# Department of Mechanical and Nuclear Engineering

**ME375 – Vibrations Laboratory**
**Spring 2008**
**Classroom**: 239 Reber Building

**Section #1**: Tuesday 8:00 AM – 11:00 AM
**Section #2**: Tuesday 11:15 AM – 2:15 PM

**Grading:**

50% Four lab reports

25% Weekly deliverables

25% Weekly quizzes

**Attendance Policy**

As a laboratory oriented activity, your active participation is needed. Team members are expected to attend **ALL** classes.

1. Each unexcused absence will cause a deduction of a letter grade in the final course evaluation.
2. If an absence is necessary due to sickness or unforeseen circumstances, the Teaching Assistant and Course Supervisor must be notified via email **BEFORE** the start of class.
3. Provided the absence is justified and advanced notification provided, no grade deduction will occur.

**Course Objectives**

Upon successfully completing this course, a student will be able to:

1. Plan, implement and debug instrumentation to measure vibrations of mechanical systems.
2. Implement experimental test systems using data acquisition, filtering, and windowing to maximize measurement quality.
3. Recognize the dominant (single degree of freedom) behavior seen in many larger, more complicated engineering systems and see the need for simple analytical tools.
4. Learn and operate commercial data acquisition and manipulation software and understand the underlying algorithms and theory upon which the software is based.
5. Implement a nonlinear simulation of a mechanical system using MATLAB/Simulink.
6. Use MATLAB/Simulink to compare measured and predicted dynamic behavior.
7. Verify the results of computer analyses of dynamic systems by various methods including experimental measurement and analytical modeling.

# Schedule

| *Week* | *Date* | *Topic* | *Due* |
|---|---|---|---|
| 1 | Tues. Jan 15 | Introduction to MATLAB | |
| 2 | Tues. Jan 22 | Introduction to SigLab | |
| 3 | Tues. Jan 29 | Data Acquisition for the Translational Test Stand | Report 1 |
| 4 | Tues. Feb 5 | Data Comparison for the Translational Test Stand | |
| 5 | Tues. Feb 12 | Data Acquisition for the Torsional Test Stand | |
| 6 | Tues. Feb 19 | Data Comparison for the Torsional Test Stand | |
| 7 | Tues. Feb 26 | Base Excitation SDOF Vibration | Report 2 |
| 8 | Tues. March 4 | Fourier analysis: Power Spectra | |
| 9 | Tues. March 18 | Steady State Response of SDOF Vibration Systems | |
| 10 | Tues. March 25 | Pump Isolation Platform Performance | |
| 11 | Tues. April 1 | RC Car Spring Constants | Report 3 |
| 12 | Tues. April 8 | RC Car Shock Absorber Damping Constants | |
| 13 | Tues. April 15 | RC Car Suspension Design | |
| 14 | Tues. April 22 | RC Car Suspension Performance Assessment | PowerPoint Presentation |

**Instructor**:

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