Philadelphia University

Faculty of Engineering & Technology
Department of Electrical Engineering
First Semester 2019 / 2020

Course Title:	Automatic Control (610414)
Prerequisite:	Measurement & Instrumentation (610332)
Credit Hours:	3 credit hours (16 weeks per semester, approximately 45 contact hours)
Textbook:	'Modern Control Engineering, by Katsuhiko OGATA, Pearson Education, 2002
References:	Control System Engineering, by S. Sivanagaraja and L. Devi, New Age International publishers, 2008 Automatic Control Systems, F.Golnaraghi, B.:uo, John Wiley, 2010.
Description:	The course is a requirement for level 4 of electric engineering students. It introduces the basic principles and analysis of control feedback systems.
Website:	http://www.philadelphia.edu.jo/academics/m_salman/
Instructor:	Dr. Mohammed Mahdi Email: m_selman@philadelphia.edu.jo Office: Engineering building, room 6726, ext: 2154 Office hours: MON. WED. 11:15 – 12:45

Course Outlines:

Week	Topic
1,2	Revision of basic and required mathematics for the course, types of roots and Laplace transformation.
3, 4	Mathematical modeling of physical, electrical and mechanical systems. Differential equation derivation.
5	Definition of system and it's types.
6, 7	Definition of transfer function, zeros and poles real, multiple and complex. Laplace transform of differential equations.
8	Concept of open-loop and closed-loop systems.
9, 10	Block diagram representation, block diagrams manipulation, block diagram reduction, Mason's Gain Formula.
11, 12	Time response determination for different inputs. Partial fraction expansion and inverse Laplace transformation.
13	Damping ratio and natural undamped frequency, Time response specifications, PID controllers
14	Stability concept and analysis of control system
15	Routh's stability criterion
16	Root locus method, concept, rules of sketching and analysis, Revision

Course Learning Outcomes with reference to ABET Student Outcomes:
Upon successful completion of this course, student should:

1.	Understand the concept of physical systems	1
2.	Carry out mathematical modeling of physical systems	1, 2
3.	Know the meaning and application of transfer function, zeros and poles	1, 2
4.	Understand the concept of block diagram, manipulation and reduction of block diagrams	1, 2
5.	Determination of time response and evaluation, PID applications.	1, 2
6.	Understand the concept of system stability	1, 2
7	Use root-locus for control system analysis	1

Assessment Guidance:

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

Sub-Exams:	The students will be subjected to two scheduled written exams, first exam and second exam during the semester. Each exam will cover materials given in lectures in the previous 3-4 weeks.
Quizzes:	(3) quizzes of (10-15) minutes will be conducted during the semester. The materials of the quizzes are set by the lecturer.
Homework and projects:	Tutorials sheets will be handed out to the students and homework should be solved individually and submitted before or on a set agreed date. Student may be assigned to present project(s). Cheating by copying homework from others is strictly forbidden and punishable by awarding the work with zero mark
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	20%
Second Exam	20%
Homework and Quizzes	20%
Final Exam	40%
Total:	100%

Attendance Regulation:

The semester has in total 45 credit hours. Total absence hours from classes and tutorials 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.

September, 2019