AE 4341 – Aircraft Design

HOURS: 2-3-3

CATALOG DESCRIPTION:

Aircraft Vehicle Design. Preliminary design or case study of a complete flight vehicle, including a propulsion system, a structural system, and a control system.

PREREQUISITES:

AE 3330 Introduction to Aerospace Vehicle Performance
AE 3340 Design and Systems Engineering Methods

COURSE OBJECTIVES:

Develop an understanding of aircraft design methodology through lectures and applications.

LEARNING OUTCOMES:

Student will complete projects culminating in the conceptual design of a relevant aircraft to meet given specifications that will lead to the following outcomes:

1. Design principles (requirements, design methods, trade studies, and project lifecycle)
2. Subsystem sizing, computational design, performance evaluation
3. Application specific environment
4. Technical communications
5. Project management, time management
6. Team skills, leadership

TOPICAL OUTLINE:

1. Design methodology, report writing, requirements (3 classes)
2. Mission development, concept selection (2 classes)
3. Weight sizing and sensitivity studies (2 classes)
4. Constraint sizing and sensitivity studies (2 classes)
5. Design aerodynamics, airfoil and wing selection (2 classes)
6. Empennage selection and sizing, fuselage design (2 classes)
7. Structural design factors, materials (2 classes)
8. Structural layout and design, manufacturing (2 classes)
9. Propulsion and landing gear sizing and installation (4 classes)
10. Stability and control, weight and balance, handling qualities and design (3 classes)
11. Advanced design topics: low observables, advanced configurations (2 classes)
12. Life cycle cost (2 classes)
13. Socio-economic, ethical aspects of design (2 classes)