

**Spring 2024**  
**MECH 4366 (23425) Senior Design Project**

**Course Description** Design, analysis, manufacturing, testing and control of high-power rockets.  
*Pre-approval from UTEP Rocket Team Director is required.*

**Instructor** Miguel Cedeno, Ph.D.  
Assistant Professor of Instruction  
3D Lockheed Martin Lab Administrator  
Rocket Team Director  
Aerospace and Mechanical Engineering

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<https://outlook.office365.com/owa/calendar/OfficeHoursSpring2024@minersutep.onmicrosoft.com/bookings/>

[Click here for Booking](#)

**Reference Textbooks** No textbook is required for the course. All textbooks in AME courses can be used.

- Course Content**
1. Analytical Solutions (Open Rocket)
    - a. How to design a high-power rocket.
  2. CFD/FEA
    - a. Testing and simulation
  3. Engineering Design, Build, Test
    - a. Thermal Fluid Systems

<u>Report 1 (midterm)</u>	<u>50</u>
<u>Report 2 (final)</u>	<u>50</u>

**Possible Points** **100**

**A (100-90): B (89-80): C (79-70): D (69-60): F (59 and Below)**

Participation within sub teams meeting and tasks are mandatory.

**Major Course Objective** This course is a capstone type of course in the aero/mechanical area. It corresponds to the mechanical design course in the Mechanical Systems area. The course is intended for senior Mechanical Engineering students who intend to practice in the mechanical design area of aerostructures.

**ABET Program Outcomes Impacted** This class significantly addresses the following ABET objectives:  
(a) an ability to apply knowledge of mathematics, science, and engineering  
(b) an ability to design and conduct experiments, as well as to analyze and interpret data  
(c) an ability to identify, formulate, and solve engineering problems

### Technology requirements

Course content is delivered via the Internet through the Blackboard Collaborate ULTRA. Ensure your UTEP e-mail account is working, and you have access to the Web and a stable web browser. Google Chrome and Mozilla Firefox are the best browsers for Blackboard; other browsers may cause complications. When having technical difficulties, update your browser, clear your cache, or switch to another browser.

You will need to have access to a computer/laptop, scanner, webcam. You will need to download or update the following software: Microsoft Office, Adobe Acrobat Reader, Windows Media Player, QuickTime. Check that your computer hardware and software are up-to-date and able to access all parts of the course.

If you do not have a word-processing software, you can download Word and other Microsoft Office programs (including Excel, PowerPoint, Outlook and more) for free via UTEP's Microsoft Office Portal. Click the following link for more information about [Microsoft Office 365](#) and follow the instructions.

**IMPORTANT:** If you encounter technical difficulties beyond your scope of troubleshooting, please contact the UTEP [Help Desk](#) as they are trained specifically in assisting with technological needs of students. Please do not contact me for this type of assistance.

### Course Communication: *How we will stay in contact with each other*

There are several ways we can keep the communication channels open:

- **Office Hours:** My office hours will be held on MS Teams on Fridays 8-9 am. If you need to meet with me at another time, feel free to stop by my office on campus when I'm there.
- **Email:** UTEP e-mail is the best way to contact me. I will make every attempt to respond to your e-mail within 24-48 hours of receipt. **When emailing me, be sure to email from your UTEP student account, and please put the course number in the subject line.** In the body of your e-mail, clearly state your question. At the end of your e-mail, be sure to put your first and last name, and your UTEP ID.
- **Announcements:** Check the Blackboard announcements frequently for any updates, deadlines, or other important messages.

### NETIQUETTE

As we know, sometimes communication online can be challenging. It's possible to miscommunicate what we mean or to misunderstand what our classmates mean, given the lack of body language and immediate feedback. Therefore, please keep this netiquette (network etiquette)

guidelines in mind. Failure to observe them may result in disciplinary action.

- Always consider the audience. This is a college-level course; therefore, all communication should reflect polite consideration of others' ideas.
- Respect and courtesy must always be provided to classmates and the instructor. No harassment or inappropriate postings will be tolerated.
- When reacting to someone else's message, address the ideas, not the person. Post only what anyone would comfortably state in a face-to-face situation.
- **Blackboard is not a public internet venue**; all postings should be considered private and confidential. Whatever is posted in these online spaces is intended for classmates and professors **Please do not copy documents and paste them to a publicly accessible website, blog, or other space such as Chegg.**

**Course Policies:** *What do you need to do to be successful in the course?*

### **Attendance and participation**

Attendance on the course is determined by participation in the course's learning activities. Your participation in the course is essential only for your learning and success but also for creating a community of learners. Participation is determined by the completion of the following activities:

- Reading/Viewing all tasks to ensure understanding of assignment requirements per week. Officers will assigned weekly tasks to be completed.
- Meet regularly with the team and attending general meetings with the director organize a meeting.
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### **Academic dishonesty**

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test (Chegg), or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as one's own. Collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the Office of Student Conduct and Conflict Resolution (OSCCR) for possible disciplinary action. To learn more, please visit [HOOP: Student Conduct and Discipline](#).

All information is classified and cannot be used, distributed or storage in different server than the official MS Teams Group of the Rocket Team.

