Course Title and Number
Control Systems 0908441

Lecturer
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Course Website
http://fetweb.ju.edu.jo/staff/Mechatronics/LShareef/
http://www2.ju.edu.jo/sites/Academic/l.sharif/Material/Forms/AllItems.aspx
The course website will contain the following:
- Any important announcements (e.g., exam dates…)
- Handout materials
- Exercises and problems (and solutions where possible)
- Home-works (and solutions where possible)
- Quizes and exams (where possible)
- Extra reading material.
- Assignments submitted by students

Attendance
Absence of more than 7 hours (seven one hour lectures or five one and half hour lectures) will result in the expulsion of the student from the course. This will be applied very strictly.

Course Outline
The course provides the student with a general overview of the dynamical behaviour of engineering systems and their control. The student will understand the problem of stability and the methods of controlling systems. Time domain and frequency domain methods will be explored. Heavy reliance will be made on the use of Matlab and Simulink for examples and to reinforce student understanding.

Course contents
1. Introduction to Control Systems (1 week).
2. Modelling of mechanical and electrical systems; the use of differential equations; Laplace Transforms (1 weeks).
3. The use of block diagrams; block diagram reduction (1 week).
4. System response analysis: zero order systems; first order system response to impulse, step and ramp inputs; second order system response to impulse, step and ramp inputs; steady state error; the final value theorem; higher order systems using Matlab; performance specification of second order system (rise time, settling time, percentage overshoot) (3 weeks).
5. The concept of stability; the use of Routh’s stability criterion method for assessing the stability of systems (1 week).
6. The root locus method; assessing stability using the root locus method; design (2 weeks).
7. Compensator design (lead lag compensator design) using the Root Locus method (1 week).
9. Compensator design (lead lag compensator design) using the frequency domain methods (1 weeks)
10. PID controllers (2 weeks).

Project
A project will be set. More details will be given later.

Main textbook

Supporting textbook

Course Marking
Quizes 10% (2 to 4 quizes)
Project: 15% (the project assessment will be based on report, teamwork, time management, presentation and discussion, as well as the final working software)
Midterm Exam: 25%.
Final Exam: 50%