The University of Jordan
School of Engineering
Department of Industrial Engineering
2nd Semester – A.Y. 2014/2015

Course: System Dynamics and Control Laboratory – 0906346 (1 Cr. – Core Course)

Instructor: Dr. Mohammad Al Janaideh.
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Course Website: **http://engineering.ju.edu.jo/Departments/DeptAnnouncements.aspx?DeptName=Industrial%20Engineering**

Catalog Data: The lab consists of experiments that are related to: First and second order systems, Stability of dynamical systems. Frequency response, System identification, Servo systems, Design and tuning of a PID controller in closed loop systems. Practical applications in control systems, Simulation of control systems using MATLAB Simulink.

Prerequisites by Course: System Dynamics and Control – 0906345.

Prerequisites By Topic: Students are assumed to have sufficient knowledge pertaining to the modeling of systems, Characteristics of feedback control systems, stability of systems and design of control systems

Textbook

- System Dynamics and Control Lab Manual.

References:

- K. Ogata, Modern Control Engineering Prentice Hall.
- R Dorf and Bishop, Modern Control System, Prentice Hall.
- Norman S. Nise, Control systems Engineering, Wiley.
- MIT open course website, Control system tutorials.

Schedule & Duration: 16 Weeks, 16 lectures (3 hours each) plus exams.

Minimum Student Material: Textbook, class handouts, scientific calculator, and an access to a personal computer.

Minimum College Facilities: Classroom with whiteboard and projection display facilities, library, computational facilities with MATLAB and other engineering programs.

Course Objectives: The overall objective of this course is to provide the student with the knowledge to model, analyse and design control systems, and to provide him with an effective tool to study and design control systems using MATLAB software..

Course Learning Outcomes and Relation to ABET Student Outcomes:

Upon successful completion of this course, a student should:

1. Realize the importance of control systems in real life. [a, e]
2. Have the ability to find differential equations and transfer functions to model dynamical systems. [a, k]
3. Use experimental approach to model, analyze and control real dynamical systems. [a, e]

4. Anayze the stability, performance and disturbance rejection characteristics for closed loop feedback systems. [a,b,e,k]
5. Apply different teqniques in desinging control systems. [a,b,e,k]
6.. Use MATLAB software to simulate and analyze control systems [b, k]

Course Topics:

	Topic Description	Hrs
Exp1.	Introduction To MATLAB Simulink.	**3**
Exp2	Modeling of First order and Second order Systems.	**3**
Exp3.	Introduction To PID Controller.	**3**
Exp4.	Design of PID Controller Using Root Locus Method.	**3**
Exp5.	Frequency Response of Filters.	**3**
Exp6.	Control System Project.	**3**
Exp7	Control of Temperature System.	**3**
Exp8.	DC motor Position and Speed Control.	**3**
Exp9.	Robotino.	**3**
Exp10.	Introduction to PLC Controllers.	**3**

Ground Rules:

Attendance is required and highly encouraged. To that end, attendance will be taken every lecture; Absence of more than *7 hours* will result in the expulsion of the student from the course.

Assessments:

Exams, Quizzes, Projects, and Assignments.

Grading policy:

Midterm Exam	**30 %**
Assignments	**20 %**
Quizzes	**10%**
Final Exam	**40 %**
Total	**100%**

Last Updated:

Mar. 2015

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