**Reasonable Accommodation Policy:** The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services, and activities with documented disabilities to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the [UTEP Center for](#)

[Accommodations and Support Services](#) (CASS). Contact the Center for Accommodations and Support Services at 915-747-5148, or email them at [cass@utep.edu](mailto:cass@utep.edu), or apply for accommodations online via the [CASS portal](#).

### **Plagiarism detecting software**

Some of your course work and assessments may be submitted to SafeAssign, a plagiarism detecting software. SafeAssign is used to review assignment submissions for originality and will help you learn how to properly attribute sources rather than paraphrase.

### **Copyright statement for course materials**

All materials used in this course are protected by copyright law. The course materials are only for the use of students currently enrolled in this course and only for the purpose of this course. They may not be further disseminated.

**Course Resources:** Where you can go for assistance UTEP provides a variety of student services and support:

#### Technology Resources

- [Help Desk](#): Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in person if on campus.

#### Academic Resources

- [UTEP Library](#): Access a wide range of resources including online full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.
- [University Writing Center \(UWC\)](#): Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources.
- [Math Tutoring Center \(MaRCS\)](#): Ask a tutor for help and explore other available math resources.
- [RefWorks](#): A bibliographic citation tool; check out the RefWorks tutorial and Fact Sheet and Quick-Start Guide.

#### Individual Resources

- [Military Student Success Center](#): Assists personnel in any branch of service to reach their educational goals.
- [Center for Accommodations and Support Services](#): Assists students with ADA-related accommodations for coursework, housing, and internships.
- [Counseling and Psychological Services](#): Provides a variety of counseling services including individual, couples, and group sessions as well as career and disability assessments.

### **Department of Aerospace and Mechanical Engineering Safety Statement**

The Department of Aerospace and Mechanical Engineering at the University of Texas at El Paso is committed to a model of excellence in education that includes providing a safe and healthy environment for its students, staff, faculty, and the general public.

Our goal is to maximize education and research training that can only occur if you, the individual, minimize hazards and risks. This can be done by:

- Providing adequate control of the health and safety risks arising from any and all activities;
- Consulting with employees on matters affecting their health and safety
- Providing and maintaining safe laboratories and equipment;
- Ensuring safe handling and use of substance;
- Ensuring all employees are competent to do their task and have adequate training; and
- Maintaining clean, safe and healthy working conditions

The principal investigator or individual in charge of each laboratory is ultimately responsible for safety in that respective lab. This includes training and ultimate release of the laboratory. Within the Department, we hold every employee (staff, faculty, student) responsible for implementing our safety practices and our departmental safety policy. We hold every employee (staff, faculty, student) responsible for providing leadership within our department to establish effective environmental safety and occupational health standards.

## CLASS SCHEDULE

Week	Dates	Topic(s)	Scheduled and DUE
1	January 15, 2024	General Meeting	-
	January 17, 2024	Recap of team's standing for the new competition	-
2	January 22, 2024	Review last year design	-
	January 24, 2024	Review last year design	<b>Review with officer</b>
3	January 29, 2024	Review last year design	<b>Review with officer</b>
	January 31, 2024	Learn Open Rocket	-
4	February 5, 2024	Learn Open Rocket	<b>Review with officer</b>
	February 7, 2024	Learn Open Rocket	<b>Review with officer</b>
5	February 12, 2024	NAR Certifications	-
	February 14, 2024	NAR Certifications	-
6	February 19, 2024	ANSYS Fluent in Class Lectures	NAR Certifications Exam (Level 1/2/3)
	February 21, 2024	NAR Certifications	-

	February 26, 2024	NAR Certifications	-
7			
	February 28, 2024	HeroX Competition Progress report by ERSA	NAR Certifications Exam (Level 1/2/3)
	March 4, 2024	HeroX Competition Progress report by ERSA	<b>Review with officer</b>
8	March 6, 2024	HeroX Competition Progress report by ERSA (Submission)	<b>SUBMIT Report 1</b>
9	March 11, 2024 March 13, 2024	Spring Break	
	March 18, 2024	Prepare test flight protocols	<b>Review with officer</b>
10	March 20, 2024	Prepare test flight protocols	<b>Review with officer</b>
	March 25, 2024	Prepare test flight protocols	<b>Review with officer</b>
11	March 27, 2024	Prepare test flight protocols	<b>Test Flight</b>
	April 1, 2024	Spaceport America Cup Protocols	-
12	April 3, 2024	Spaceport America Cup Protocols	-
	April 8, 2024	Spaceport America Cup Protocols	<b>Review with officer</b>
13	April 10, 2024	Spaceport America Cup Protocols	-

	April 15, 2024	Spaceport America Cup Protocols	-
14	April 17, 2024	HeroX Competition Progress report by ERSA (technical report)	<b>Review with officer</b>
	April 22, 2024	HeroX Competition Progress report by ERSA (technical report)	<b>Review with officer</b>
15	April 24, 2024	HeroX Competition Progress report by ERSA (technical report)	<b>Review with officer</b>
	April 29, 2024	HeroX Competition Progress report by ERSA (Final Submission)	<b>Review with officer</b>
16	May 1, 2024	<b>SUBMIT Report 2 &amp; Confirm Spaceport America Cup Spot</b>	