

ABET Course Syllabus**ENAE 301 Dynamics of Aerospace Systems**

Credits & Contact Hours: 3 credits (3 hours lecture)

Course Status: Required

Schedule: Offered every Fall semester

Course Description: Kinematics and dynamics of three dimensional motion of point masses and rigid bodies with introduction to more general systems. Primary emphasis on Newtonian methods. Practice in numerical solutions and computer animation of equations of motion using MATLAB.

Pre-Requisites: ENAE 283, Linear Algebra, MATH 246, PHYS270/271

Co-Requisites: None

Textbooks: N. Kasdin and D. Paley. Engineering Dynamics: A Comprehensive Introduction. Princeton University Press, 2011.
B. Tongue and S. Sheppard. Dynamics: Analysis and Design of Systems in Motion. Wiley, first edition, 2004 (recommended).
J. Meriam and L. Kraige. Engineering Mechanics: Dynamics. Wiley, sixth edition, 2006 (recommended).
A. Rao. Dynamics of Particles and Rigid Bodies. Cambridge University Press, 2005 (recommended).

Other Required Material: Course lecture notes and handouts

Course Oversight: Dynamics and Control Committee

Syllabus Prepared By/Date: Dr. Derek Paley, June 2011

Course Objectives/Student Learning Outcomes:

1. Apply Newton's laws to derive equations of motion for particles.
2. Apply Newton's laws to derive translation and rotational equations of motion for rigid bodies.
3. Can analytically or numerically solve the resulting equations of motion.
4. Understood gyroscopic effect for 3D rigid bodies.

Topics Covered:

1. Particle Dynamics in the Plane
2. Planar Motion of a Multi-Particle System
3. Planar Rigid Bodies and Motion in Rotating Frames
4. Dynamics in Three Dimensions

Relationship of Course Objectives to Program Outcomes

This course addresses program outcomes: 1, 2, 3, 4, 5, 9, 16