



MENG 4350–Introduction to Aerospace Vehicles Design

Course Syllabus

Semester / Year	Fall 2026
Catalog Description	This course will introduce students to the principles of aircraft and spacecraft design. Topics related to aircraft include aviation and airframe loads, wing design, propulsion, aircraft performance, and stability and control. For spacecraft, the course will cover the design process, spacecraft subsystems, rocket and launch vehicle performance, spacecraft thermal interactions, and orbital mechanics. Additionally, the course will include a hands-on project that will involve using software for modeling purposes Three hours of lecture per week.
Prerequisites	ENGR 2302, and grade C or better in MENG 3309
Section Number	050, 051
Instructor Name	Dr. Ermias G. Koricho
Contact Information	Email: ekoricho@uttyler.edu Phone: 903-730-3895 Office: A220
Class Type / Instruction Mode / Location	HEC: Lecture/Face-to-Face/ HEC 0A216 Tyler: Hybrid – Zoom Lectures and In-Classroom-Exams/RBN 03038. Zoom ID: It will be posted on the Syllabus page in Canvas
Class Time	Tue and Thu 3:30 PM to 04:50 PM
Office Hours	Tu and Th 11:00 AM to 12:00 PM W 01:00 PM to 02:00 PM and by appointment
No. of Credits	3 credits
Required Textbook	No textbook is required as lectures will reference material from a range of Aircraft and Spacecraft textbooks and provide a full complement of lecture notes with practice questions.
Optional References	Aircraft 1. Aircraft Structures for engineering students, Fourth Edition, T. H. G. Megson, 2007. 2. Anderson, Introduction to Flight, 8th Ed. 2016 Spacecraft 1. Spacecraft Structures, J. Wijker, 2008. (Textbook) 2. Sellers, Understanding Space: An Introduction to Astronautics, 3rd Ed. 2005
Additional Rules and Requirements	1. Since the mechanical engineering program is designed to prepare students for professional practice, all submitted work (e.g., homework, lab reports, projects, presentations) is expected to meet professional standards. Work that does not reflect professional quality may be subject to grade reductions, even if professionalism is not explicitly listed in the grading rubric.



	2. Students can use AI programs (ChatGPT, Copilot, etc.) in this course. If you utilize an AI tool to help create content for an assignment, you must acknowledge and cite the tool's contribution to your work.								
Evaluation Method	<u>Grading System:</u> <table><tr><td>¹Assignments and Quizzes</td><td>20%</td></tr><tr><td>Midterm Exam</td><td>30%</td></tr><tr><td>Final Exam</td><td>30%</td></tr><tr><td>²Project</td><td>20%</td></tr></table> ¹There will be homework assignments that are directly related to classroom discussion and test material. Everybody is required to attend all the classes. There will be both announced and unannounced quizzes. These quizzes cannot be made up in any circumstances. ²The project is a group project on aircraft/spacecraft subsystem design. Detailed information about the project will be delivered during the class.	¹ Assignments and Quizzes	20%	Midterm Exam	30%	Final Exam	30%	² Project	20%
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Grading Policy / Scale	Letter grades, scale: A: 90 – 100; B: 80 – 89; C: 70 – 79; D: 60 – 69; F: < 60								
Important Events / Dates	Census date: September 08 Drop for non-payment: September 16 Last date to withdraw from one or more 15-week courses: October 30 Exam date(week): Midterm Exam: October 16, 2026. Final Exam: December 10, 2026 as per the university calendar. https://www.uttyler.edu/academics/academic-calendar-26-27/								
Attendance / Makeup policy / other rules	Regular attendance is required. In case you have to miss a class, it is your responsibility to keep up with the class work and be informed of all announcements made in the class. Homework Assignments: homework will be assigned according with the topics covered in lectures. Assignments are considered very important for the understanding of the course material. Completing your homework independently is an absolute necessity to do well in this course. Besides, it is expected that all work products (e.g. homework, projects, presentations, reports, etc.) submitted for class to be of professional quality. Failure to submit professional quality work may result in grade reductions, regardless of whether any grading scheme or rubric for an assignment explicitly includes professionalism in the grade calculation. Makeup exam: An opportunity to make up a missed exam may be available to students with an excused absence. Excused absences include absences for university-sponsored events and for religious observances (University policies). Other makeups are granted only in extreme cases and at the discretion of the instructor. Excused absence due to illness will require evidence of treatment by medical personnel at a medical facility. Makeup exams may be scheduled for the end of the semester. Canvas: All course materials, including the syllabus, handouts, example problems with solutions, homework assignments, quiz solutions, and review								



	materials, will be posted on Canvas. Please make sure to review the materials posted on Canvas regularly.
Course Learning Objectives / ABET & PEOs Relation	By the end of this course, students will be able to: 1. Demonstrate knowledge of fundamentals of aircraft and spacecraft design requirements and related theories. 2. Identify and describe the key components of aircrafts and spacecrafts. 3. Design and evaluate basic structural components of aircrafts and spacecrafts. 4. Conduct a case study as an application integrating the course components with skills gained in different parts of the curriculum. 5. Communicate technical results and findings to different audiences.
Tentative Topics / Course Plans	Topical Outline: Aircraft Week 1 Module 1: Introduction to Aerospace Vehicles Design, Materials Week 2 Module 2: Aviation and Airframe loads Week 3 Module 2: Aviation and Airframe loads Week 4 Module 3: Performance of Airfoils and Wings Week 5 Module 3: Performance of Airfoils and Wings Week 6 Module 4: Elements of Airplane Performance. Week 7 Module 5- Principle of Stability and Control Week 8 Module 6- Airplane propulsion and power, Mid-Exam Spacecraft Week 9 Module 7: Spacecraft systems- Design-Introduction & Spacecraft subsystems and Design Week 10 Module 7: Spacecraft systems Design- Structural Design Week 11 Module 8 - Spacecraft thermal interactions Week 12 Module 9 - Introduction to Astrodynamics Week 13 Module 10 -Rocket Performances and Launch Vehicles Week 14 Module 11-Introduction to spacecraft systems engineering Week 15 Review and Project assessment
University Policies	https://www.uttyler.edu/offices/academic-affairs/faculty-resources/syllabus-information/