MAE 2
Introduction to Aerospace Engineering (4 units)

Class/Laboratory Schedule: four hours of lecture, 2 hours of lab, six hours outside preparation. 12 hours/week total

Course Coordinator(s): Mark Anderson

Textbooks/Materials:

1. Anderson, J, D., Introduction to Flight (7^{th} Ed 2011)

Catalog Description: An introduction to topics in aeronautical and astronautical engineering including aerodynamics, propulsion, flight mechanics, structures, materials, orbital mechanics, design, mission planning, and environments. General topics include historical background, career opportunities, engineering ethics, and professionalism.

Prerequisites: None.

Course type: Required

Course Objectives & Performance Criteria

1. Introduction to Aerospace Engineering
    - Objective: Students will be able to analyze aerospace engineering including vehicle types, history, modern design, and current research.
    - Performance: Students will be able to identify vehicle types, historical references, design practices, and research activities.
2. Engineering Responsibilities and Ethics
    - Objective: Students will be able to evaluate the role of a professional engineer, focusing on responsibilities and ethics.
    - Performance: Students will be able to provide examples of engineering responsibilities and ethical issues.
3. Aerospace Engineering Sub-Disciplines
    - Objective: Students will be able to examine key aerospace engineering disciplines (aerodynamics, propulsion, etc.).
    - Performance: Students will be able to demonstrate understanding of how technical sub-disciplines contribute to aerospace engineering.
4. Team-Based Aerospace Vehicle Design

- Objective: Students will be able to synthesize a team-based preliminary aerospace vehicle design with reports.

- Performance: Students will be able to work effectively in teams to complete and document an aerospace vehicle design.

This freshman-level course is designed to introduce the student to the field of aerospace engineering. It was developed to expose our students to all of our program objectives, including the unique disciplines that make up aerospace engineering, working in teams on an open-ended design problem, using modern computer software, reporting the results both written and orally, and learning about professional responsibilities and engineering ethics.

Course Topics:

1. Review of vehicles and aerospace terminology.
2. Historical review of aeronautical and astronautical engineering
3. Modern design and analysis techniques for aerospace vehicles
4. Current research performed by university and Government laboratories
5. Case studies: successful engineering designs and professional responsibilities
6. Overview of aerospace engineering topics:
    a. Aerodynamics
    b. Propulsion
    c. Flight mechanics, performance, and stability
    d. Structures and materials
7. Orbital mechanics, mission planning, launch systems
8. Conceptual design of an aerospace vehicle
9. Professionalism and ethics

Last Updated: March 2025