

- Course Number and Title: M E 456. Experimental Modal Analysis
- Catalog Description: Emphasis on *hands-on techniques for structural vibrations test in practical applications*; interpretation of experimental results by means of advanced signal processing tools; and basic system identification methodology and reduced-order modeling procedures.
- Credit Hours: 3 Credits (3)
- Prerequisite(s) / Corequisite(s): Prerequisite(s): (M E 328 and M E 261) or *consent of instructor*
Corequisite(s): None
- Required: Elective for BSME or BSAE Degree
- Course Availability: Fall and Spring Semesters
- Instructor (Usual): Dr. Young S. Lee (See <https://mae.nmsu.edu/people/faculty.html>)
- Textbook:
 - **Theory:** (i) Thomson, W.T., *Theory of Vibration with Applications*, Prentice Hall, or (ii) Rao, S.S., *Mechanical Vibrations*, Pearson
 - **Experiment:** Ewins, D.J., *Modal Testing: Theory and Practice*, John Wiley & Sons, Inc.
- Course Learning Objectives: After completing this course, a student should be able to:
 - 1) Understand fundamentals of linear vibrations theory for discrete and continuous systems;
 - 2) Perform basic numerical and experimental modal analysis of structures;
 - 3) Utilize basic and advanced signal processing tools;
 - 4) Extract system parameters for a mathematical model from a physical model.
- Topics Covered: Theory and experiments about
 - Free and forced vibrations of single- and two-degree-of-freedom systems;
 - Multi-degree-of-freedom models obtained by discretizing continuous structures;
 - Bending vibrations of Euler beams;
 - Signal processing techniques, including Fourier/wavelet transforms and filtering.