San José State University
Aerospace Engineering
AE15 - Air & Space Flight: Past, Present, and Future - Fall 2021

Course and Contact Information

Instructor:	Professor Sean Montgomery
Email:	sean.montgomery@sjsu.edu or sean5montgomery@gmail.com
Office Hours:	After class, Thursdays 3:00 to 4:00 pm, or by appointment
Class Days/Time:	Wednesdays 12:30 to 1:20 pm
Classroom:	Online (Zoom)
Final Exam Time:	Tuesday December 14th, 12:15 to 2:30 pm

Course Website (Canvas)

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on my faculty web page at http://www.sjsu.edu/people/firstname.lastname and/or on Canvas Leaning Management System course login website at http://sjsu.instructure.com. You are responsible for regularly checking with the messaging system through MySJSU at http://my.sjsu.edu (or other communication system as indicated by the instructor) to learn of any updates.

Course Description

Introduction to the history, basic principles, current and future developments of the aerospace engineering field.

Course Goals

To introduce students to:

- The historical context in which aeronautical and astronautical systems have been developed.
- The basic principles of atmospheric flight and aircraft design.
- The basic principles of space flight and spacecraft design.
- The current and future developments in the field of aerospace engineering, the aerospace engineering industry status and outlook.

Course Learning Outcomes (CLO)

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

1. Identify the major milestones in the history of atmospheric and space flight, explain the driving forces behind each milestone, and discuss the impact on society and globalization.
2. Explain how aerospace vehicles generate lift and calculate lift using approximate methods.
3. Explain how aerospace vehicles generate drag at various flight regimes and calculate drag using approximate methods.
4. Communicate and collaborate effectively with teammates (by setting goals, managing time, resolving conflicts, delegating tasks, making critical decisions, etc.) while working on aerospace engineering problems.
5. Identify current and future development in aerospace engineering and discuss the challenges facing the aerospace industry in the 21st century.

Required Texts/Readings

None. Lecture notes will be available through Canvas. Students are expected to search online for assignments and class discussions.

Course Requirements and Assignments

Participation

Participation is essential to learning. Students are expected to participate in class discussions by asking questions and offering relevant responses. Students may also participate by writing their questions or comments on paper in class and turning them in at the end of the lecture. Students may earn participation credit by asking or answering questions posted on Canvas.

Homework

Homework assignments will consist of writing short responses to open ended questions (for example: Why were most early airplanes biplanes?) The purpose of these homework assignments is for students to do some research on their own on topics that will be discussed at a future class. To answer the questions, students are expected to search online for information to help them write their response. Students are expected to write their own unique responses. Direct word for word quotes may be used occasionally and must be in quotation marks and include a source citation. **Plagiarized homework will not receive any credit.**

Reflections

After each class, students will write a brief reflection on what they learned in class that day and any questions they may have.

Quizzes

Short quizzes will be given occasionally to check how well students understand key points. Longer cumulative quizzes may be given toward the end of the semester.

Final Project

Instead of a final exam, all students must complete an individual project for the class. Students will present their projects during the scheduled final exam time. There are several projects options (choose one):

Option 1) Give a presentation on an aircraft or spacecraft you are interested in.

Option 2) Rubber band powered airplane competition for the longest flight time.

Option 3) Rocket project launched off campus.

Option 4) Go observe in person a high power rocket launch and present or write about what you learn.

Details for each option:

Option 1)
You may present on any aircraft or spacecraft that interests you. If you chose an aircraft that was covered in lecture, make sure you don't just repeat what was said in the lecture. See the "Lecture Notes" folder in the files section on Canvas for ideas of aircraft and spacecraft to present on. Prepare a slide show to go with your presentation. Aim for a length of roughly **10 minutes per person**.

Option 2)

- It's preferred that you come up with your own design. You can buy a kit and put it together, but you will receive a 15 second penalty compared to other groups that use their own design.
- **Take pictures of building the plane and upload them to Canvas.** The pictures should make it clear whether it's your own design or a kit.
- You must standard file folder rubber bands so that everyone has the same size "motor." You may use your own propeller or one that's provided.
- Record video of your design flying from launch until landing. The longest flight wins.
- **Maximum of 24 inches (2 feet) length in any direction** (wingspan or tail to propeller).
- No material restrictions, but your design must not be dangerous (no exposed sharp metal spikes or things like that). If your plane flies into someone, it shouldn't hurt that person. See me if you have questions.
- You can find supplies at local hobby shops such as Sheldon's Hobbies in San Jose and Aero Micro in Santa Clara. I would expect groups to spend about $20 on supplies, $40 at most.

