Philadelphia University
Course Outline

Course Title	**:**	**EMBEDDED SYSTEMS DESIGN** **(630470)**
Prerequisite	**:**	Microprocessors **(630371)**
Text Book	**:**	An Introduction to the design of small-scale Embedded Systems. By: Tim Wilmshurst, Palgrave, UK, 2004. ISBN:0-333-92994-2
Credit Hours	**:**	3 **Level** : 4th year
Instructor	**:**	Prof. Kasim M. Al-Aubidy, **Room:** 716
Semester	**:**	Summer 2015/2016 **Time:**8:00-9:00 (Sunday to Thursday) **Office Hours:**14:00-15:00 (Monday & Wednesday)

Course Goals:
To cover the principles and design methods of embedded computer systems. It covers the principles of single chip microcomputers, interfacing techniques and microprocessor-based system realization.

Time Schedule:
Duration: 16 weeks **Lectures:** 3 hours /week
Tutorial: Non **Laboratories:** Non

Objectives:
At Completing this module the student should be able to :
1- Understand the operation of embedded systems
2- Design and implement embedded systems
3- Modify the performance of embedded systems

week	Course Contents	Tasks
1	Introduction to embedded systems, Microcontroller Architecture.	Project Selection
2	Microcontroller Operation, Programming: Instruction set, Program Developing.	HW1
3	Microcontroller Programming: Timing and Subroutines.	
4	Microcontroller Input/Output Interfacing; digital, analog, pulses.	HW2
5	Keypad Interfacing. LCD Interfacing	HW3
6	Serial Interfacing, ESD using single board.	Project (Phase1)
7	Embedded Systems and Wireless Sensor Networks.	
8	MiniProjects Design using single-chip microcontrollers	Project (Phase2)

Mode of Assessment

1.	**First Exam**	**20%**
2.	**Second Exam**	**20%**
3.	**Quizzes**	**10%**
4.	**Projects**	**10%**
5.	**Final Exam**	**40%**

References

1. Raj Kamal, "Embedded Systems: Architecture, Programming & Design", 1st edition, 2007, McGraw Hill, USA 2007.
2. Frank Vahid and Tony Givargis, "Embedded System Design: A Unified Hardware/Software Introduction" John Wiley & Sons, 2002.
3. Joan Peatman, "Embedded Systems Design with the PIC18F452 microcontroller", Prentice-Hall, USA 2003.
4. Stuart R. Ball, "Embedded Microprocessor Systems: Real World Design", 2nd edition, Newton, Mass. USA, 2002.
5. Steven Heath, "Embedded Systems Design", 2nd edition, Newton, Mass. USA, 2002.
6. http://romux.com/tutorials/pic-tutorial/central-processing-unit

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Faculty of Engineering

Embedded Systems Design (630470)

Summer Semester 2015/2016 Projects

Project 1: Keypad Interfacing and Programming.

Project 2: Liquid Crystal Display (LCD) Interfacing.

Project 3: Analog Input/Output Interfacing.

Project 4: Calendar Design and Programming.

Project 5: Serial Input/Output Interfacing.

Project 6: Temperature Monitoring and Control.

Project 7: Pulse Width Modulation (PWM) Signal Generation.

Project 8: Stepper Motor Control.

Project 9: DC Motor Control.

Project 10: Speed and Position Measurement of a Rotating Shaft.

Project 11: Alarm System Design and Applications.

Project 12: Waveforms Generator Design.

Project 13: Digital Voltmeter Design.

Project 14: Fuzzy Logic Based Security System Design.

Project 15: Data Acquisition System Design.

Project 16: Design and Implementation of an Office Monitoring System.

Project 17: Microcontroller-Based Real-Time Algorithm Implementation.

Project 18: FPGA-Based Embedded System Design.

Project 19: Design and Implementation of a Programmable Casher Unit.

Project 20: Design and Implementation of an Elevator Controller.