

## AA 311 COURSE DETAILS

<b>TITLE:</b>	Atmospheric Flight Mechanics
<b>CREDITS:</b>	4
<b>FORMAT &amp; SCHEDULE:</b>	Lecture, 4 hours / week
<b>FACULTY CONTACT:</b>	Antonino Ferrante

### **COURSE DESCRIPTION (Catalog Short Form, 50 words Max):**

Applied aerodynamics, aircraft flight "envelope," minimum and maximum speeds, climb and glide performance. Range and endurance, take-off and landing performance, using both jet and propeller power plants. Longitudinal and dynamic stability and control, wing downwash, stabilizer and elevator effectiveness, power effects. Lateral and directional stability and control.

### **COURSE OVERVIEW & LEARNING OBJECTIVES:**

Flight mechanics is the study of how airplanes lift themselves and perform at flight. This course covers basic understanding of standard atmosphere, basic aerodynamics, shapes of airplanes, airplane performance, stability and control, propulsion and hypersonic flight.

Students completing this course in good standing will be able to:

1. Apply dimensional analysis
2. Explain how a wing generates lift and identify drags generated from various sources
3. Explain the performance of the aircraft based on their geometry and aerodynamic coefficients
4. Explain the static and dynamic stability
5. Explain or calculate the thrust gained from reciprocating engine-propeller combination, and jet propulsion engine
6. Identify fundamentals of hypersonic regime

## COURSE REQUIREMENTS

**PREREQUISITES:** M E 230

**REQUIRED TEXTBOOK:** *Introduction to Flight*, 8th Ed by John D. Anderson, McGraw-Hill, 2012

## COURSE SCHEDULE

### Topics

Introduction to flight mechanics ; Dimensional analysis

Standard atmosphere

Basic aerodynamics

Aerodynamic shapes of airplanes

Airplane performance

Stability and control

Propulsion

Hypersonic flight