



# Philadelphia University

Faculty of Engineering - Department of Electrical Engineering

## Course Details:

**Title:** Automatic Control Lab. (610416)

**Prerequisite:** Automatic Control (610414)

**Credit Hours:** 1 credit hours (16 weeks per semester, approximately 45 contact hours)

**Textbook:** Laboratory notes and manual

**References:** 1) R.C. Dorf & R.H. Bishop, " Modern Control Systems", 12th Edition, Prentice Hall,2011.  
2) K. Ogata, " Modern Control Engineering", 45h Edition, Prentice Hall,2010

### Course

**Description:** Measurement of motor characteristics: armature connection and field connection.  
Transient response of motors. Closed-loop position and speed control systems.  
Dead band and transient characteristics. Passive network compensation.  
Stabilization with Tacho generator feedback: frequency response measurement

## Course Outlines:

Week	Topic
1	Introduction
2	DC Servo motor ( Input voltage versus Output speed )
3	Servo motor (Load versus speed)
4	Transient Response for DC Servo motor
5	Operational Amplifier as an error detector
6, 7	Fundamental of closed loop system
8, 9	Gain of the system versus speed control
10, 11	Bidirectional speed control
12	Controllability of the motor speed
13	Error output in position control
14, 15	Closed loop position control
16	Speed feedback and position control

## Course Learning Outcomes with reference to ABET Student Outcomes:

Upon successful completion of this course, student should:

1.	An understanding of the use of Amplifiers and sensors in feedback Control system	[b, c, d]
2.	A knowledge of designing open loop and closed loop control system with emphasis on stability of the system ,Applying different controller's structures for processes with disturbance	[b, c, d]
3.	Know how to implement controller design techniques to make the system behavior satisfy design objectives	[a, b, c, d]

## Assessment Guidance:

Evaluation of the student performance during the semester (total final mark) will be conducted according to the following activities:

- Quizzes:** (3-5) quizzes of (10-15) minutes will be conducted during the semester. The materials of the quizzes are set by the lecturer.
- Reports:** 10 report.
- Final Exam:** The students will undergo a scheduled final exam at the end of the semester covering the whole materials taught in the course.

## Grading policy:

First Exam	"Quizzes (5%), reports (12%) and performances (3%)"	20%
Second Exam	"Quizzes (5%), reports (12%) and performances (3%)"	20%
Third Exam	"Quizzes (5%), reports (12%) and performances (3%)"	20%
Final Exam	"Practical 30% and Theoretical 10%"	40%
Total:		100%

## Attendance Regulation:

The semester has in total 45 credit hours. Total absence hours from classes must not exceed 15% of the total credit hours. Exceeding this limit without a medical or emergency excuse approved by the deanship will prohibit the student from sitting the final exam and a zero mark will be recorded for the course. If the excuse is approved by the deanship the student will be considered withdrawn from the course.

May, 2018