



Philadelphia University
Faculty of Engineering
Department of Mechatronics Engineering

First Semester 2013/2014

Course Syllabus

Course Title: Mechatronics System Design	Course code: 640598
Course Level: 5 th Year	Course prerequisite(s): 640582
Lecture Time: 11:10-12:00 Sunday, Tuesday, and Thursday	Credit hours: 3

Academic Staff Specifics

Name	Rank	Office No.	Office Hours	E-mail Address
Dr. Ibrahim Al-Naimi	Assistant Prof.	6408	2:00-4:00 Tuesday & Thursday	inaimi@philadelphia.edu.jo

Course module description:

The course provides the student with general overview of mechatronics systems, their main components and the approach to the design process.

Course module objectives:

An important aim of the course is to allow the student to integrate his/her knowledge of measurement systems, control, electronics, programming and mechanics into designing comprehensive mechatronics systems. The practical assignments and the project work prepare the student for the final year graduation project, by enhancing planning and team work skills as well as practical project work and the building of prototypes.

Course/ module components:

- **Books (title , author (s), publisher, year of publication):**
Mechatronics: An Integrated Approach. By Clarence W. Silva, CRC Press 2005
- **Support material (s) (vcs, acs, etc).**
- **Study guide (s) (if applicable)**
- **Homework and laboratory guide (s) if (applicable).**

Teaching methods:

Lectures, discussion groups, tutorials, problem solving, debates, etc.

Learning outcomes:

At completing this module the student should be able to understand:

- How to select proper sensors and actuators for the mechatronics system design.
- How to model and simulate the system to be designed.
- How to design and emulate mechatronics system controller.
- How to interface system components to each other.
- How to test and evaluate the final design

Assessment instruments

- **Short reports and presentations**
- **Quizzes:** Two Quizzes will be offered.
- **Project:** A project assignment will be handed to the students.
- **Final examination:** 40 marks

Allocation of Marks	
Assessment Instruments	Mark
1 st examination	20%
2 nd examination	20%
Project	10%
Quizzes	10%
Final Examination:	40%
Total	100%

Documentation and academic honesty

- Documentation style (with illustrative examples)
- Protection by copyright
- Avoiding plagiarism.
- **Ethics and Disability Act:**
 - Students may consult with one another on solutions, but copying another student's code is strictly prohibited.
 - Students should write their own code. Using code found on books or internet is prohibited.
 - The Instructor follows general university "Academic Dishonesty/Cheating Policy".

Course/module academic calendar

week	Basic and support material to be covered	Homework/Project
(1)	Introduction to mechatronics systems	
(2)	Mechatronics systems design procedures/stages and general engineering principles.	
(3)	Mechanics and drive	
(4)	Mechanics and drive	
(5)	Motor selection (DC motors)	
(6)	Motor selection (AC motors)	
(7)	Motor selection (stepper motors)	
(8)	Sensors and transducers selection	
(9)	Sensors and transducers selection	
(10)	Signal conditioning circuit design	
(11)	Signal conditioning circuit design	Project
(12)	Controller selection and programming algorithms	
(13)	System modeling and simulation	

(14)	System modeling and simulation	
(15)	MSD Case Study: Robotics	

Expected workload:

On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Attendance policy:

Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course. The student is responsible for all assignments on a weekly basis. No make-up will be given for missed quizzes, tests or assignments, unless a case is made in advance with Instructor's approval.

Module references

Books

- Electric Drives and Electromechanical Systems by Richard Crowder, Newnes, 2006.
- Introduction to Mechatronics and Measurement Systems by Hstand and Alciatore, McGraw Hill 1999

Journals

Websites