Philadelphia University
Faculty of Engineering
Department of Mechatrinics Engineering
Second semester, 2008/2009

Course Syllabus

Course Title: Modeling, Simulation and Interface	**Course code: (640465)+(630573)**
Course Level: 4th year	**Course prerequisite (s) and/or corequisite (s): 630203, 640451**
Lecture Time: 9:45-11:15 M, W	**Credit hours: 3**

Academic Staff Specifics

Name	Rank	Office Number and Location	Office Hours	E-mail Address
Dr. Ashraf Saleem	Assistant Professor	C608 Department of Mechatronics	10:00-11:00	Ashraf_saleem@yahoo.com

Course module description:

The course aims to make the student familiar with basic concepts used in the modeling of mechtaronic systems, simulate the models using Matlab/Simulink, and use the PC interface with Labview to control mechatronic systems

Course module objectives:

At completing this course the student should be able to:

- **Use different modeling techniques in order to model Mechatronics systems.**
- **Draw the Block Diagrams for Mechatronics systems.**
- **Use Simulink and MATLAB to simulate time-domain and frequency domain models.**
- **Analyze and understand the dynamic system's response.**
- **Understand system interface concepts.**
- **Use Simulink to interface Input/Outputs through the PC Ports and DAQ cards.**
- **Use Labview for simulation and interface.**

Course/ module components

- **Books (title , author (s), publisher, year of publication)**
  Title: Mechatronics: An Integrated Approach
  Author:Clarence W. Silva
  Publisher: CRC Press
  Edition : first, 2005

- **Mechatronics** by Dan Nesculescu, Prentice Hall 2002
- **Mechatronics** by Bolton, Prentice Hall, 2nd edition

Teaching methods:

- 3 Lectures a week
- 2-3 Appointments for tutorials and problem solving after each chapter
- 3-4 Appointments for software simulation at lab.

Learning outcomes:

- Knowledge and understanding
  The student should know the basic principles of Modeling and Simulation of Mechanical , Electrical , Thermal and Fluid systems.

- Cognitive skills (thinking and analysis).
  Some projects assigned aim to develop the thinking and analysis capability of the students

- Communication skills (personal and academic).
  Not applicable

- Practical and subject specific skills (Transferable Skills).
  Some practical projects assigned aim to develop the practical capability of the students:
  - be familiar with some related software as MATLAB.

Assessment instruments

- Short reports and/ or presentations, and/ or Short research projects
- Quizzes.
- Home works
- Final examination: 50 marks

Allocation of Marks	
Assessment Instruments	**Mark**
First examination	**20**
Second examination	**20**
Final examination: 50 marks	**50**
Reports, research projects, Quizzes, Home works, Projects	**10**
Total	**100**

Documentation and academic honesty

- Documentation style (with illustrative examples)

- Protection by copyright
- Avoiding plagiarism.

Course/module academic calendar

week	Basic and support material to be covered	Homework/reports and their due dates
(1)	Introduction to Modeling Techniques	
(2)	State-space representation	
(3)	State models from linear graphs	
(4)	Illustrative examples	Selected typical Problems
(5)	Mechanical systems	
(6)	Examples on Mechanical systems	Selected typical Problems
(7)	Electrical systems	
(8)	Examples on Electrical Systems	Selected typical Problems
(9) Mid Examination	Tutorial and problem solving	Selected typical Problems
(10)	Fluid systems	
(11)	Thermal systems	
(12)	Tutorial and problem solving	Selected typical Problems
(13)	Simulation using MATLAB and SIMULINK programming	
(14)	Illustrative examples	
(15)	Data Acquisition Systems	
(16) Final Examination		

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.

Module references

Books

- **Mechatronics by Dan Nesculescu, Prentice Hall 2002**
- **Mechatronics by Bolton, Prentice Hall, 2nd edition**

Journals

- **Journal of Modeling and Simulation**
- **Journal of Mechanical and Electrical systems modeling.**

Websites

http://ocw.mit.edu/OcwWeb/web/home/home/index.htm
http://www.ebooksquad.com