San José State University

Aerospace Engineering Department
AE 100 – Fundamentals of Aerospace Engineering – Fall 2019

Course and Contact Information

Instructor:	TBA
Office Location:	TBA
Telephone:	TBA
Email:	TBA
Office Hours:	TBA
Class Days/Time:	TBA
Classroom:	TBA
Course Credit:	3 units
Prerequisite:	"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 Goal

Introduce students to the fundamental disciplines of aerospace engineering. More specifically, introduce the basic principles of aerodynamics, aerospace structures and material selection, stability and control of aerospace vehicles, propulsion systems, airplane performance, flight and orbital 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

J.D. Anderson Jr., Introduction to Flight, 8th ed., McGraw Hill, 2015.

Other Readings

Class Notes

Course Requirements and Assignments

Homework: Weekly homework assignments will be used to assess understanding of the material.

Success in this course is based on the expectation that students will spend a minimum of 9 hours per week including class time.

Grading Information

Homework:	*50%*	Due before class. No late homework will be accepted!
In-class problem solving (workouts):	*20%*	
Final exam:	*30%*	

Grading Scale:		
	A+	100 to 97%
	A	96.9 to 93%
	A-	92.9 to 90%
	B+	89.9 to 87%
	B	86.9 to 83%;
	B-	82.9 to 80%
	C+	79.9 to 77%
	C	76.9 to 73%;
	C-	72.9 to 70%
	D+	69.9 to 67%
	D	66.9 to 63%
	D-	62.9 to 60%
	F	< 60%.

Classroom Protocol

Students will turn their cell phones off or put them on vibrate mode while in class. They will not answer their phones in class. In the classroom, students may use computers only for class-related activities, such as taking notes on the lecture underway, following the lecture on Web-based PowerPoint slides that the instructor has posted, and finding Web sites to which the instructor directs students at the time of the lecture. Attendance will not be taken during class, but if students miss a class they are still responsible for any material discussed or assignments given.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/"

AE Department Policies

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

Approximate Course Schedule

Week	*Topics, Readings, Assignments, Deadlines*
1	Introduction to aerospace engineering. Anatomy of airplanes and spacecraft.
2	Aerodynamics; lift and drag. Form, skin friction, vortex, and wave drag. Drag polars.
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	Airbreathing engines: internal combustion engines, propellers and rotors, turboprops, turbojets, turbofans, ramjets, scramjets.
11	Rocket engines: solid and liquid propellant; advanced propulsion concepts.
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.
16	Review