Course Title: MEC532 Vibration and Control, Fall 2012
Prerequisites: Permission of instructor
Lecture: Wed 17:30 – 20:20; Room: Old Engineering 112
Instructor: Dr. Imin Kao, Professor email: imin.kao@stonybrook.edu
Office: LE-167; Phone (631)632-8308
Office Hours: Mon 12:00-14:00, Wed 15:00-17:00 & other time by appointment

Course Objectives: Fundamentals of vibrations and control of vibrations of structures and dynamic systems. Topics include one dof systems and responses, multiple dof systems and responses, classical feedback control theory, modern state-space feedback control theory, application of control methodology in structures and systems under vibration and dynamics; introduction of optimal control theory; distributed transducers for active control of vibration.


Examinations: Two midterm exams (in-class and/or take-home)
One Final Exam (TBA)
- All exams are scheduled in class, unless otherwise specified
- NO make-up exams unless arranged prior to the exams

Grading: Your semester letter grade is based on your performance on the following subjects, including exams and homework assignments:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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<tr>
<td>Midterms</td>
<td>20 pts each</td>
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<tr>
<td>Final</td>
<td>35 pts</td>
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<tr>
<td>Homework</td>
<td>25 pts</td>
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Topics: (on the next page)
Topics of MEC532 course include the following:

- Introduction to mechanical vibrations of one dof systems
- Free, forced, damped vibration and analysis for one dof systems
- Responses: transient and steady-state response using the Laplace Transform
- Multiple dof systems and their free/forced vibration analysis
- Modal analysis and eigenvalue problems
- Classical feedback control theory: block diagram, dynamic response, Root locus, Bode diagrams, · · ·
- Converting dynamic equations of motion to state-space realization
- Canonical forms of state-space realization
- Modern control theory (or state-space control theory): Control law (controller) & estimator design
- One-dof discrete system: Laplace Transform, dynamic response, vibration analysis, feedback control
- Two-dof and multiple-dof systems: vibration and modal analysis, feedback control design (state-space)
- Distributed transducers for active control of vibrations
- Usage of MATLAB and/or Simulab in the analysis of vibration and control

Important calendar days for the Fall 2012 semester:

| Holidays (no classes held): | September 3-4, 2012 (Labor Day)  
|                           | November 21-25, 2012 (Thanksgiving Holiday) |
| Classes to be held:       | 8/29/12, 9/5/12, 9/12/12, 9/19/12, 9/26/12, 10/3/12, 10/10/12, 10/17/12,  
|                           | 10/24/12, 10/31/12, 11/7/12, 11/14/12, 11/28/12, 12/5/12 |
| First Day of Classes:     | Monday, August 27, 2012 |
| Last Day of Classes:      | Friday, December 7, 2012 |
| Final Examinations:       | December 11-19, 2012 |
Usage of the Blackboard and PodCasting

You are required to use Blackboard on which important announcements, homework/handouts, and supplementary materials of the course will be posted. In addition, I will make available lectures and supplementary materials using video podcast. The Podcasting materials can be accessed through “EchoCenter” in Blackboard. You can access blackboard and video podcasts at:

http://blackboard.stonybrook.edu

Under the content area in the left panel, select “EchoCenter”. This displays the list of the video podcasts. You can select “LAUNCH ECHO” and see the video podcasts using the Echo application, or import to iTunes.

Please note that you have to use your NetID to login to the blackboard system. Go to the helpdesk in the Main Library SINC Site if you have problems logging in. You can also call: 631-632-9602 or e-mail: helpme@ic.sunysb.edu for further information.

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Various University Policies and Statements

Americans with Disability Act & University Policy: If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact Disability Support Services at (631) 632-6748 or http://studentaffairs.stonybrook.edu/dss/. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website:

http://www.sunysb.edu/ehs/fire/disabilities.shtml

The SUNY Critical Management Initiative: Stony Brook University expects students to maintain standards of personal integrity that are in harmony with the educational goals of the institution; to observe national, state, and local laws and University regulations; and to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, and/or inhibits students’ ability to learn.

Academic Integrity Statement of University: Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person’s work as your own is always wrong. Any suspected instance of academic dishonesty will be reported to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at http://www.stonybrook.edu/uaa/academicjudiciary/ of the University and the CEAS CTPC website at http://www.ceas.sunysb.edu/adishonesty.asp.