

University of Jordan
Computer Engineering Department
Course Outline
Embedded Systems (0907333)

I. Course Description

The main objectives of this course are: learning and understanding basics of embedded systems, microcontrollers' architectures, programming microcontrollers, designing simple embedded systems, and linking various concepts of electronics and circuits within the embedded systems framework.

II. Course Objectives

By the end of this course, you should be familiar with the microcontrollers and embedded systems basic architectures, features, and programming.

III. Expected Outcomes

1. Ability to design and construct complete simple embedded system hardware.
2. Ability to program and interface embedded systems for industrial applications.

IV. Textbooks and References

1. Tim Wilmshurst, *Designing Embedded Systems with PIC Microcontrollers: Principles and Applications*, Newnes, 2007. **Main Textbook.**
2. Tim Wilmshurst, *An Introduction to the Design of Small-Scale Embedded Systems*, Palgrave, 2001.

V. Student Materials

Textbook, Class Handouts, Engineering Calculator, PC, and the Internet.

VI. College Facilities

A classroom with whiteboard and projection facilities, library, and computer laboratory.

VII. Instructional Methods

1. Lectures
2. Office Discussions
3. Tutorials

VIII. Evaluation of Outcomes

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| 1. Four Quizzes | 20% |
| a. <i>Quiz 1 (9/10-13/10)</i> | |
| b. <i>Quiz 2 (23/10-27/10)</i> | |
| c. <i>Quiz 3 (4/12-8/12)</i> | |
| d. <i>Quiz 4 (18/12-22/12)</i> | |
| 2. Midterm Exam (31/10-15/11) | 30% |
| 3. Final Exam (7/1/2012-15/1/2012) | 50% |

IX. Class Policies

- Attendance is required
- All submitted work must be yours
- Cheating will not be tolerated

X. Professional Component Contribution

This is an introductory course in embedded systems hardware design, programming, and interfacing techniques. It helps students to understand how various hardware components of a modern microcontroller can interface within real systems.

XI. Course Outline

The following table contains the list of topics to be covered in the course.

Topic	Textbook Sections
Getting Started with Embedded Systems	1.1–1.6
Minimum Systems and the PIC® 16F84A	2.1–2.6
Starting to Program – An Introduction to the Assembler	4.1–4.4
Building Assembler Programs	5.1–5.4
Working with Time: Interrupts, Counters, and Timers	6.1–6.5
Parallel Ports, Power Supply and the Clock Oscillator	3.1–3.6
Starting with Serial	10.1, 10.2, 10.10.1-10.10.6
Data Acquisition and Manipulation	11.1–11.3
The human and physical interfaces	8.1–8.9
Taking Timing Further	9.1–9.8

XII. Sections and Instructors

Sec	Meeting Time	Room	Instructor	Office Hours	e-mail, Homepage
2	Sun, Tue, Thu 11:00-12:00	CPE 001	Dr. Gheith Abandah	Mon 11-12 Tue 12-1 Thu 10-11	abandah@ju.edu.jo , http://www.abandah.com/gheith
3	Mon, Wed 9:30-11:00	Civil 002			
1	Sun, Tue, Thu 9:00-10:00	Civil 002	Dr. Iyad Jafar	Sun 10-11 Mon 9 -10 Thu 11 -12	Iyad.jafar@ju.edu.jo http://fetweb.ju.edu.jo/staff/cpe/jafar
4	Sun, Tue, Thu 3:00 – 4:00				