Option 3)

- Only select this option if you already have experience with rockets, or you know someone that can help you launch them safely.
- You may design your rocket (such as a water rocket using a 2 liter bottle), or build one from a kit (such as Estes rockets).

- You must find your own safe launch site and launch your rocket before the day of the scheduled final exam time for AE15. Video the launch and show it during the project presentations to receive credit.
- **If you are reckless, you will receive an F for the project even if your rocket is successful.** If you've never launched rockets before, start with a small rocket. See me if you have questions or want approval for an idea.

Option 4)
You can ask the rocket club about upcoming launches. These usually occur near Frenso, CA or Black Rock, NV. If you find a closer location, see me for approval. Talk to the people about their rocket and give a brief (3 to 5 minute) presentation on what you learned, OR write a 750 word report.

Grading Information

Quizzes	20%
Participation	20%
Reflections	20%
Homework	20% (½ credit for late homework)
Final Project	20%

A+	Depends on how much extra credit is offered (roughly >97%)
A	≥ 92%
A-	90% - 92%
B+	88% - 90%
B	82% - 88%
B-	80% - 82%
C+	78% - 80%
C	72% - 78%
C-	70% - 72%
D	60% - 70%
F	< 60%

University Policies

AE Department & SJSU Policies are posted at: <http://ae.sjsu.edu/program-policies>

Fall 2021 Online

Zoom
Class will meet online via Zoom. You can find the links to join these meetings under the "Zoom" section on Canvas. They are also posted on the Calendar.

Technology Requirements
Students are required to have an electronic device (laptop, desktop or tablet) with a camera and built-in microphone. SJSU has a free equipment loan program available for students. Students are responsible for ensuring that they have access to reliable Wi-Fi during tests and quizzes. See Learn Anywhere website for current Wi-Fi options on campus.

Connection Issues
If you experience connection issues with the Zoom class session, attempt to rejoin. If you are unable to resolve the issues, you may watch the recording of the class to see what you missed.

Zoom Classroom Etiquette
- Mute Your Microphone: To help keep background noise to a minimum, make sure you mute your microphone when you are not speaking.
- Be Mindful of Background Noise and Distractions: Find a quiet place to "attend" class, to the greatest extent possible.
    - Avoid video setups where people may be walking behind you, people talking/making noise, etc.
    - Avoid activities that could create additional noise, such as shuffling papers, listening to music in the background, etc.
- Position Your Camera Properly: Be sure your webcam is in a stable position and focused at eye level.
- Limit Your Distractions/Avoid Multitasking: You can make it easier to focus on the meeting by turning off notifications, closing or minimizing running apps, and putting your smartphone away (unless you are using it to access Zoom).
- Use Appropriate Virtual Backgrounds: If using a virtual background, it should be appropriate and professional and should NOT suggest or include content that is objectively offensive or demeaning.

Recording Zoom Classes
This course or portions of this course (i.e., lectures, discussions, student presentations) will be recorded for instructional or educational purposes. The recordings will only be shared with students enrolled in the class through Canvas. The recordings will be deleted at the end of the semester. If, however, you would prefer to remain anonymous during these recordings, then please speak with the instructor about possible accommodations (e.g., temporarily turning off identifying information from the Zoom session, including student name and picture, prior to recording).

Students are not allowed to record without instructor permission Students are prohibited from recording class activities (including class lectures, office hours, advising sessions, etc.), distributing class recordings, or posting class recordings. Materials created by the instructor for the course (syllabi, lectures and lecture notes, presentations, etc.) are copyrighted by the instructor. This university policy (S12-7) is in place to protect the privacy of students in the course, as well as to maintain academic integrity through reducing the instances of cheating. Students who record, distribute, or post these materials will be referred to the Student Conduct and Ethical Development office. Unauthorized recording may violate university and state law. It is the responsibility of students that require special accommodations or assistive technology due to a disability to notify the instructor.

AE 15 - Air & Space Flight: Past, Present, and Future

Course Schedule

Tentative schedule, subject to change.

Course Schedule

Week	Topics, Readings, Assignments, Deadlines
1	Introduction / Early Aviation
2	Aircraft Basics
3	WWI
4	Golden Age
5	Golden Age
6	Helicopters
7	Early Rocketry
8	The Space Race
9	Launch Vehicles
10	Airliners
11	Airliners
12	Break
13	SpaceX
14	Spyplanes or Unmanned Aircraft
15	Current and Future Aircraft
16	Current and Future Spacecraft
17	Final Project Presentations