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: Introduction to the fundamentals of aerospace engineering. Topics covered include: history of aeronautical and astronautical engineering, overview of modern design and analysis practices for aircraft and spacecraft including aerodynamics, propulsion, structures, materials, performance, stability, and orbital mechanics. Professional ethics. Student team design projects that integrate course topics.

Prerequisites: None.

- ■ Required Course
- □ Technical Elective Course
- □ Other: _____

Performance Criteria:

Objective 1
Students will identify vehicle types, historical references, modern design practices, and current research activities that are common in the profession of aerospace engineering.

Objective 2
Students will provide examples of the responsibilities and ethical issues that might be faced by a professional engineer.

Objective 3
Students will demonstrate an understanding of how various technical sub-disciplines contribute to the field of aerospace engineering.

Objective 4
Students will demonstrate an ability to work within a team that successfully completes and documents the preliminary design of an aerospace vehicle.

Course Objectives:
(Numbers in parentheses refer to MAE Program Outcomes)

1. To introduce the student to the field of aeronautical and astronautical engineering including vehicle types and definitions, historical perspective, overview of modern design and analysis practices, and review of current aerospace related research and development. (8h, 9i, 10j, AE12, AE13, AE14).

2. To teach the student the role of a professional engineer including responsibilities and ethics (6f).

3. To introduce the student to the various disciplines that make the aerospace engineering degree unique, including aerodynamics, propulsion, stability, structures, and materials, and associate engineering analysis (1a, 5e, AE12, AE13).

4. To teach the students to work in teams to perform a preliminary design of an aerospace vehicle, including written and oral reports (3c, 4d, 5e, 7g, 11k, AE14).

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

Prepared and Reviewed by: John B. Kosmatka

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