%	C
60-69.99%	D
< 60%	F

University Policies

Academic Integrity: UCLA is a community of scholars. In this community, all members including faculty, staff and students alike are responsible for maintaining standards of academic honesty. As a student and member of the University community, you are here to get an education and are, therefore, expected to demonstrate integrity in your academic endeavors. You are evaluated on your own merits. Cheating, plagiarism, collaborative work, multiple submissions without the permission of the professor, or other kinds of academic dishonesty are considered unacceptable behavior and will result in formal disciplinary proceedings usually resulting in suspension or dismissal. See the Dean of Students website for more information.

Accommodations for Students with Disabilities: If you are already registered with the Center for Accessible Education (CAE), please request your Letter of Accommodation in the Student Portal. If you are seeking registration with the CAE, please submit your request for accommodations via the CAE website. Students with disabilities requiring academic accommodations should submit their request for accommodations as soon as possible, as it may take up to two weeks to review the request. For more information, please visit the CAE website, visit the CAE at A255 Murphy Hall, or contact us by phone at (310) 825-1501.

Title IX:

Advocacy and Confidential Services

Please note that 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, 205 Covel Commons, Los Angeles, CA, 90095, care@careprogram.ucla.edu, (310) 206-246 5. Counseling and Psychological Services (CAPS) provides confidential counseling to all students and can be reached 24/7 at (310) 825-0768.

Reporting and Non-confidential Services

Your professor is required under the UC Policy on Sexual Violence and Sexual Harassment to inform the Title IX Coordinator should he become aware that you or any other student has experienced sexual violence or sexual harassment. In addition, You can also report sexual violence or sexual harassment directly to the University's Title IX Coordinator, 2255 Murphy Hall, titleix@equity.ucla.edu, (310) 206-3417. Reports to law enforcement can be made to UCPD at (310) 825-1491.

Additional Resources for Students:

UCLA provides resources if you are feeling overwhelmed and need personal and/or academic assistance. Please see the Red Folder REV2020 web for more 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. The Group Tutors of this course acknowledge the Gabrielino/Tongva peoples as the traditional land caretakers of Tovaangar (the Los Angeles basin and So. Channel Islands). As a land grant institution, we pay our respects to the Honuukvetam (Ancestors), 'Ahiihirom (Elders), and 'Eyoohiinkem (our relatives/relations) past, present, and emerging.