San José State University
Aerospace Engineering Department
AE 100, Fundamentals of Aerospace Eng., Section 01, Fall 2022

Course and Contact Information

Instructor: Emily Pippin

Email: emily.pippin@sjsu.edu
Office Hours: MW 8:50 pm to 9:30 pm
Class Days/Time: MW 7:30 pm to 8:45 pm
Classroom: Engineering Building 395
Prerequisites: "C" or better in Math 30, Phys 50, Engr 10

Course Description

Introduction to the fundamental disciplines and concepts of aerospace engineering and in particular of aerodynamics, aerospace structures, stability and control, propulsion, and flight mechanics.

Course Learning Outcomes (CLO)

Upon successful completion of this course, students will be able to:

1. Explain the nature of aerodynamic forces and estimate lift and drag on aerodynamic bodies.
2. Analyze simple airplane and spacecraft structures.
3. Explain the concept of static and dynamic stability of aerospace vehicles.
4. Describe the effect of different vehicle parts on longitudinal, lateral and directional stability.
5. Calculate the thrust and propulsive efficiency of different types of air-breathing and rocket engines.
6. Analyze aircraft takeoff, climb, maneuvering, cruise, glide, loiter, and landing performance.
7. Design simple orbital maneuvers.
8. Calculate aerodynamic and heat loads on hypersonic vehicles.

Required Texts/Readings

Textbook (Not required to purchase)

J.D. Anderson Jr., Introduction to Flight, 8th ed., McGraw Hill, 2015.
https://www.amazon.com/Introduction-Flight-John-Anderson-Jr/dp/0078027675/

Other Readings

Readings will be provided on Canvas throughout the semester.

Course Requirements and Assignments

"Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus."

In Class Problems and Homework

Problems will be given during class (workouts) and homework will be assigned with at least one weeks advance notice.

Midterm Exam

One midterm exam will be given during class time.

Final Exam or Final Project

Students must either take a final comprehensive exam OR submit a final project in place of the final exam. The project must integrate at least 3 different areas from the class (aerodynamics, propulsion, stability and control, structures, materials, performance and dynamics). Students have flexibility in choosing a project as long as the project is related to aerospace. Students doing projects will give a presentation to the class and submit a written report.

Grading Information

- In-Class Problems and Homework: 40%
- Midterm: 25%
- Final Exam or Final Project: 35%

Grade	*Percentage*
A plus	*96 to 100%*
A	*93 to 95%*
A minus	*90 to 92%*
B plus	*86 to 89 %*
B	*83 to 85%*
B minus	*80 to 82%*
C plus	*76 to 79%*
C	*73 to 75%*
C minus	*70 to 72%*
D plus	*66 to 69%*
D	*63 to 65%*
D minus	*60 to 62%*

University Policies

Per University Policy S16-9 ,relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on Syllabus Information web page (https://www.sjsu.edu/curriculum/courses/syllabus-info.php). Make sure to visit this page to review and be aware of these university policies and resources.

AE Department policies can be found at http://www.sjsu.edu/ae/programs/policies/

AE-100 Fall 2022 Course Schedule

Tentative and subject to change. See CANVAS for updated schedule

Module	Topics
1	Introduction to aerospace engineering. Anatomy of airplanes and spacecraft.
2	Aerodynamics; lift and drag. Form, skin friction, vortex, and wave drag.
3	Airfoils and wings. High-lift systems.
4	Aerodynamic design of low and high-speed vehicles.
5	Importance of structural weight and integrity. Design of aircraft and spacecraft structures.
6	Fatigue. Aerospace materials. Loads. Weight estimation.
7	Strength of materials; free body diagrams and equilibrium equations.
8	Static and dynamic stability. Control of airplanes and spacecraft.
9	Airplane longitudinal, lateral, and directional stability.
10	Rocket propulsion.
11	Airbreathing engines: internal combustion engines, propellers and rotors, turboprops, turbojets, turbofans, ramjets, scramjets.
12	Airplane performance: takeoff, climb, maneuvering, absolute and service ceilings, cruise, range and endurance, gliding, loiter, landing.
13	Earth and planetary entry.
14	Orbital maneuvers.
15	Hypersonic vehicles.