

## AE 426 COURSE SYLLABUS

### 1. Department, Number and Title of course

Department: Aerospace Engineering  
Course Number: AE 426  
Course Title: Flight Dynamics

### 2. Designation: Required Course

### 3. Course (Catalog) Description

Flight performance. Static and dynamic flight stability and control of flight vehicle. Rocket trajectories and satellite orbits.

### 4. Prerequisites(s)

AE 220 or equivalent

### 5. Textbook(s) and or other required material

Nelson, R. C., *Flight Stability and Automatic Control*, 2<sup>nd</sup> Ed., McGraw-Hill Co., 1998.

### 6. Course objectives:

- To introduce students to the fundamental concepts of atmospheric flight dynamics.
- To allow students to analytically estimate static and dynamic stability derivatives.
- To enable students to study and predict aircraft performance.
- To allow students to study the stability of longitudinal and lateral motions using the linearized equations of motion.
- To enable students to control aircraft using the root locus method.

### 7. Topics Covered

- Introduction
- Static Stability (Chapter 2)
- Aircraft Equations of Motion (Chapter 3)
- Aircraft Performance (AE220 book)
- Longitudinal Motion (Chapter 4)
- Lateral Motion (Chapter 5)

- Introduction to Control Theory (Chapter 6)
- Aircraft Autopilot Design Using Control Theory (Chapter 8)

#### **8. Class/Laboratory Schedule:**

3 lectures per week, 50 minutes each.

#### **9. Course outcomes**

Outcome#1: Students will demonstrate a good understanding of flight dynamics. **(Objectives 1-2)**

Outcome#2: Students will demonstrate a good understanding of flight performance, stability, and control. **(Objectives 2-5)**

Outcome#3: Students will demonstrate the ability to use MATLAB® as a tool for matrix manipulations and dynamic simulation. **(Objectives 2-5)**

Outcome#4: Students will demonstrate the ability to work as a team in a project, give a professional PowerPoint presentation and write a technical document. **(Objectives 1-5)**