MECH 5337: Aerodynamics and Control

Class Meeting: 9:00 am - 10:20 pm TR / Liberal Arts Building 308
Instructor: Afroza Shirin, PhD
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Office: A315
Email: ashirin@utep.edu
Office hours: 10:30 PM – 12:00 PM TRs or by appointment.

COURSE OBJECTIVES

To obtain the fundamentals on aerodynamics and control, the objectives of the course are:

- Students will use mathematical tools and physical laws to obtain aerodynamic characteristics.
- Students will learn mathematical tools to understand dynamics, stability and control.
- Students will use computational tools to validate and analyze the dynamics, stability and controls of aircraft.

TOPICS COVERED

- Basic Understanding of Aerodynamics
- Aircraft Equation of Motions
- Aircraft Performance
- Static and Dynamic Stability
- Control of Aircraft
- Implement and analyze each of the above in the computational domain.

TEXTBOOKS

1. Introduction to Aircraft Flight Mechanics: Performance, Static Stability, Dynamic Stability and Classical Feedback Control, AIAA Education 2nd Edition, by Thomas R. Yechout.
2. Introduction to Flight, 8th edition, by J Anderson.
3. Flight Dynamics, Robert F. Stengel
4. AIRCRAFT DYNAMICS: From Modeling to Simulation, Marcello R. Napolitan.

GRADING

- Homework, quizzes, attendance, class participation, etc. 40%
- Take Home Exams/Projects 60%

Scale A $\geq$ 90%, B $\geq$ 80% but <90%, C $\geq$ 70% but <80%, D $\geq$ 60% but <70% and F <60%

SOFTWARE

- **Matlab.** https://www.mathworks.com/academia/tah-portal/university-of-texas-at-el-paso-40735445.html#get.
- **Matlba toolboxes:** Symbolic, Control Systems, Simscape, Multibody, Aerospace blockset.

- **StarCCM+**

Refer to ETC for specific question. Engineering building E351D (915) 747-5131.

MATERIAL FOR CLASS

Required: Laptop

ATTENDANCE AND TARDINESS

An 80% of attendance is required.

DISCLAIMER

The above schedule, policies, and assignments in this course are subject to change in the event of contingency or by mutual agreement between the instructor and the students.