August 19, 2024

Aerospace Propulsion
MECH 5335/6335 (CRN 13251/14598)
Syllabus
Fall 2024

COURSE OBJECTIVE: At the end of this course, students will be able to:

- understand basic principles of rocket propulsion;
- analyze the performance characteristics of solid rocket motors and liquid rocket engines; and
- apply main principles of propulsion system design.

TIME: TR 12:00 pm – 13:20 pm

LOCATION: BUSS 321

INSTRUCTOR: Dr. Evgeny Shafirovich

E-MAIL: eshafirovich2@utep.edu

OFFICE: A112

OFFICE HOURS: by appointment

If you need to contact me, send me an email from your UTEP account. Do not use MS Teams.

BOOKS

Required: S.D. Heister, W.E. Anderson, T.L. Pourpoint, and R.J. Cassady, *Rocket Propulsion*, 2019, Cambridge University Press, Hardback ISBN: 9781108422277, Online ISBN: 9781108381376

Recommended: G.P. Sutton and O. Biblarz, *Rocket Propulsion Elements*, 9th ed., 2017, Wiley, ISBN: 9781118753651 (Hardcover), 9781118753880 (ePDF), 9781118753910 (ePub)

BLACKBOARD: Instructor will use Blackboard for uploading course materials, updating the syllabus, and communicating with students via announcements and email.

EXAMS: There are three exams (open books and notes). A makeup exam will be provided in case of a documented emergency. There is no final exam.

DESIGN PROJECT: The number of students on each project: one or two. Each project is a conceptual design of a chemical rocket propulsion system selected by the students and approved by the instructor. For each project, the instructor will schedule weekly meetings in his office for students to report on their progress and discuss further work. Each team will make three presentations during the semester and submit the final report to the instructor.

GRADING

Exam 1	20%
Exam 2	20%
Exam 3	20%
Design project	40%

COURSE CALENDAR

Week	Day	Date	Topic	Assigned Reading
1	T	8/27	Course overview. Introduction	Chapter 1
1	R	8/29	Trajectory analysis and rocket design.	Chapter 3
2	T	9/3	Trajectory analysis and rocket design	Chapter 3
2	R	9/5	Trajectory analysis and rocket design	Chapter 3
3	T	9/10	Rocket nozzle performance	Chapter 4
3	R	9/12	Rocket nozzle performance **Project topics selected and approved.**	Chapter 4
4	T	9/17	Rocket nozzle performance	Chapter 4
4	R	9/19	Rocket nozzle performance	Chapter 4
5	T	9/24	Rocket nozzle performance	Chapter 4
5	R	9/26	Rocket nozzle performance	Chapter 4
6	T	10/1	**Project progress presentations 1**	
6	R	10/3	**Exam 1**	Chapters 3 and 4
7	T	10/8	*Review of Exam 1* Combustion and thermochemistry	Chapter 5
7	R	10/10	Combustion and thermochemistry	Chapter 5
8	T	10/15	Combustion and thermochemistry	Chapter 5
8	R	10/17	Combustion and thermochemistry	Chapter 5
9	T	10/22	Combustion and thermochemistry	Chapter 5
9	R	10/24	Combustion and thermochemistry	Chapter 5
10	T	10/29	**Exam 2**	Chapter 5
10	R	10/31	*Review of Exam 2* Solid rocket motors	Chapter 7
11	T	11/5	**Project progress presentations 2**	
11	R	11/7	Solid rocket motors	Chapter 7
12	T	11/12	Solid rocket motors	Chapter 7
12	R	11/14	Liquid rocket engines and propellants	Chapters 8 and 9
13	T	11/19	Liquid rocket engines and propellants	Chapters 8 and 9
13	R	11/21	Liquid rocket engines and propellants	Chapters 8 and 9
14	T	11/26	Liquid rocket engines and propellants	Chapters 8 and 9
14	R	11/28	*Thanksgiving Day*	
15	T	12/3	**Exam 3**	Chapters 7 – 9
15	R	12/5	*Review of Exam 3* **Final presentations. Final reports are due.**	

ILLNESS PRECAUTIONS

Please stay home if you have symptoms of a communicable illness. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodation.

ACCOMODATIONS POLICY

The University is committed to providing reasonable accommodations to students with documented disabilities. Students who become pregnant may also request reasonable accommodations, in accordance with state and federal laws and regulations and University policy. Accommodations that constitute undue hardship are not reasonable. To make a request, please register with the UTEP Center for Accommodations and Support Services (CASS). Contact CASS at 915-747-5148, email them at cass@utep.edu, or apply for accommodations online via the CASS portal.

SCHOLASTIC INTEGRITY

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, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as ones' 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 Community Standards for possible disciplinary action. To learn more, please visit https://www.utep.edu/hoop/section-2/student-conduct-and-discipline.html.

Use of A.I. technologies or automated tools, particularly generative A.I. such as ChatGPT or DALL-E, is ***not allowed*** for assignments in this class. Each student is expected to use critical and creative thinking skills to complete tasks and not rely on computer-generated ideas. Any direct use of AI-generated materials submitted as your own work will be treated as plagiarism and reported to the Office of Community Standards.

CAMPUS RESOURCES

UTEP provides a variety of student services and support. Please refer to the QR code below for a listing of campus resources or visit https://www.utep.edu/advising/student_resources/student-success-resource-hub.html.