

**MECH-AERO 5337/6337: Aero Dynamics and Control**

Class Reference Number: 24442, 25928 & 26248  
 Class Meeting: 10:30 pm - 11:50 AM TR / Chemistry Computer Sci Bldg 1.0202  
 Instructor: Angel Flores-Abad, PhD  
 Department of Aerospace and Mechanical Engineering  
 Office: A120  
 Email: [afloresabad@utep.edu](mailto:afloresabad@utep.edu)  
 Office hours: 3:30 PM – 4:30 PM MWs or by appointment.

**COURSE OBJECTIVES**

To acquire the fundamentals on spacecraft dynamics and control considering the effects of orbital mechanics. Particular focus is placed on rigid body kinematics and dynamics, attitude control, orbital determination and orbital maneuvers.

**COURSE OBJECTIVES**

- Students will use mathematical tools and physical laws to obtain the attitude dynamics of space vehicles.
- Students will apply control systems techniques to achieve a desired state of the space vehicles.
- Students will use computer tools to validate and analyze both the dynamics and controls of space systems.

**TOPICS COVERED**

- Dynamics Systems Modelling
- Rotational kinematics
- Dynamics Systems and Controls
- Orbital Dynamics
- Orbital Maneuvers and Controls
- Rigid-body Dynamics
- Rotational Maneuvers and Controls

**TEXTBOOKS**

- [1] Space Vehicle Dynamics and Control, AIAA Education 2nd Edition, by Bong Wie.
- [2] Space Vehicle Guidance, Control, and Astrodynamics by Bong Wie.
- [3] Analytical Mechanics of Space Systems, by H. Schaub and J. Junkins.
- [4] Orbital Mechanics for Engineering Students, 2nd Edition by Howard Curtis.

**GRADING**

- Homework, quizzes, online activities, in-class assignments, etc. 60%  
 Assignments submitted after the due date will be partially counted.
- Project 40%

**Scale** A  $\geq 900$ , B  $\geq 800$  but  $<900$ , C  $\geq 700$  but  $<800$ , D  $\geq 600$  but  $<700$  and F  $<600$

**SOFTWARE**

**Matlab.** <https://www.mathworks.com/academia/tah-portal/university-of-texas-at-el-paso-40735445.html#get>.

**Matlba toolboxes:** Simulink, Symbolic, Control Systems, Simscape, Multibody, Simulink control design, Aerospace blockset, Aerospace toolbox

AGI STK <https://licensing.agi.com/stk/> - contact [ddmunoz@utep.edu](mailto:ddmunoz@utep.edu)

Refer to ETC for specific question. Engineering building E201 (915) 747-5223

**MATERIAL FOR CLASS**

Required: Laptop

**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.