ME405/505: Mechatronics Spring 2010

Instructor: Prof. Dongjun Lee  office) DO502  e-mail) djlee@utk.edu  phone) 865-974-5309

Office hours: 1-2:30pm T, 12:00-1:30pm F (or by appointment)

Lecture: 3:40-4:55pm T @ Perkins 324

Lab: session R = 2:10-4:55pm R @ M14 DO;  session F = 1:25-4:10pm F @M14 DO

Teaching Assistants: Ke Huang (session R) khuang1@utk.edu  Daye Xu (session F) dxu1@utk.edu
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Prerequisite: ECE301 & ME363; or consent of instructor

Grading: Lab reports: 50%  2 Mid-term exams: each 15%  Final exam: 20%

Synopsis: Mechatronic systems typically consist of mechanical systems with electrical sensors/actuators, and governed by some control algorithms. Such mechatronic systems are ubiquitous in modern engineering machines, particularly when high-performance or some intelligent adaptation is required: industrial robots, smart home appliances, automobile (ABS, cruise/traction control), unmanned autonomous vehicles, autopilot, printers, scanners, and hard disk drives, just to name a few. This is an introductory course to this exciting field of Mechatronics, aiming to offer hands-on laboratory-based team-oriented learning of some key aspects of Mechatronics across mechanical, electrical, computer and control engineering.

Outline of topics:
1. passive RLC circuits
2. 1st/2nd order system response and Bode plot
3. op-amp circuits and filter design
4. data acquisition and sampling theorem
5. dc-motors
6. motion control
7. strain gage based force sensing
8. force control
9. some advanced control techniques
Important course information:

1. Lab report is a team report (3 students in each team). It should be formal, comprehensive and word-processed. It should at least contain: introduction, background, lab experiment description and objective, results, analysis and conclusion. It will be graded both by its technical contents as well as its logical writing. One report will be assigned for about every two weeks, with its length to be around 8-12 pages.

2. Lab report should be turned in at the beginning of the lab session on the due date. If turned in late on the same day, 50% will be deducted. Otherwise, it will get zero point. The final page of each report should have a contribution statement signed by all the team members.

3. Lab members may be changed after mid term exams, reflecting students’ performance. If you have any difficulty in working with other team members, talk to the instructor.

4. Lab session will be led by 1 TA per 4 teams. All the results and data for the lab report should be done/collected during the lab sessions. Any unprofessional behavior during the lab sessions is strictly prohibited (including, but not limited to: failure to comply with the TAs' instruction, texting/phoning, web-browsing/emailing, newspaper reading, no food/drink, etc) and can result in expulsion from the course.

5. Attendance is required. More than 5 unjustified missing course hours (e.g. 4 lectures; 2 lab sessions; or 1 lab session & 2 lectures) will automatically result in F-grade. Also, 2 tarry for the lab sessions or 3 tarry for the lectures will make 1 absence (tarry = late more than 5 min.).

6. Two in-class mid-term exams will be given (2/23, 3/30). For each exam, you will be allowed 1 letter-size two-sided paper. Otherwise, closed-book/note. Final exam schedule is TBA. It will be comprehensive and closed-book/note. You will be allowed 2 letter-size two-sided papers.

7. Evaluation criteria for the graduate students for this course will be higher than those for the undergraduate students. They will be graded separately from the undergraduate students. Some additional or different lab tasks and exam problems will be assigned to them.

8. Labview, MatLab and SimuLink will be used for this course. Labview/MatLab/SimuLink are installed in the lab PCs and can/will be used during the lab sessions. MatLab and SimuLink, freely available for CoE students, would be needed for lab report writing.

9. Students are expected to behave professionally in this class: going-in/out during the class, newspaper reading, texting/phoning, or any other unprofessional behaviors (e.g. what you would haven’t done in high school) are not allowed, and may lead in expulsion from the course.

10. Any academic dishonesty, if found, will lead to F-grade and academic disciplinary actions.
University’s Honor Statement: “An essential feature of the University of Tennessee is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of the University, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity”.

Students with Disabilities: The Office of Disability Services (ODS) assists students with disabilities. To have this service, contact the ODS: 2227 Dunford Hall, 915 Volunteer Blvd, 964-6087 (v/tty) or ods@utk.edu. For more details, see the Hiltopics or contact the ODS.