The University of Texas at El Paso
College of
Department of
Syllabus

Course Prefix and Number: AERO 4335
Course Title: Structural Dynamics
Credit Hours: 3

Prerequisite Courses: MECH 2340 and MECH 2342 both with C or better.

Course Description: This course is designed to introduce the students to aerospace structural dynamics. Many aerospace structures are subjected to time-varying loadings, including impact and cyclic excitations. Dynamic response to these loadings can have a character very different from static response. This dynamic behavior must be anticipated in the design of the structure if its performance is to be satisfactory.

Learning Outcomes:
1. Students will develop models of physical systems and represent them using standard lumped parameter components-free body diagrams.
2. Students will develop and solve the governing systems of differential equations of motion.
3. Students will calculate natural frequency and damping ratio of a single-degree-of-freedom (1-DOF) physical system.
4. Students will predict forced vibration response of a 1-DOF system.
5. Students will calculate the natural frequencies (eigenvalues) and mode shapes (eigenvectors) of a multi-degree-of-freedom physical system.
7. Students will compute natural frequencies and modes of beams and plates.


Course Schedule:
1. Introduction, review of dynamics.
2. Free vibration of single-degree-of-freedom (SDOF) systems.
3. SDOF response to harmonic and periodic excitations.
4. SDOF response to nonperiodic excitations.
5. Two-degree-of-freedom (2DOF) systems.
6. Analytical dynamics, multi-degree-of-freedom (MDOF) systems.
7. Distributed-parameter (continuous) systems.