MAE 155A
Aerospace Engineering Design I (4 units)

**Class/Laboratory Schedule**: four hours of lecture, two hours of lab, six hours outside activity, 12 hours/week total

**Course Coordinator(s)**: Mark Anderson and John Hwang

**Textbooks/Materials:**

1. Nicolai, L.M. and Carichner, G.E., Fundamentals of Aircraft and Airship Design, Vol. 1 - Aircraft Design, American Institute of Aeronautics and Astronautics, Reston VA, 2010.

2. Meyer, R.X., Elements of Space Technology for Aerospace Engineers, Academic Press, 1999.

3. Raymer, Daniel. Aircraft Design: A Conceptual Approach. American Institute of Aeronautics and Astronautics, 2018.

Catalog Description: Fundamental principles of aerospace vehicle design including the conceptual, preliminary, and detailed design phases. Aeronautical or astronautical design project that integrates all appropriate engineering disciplines as well as issues associated with optimization, teamwork, manufacturability, reporting, and professionalism.

**Prerequisites**: MAE 2, MAE 21, or SE 2 or SE 104, MAE 104, MAE 30B or MAE 130C, and SE 160A, or consent of instructor.

**Course Type:** Required

**Course Objectives:**

Objective 1: Teach students how to solve complex, open-ended design problems and to integrate knowledge of fundamental aeronautical and astronautical topics in the design of an aerospace system.

Objective 2: Strengthen and apply knowledge of aerospace topics including aerodynamics, aerospace materials, structures, propulsion, flight mechanics, and stability and control.

Objective 3: Develop students' abilities to effectively work in teams, manage project priorities, and meet project deadlines.

Objective 4: Enhance student skills in graphical, written, and oral communication.

Objective 5: Provide students with the experience of applying engineering science theory to real world design problems.

Objective 6: Improve student understanding of contemporary technological issues, impact of engineering solutions, and need for information gathering.

**Course Topics:**

1. Engineering Design Process
2. Systems Engineering
3. Vehicle Sizing and Aerodynamics
4. Propulsion System Selection
5. Mass Properties
6. Stability and Control
7. Performance Analysis and Estimation
8. Cost Estimation
9. Multidisciplinary Design Optimization
10. Project Management: Scheduling, Risk Reduction Strategies

Last Updated: May 2025