## ABET Unit Classification
- Engineering

## Compliant Catalogue
- 2007/02

## Course Code
- 0907333

## Course Title
- Embedded Systems

## Credit Hours
- 3

### Class Schedule
- Sun, Tue, and Thu: Three 50-minute sessions
- Mon and Wed: Two 75-minute sessions

### Laboratory Schedule
- None

### Tutorial Schedule
- None

### Duration
- Fifteen (15) weeks

## Course Coordinator
- Dr. Iyad F. Jafar

## Prepared by
- Course Instructors

## Date of Outline Preparation
- Jan 23, 2009

## Date of Last Revision
- January 31, 2013

## Checked by
- Course Instructors

## Approved by HoD
- Dr. Gheith Abandah
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


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

1. First Exam 20%
2. Second Exam 30%
3. Final Exam 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.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Textbook Sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Getting Started with Embedded Systems</td>
<td>1.1–1.6</td>
</tr>
<tr>
<td>Minimum Systems and the PIC® 16F84A</td>
<td>2.1–2.6</td>
</tr>
<tr>
<td>Starting to Program – An Introduction to the Assembler</td>
<td>4.1–4.4</td>
</tr>
<tr>
<td>Building Assembler Programs</td>
<td>5.1–5.4</td>
</tr>
<tr>
<td>Working with Time: Interrupts, Counters, and Timers</td>
<td>6.1–6.5</td>
</tr>
<tr>
<td>Parallel Ports, Power Supply and the Clock Oscillator</td>
<td>3.1–3.6</td>
</tr>
<tr>
<td>Starting with Serial</td>
<td>10.1, 10.2, 10.10.1-10.10.6</td>
</tr>
<tr>
<td>Data Acquisition and Manipulation</td>
<td>11.1–11.3</td>
</tr>
<tr>
<td>The human and physical interfaces</td>
<td>8.1–8.9</td>
</tr>
<tr>
<td>Taking Timing Further</td>
<td>9.1–9.8</td>
</tr>
<tr>
<td>Smarter Systems and the PIC 18FXX2</td>
<td>12.1 – 12.9</td>
</tr>
</tbody>
</table>

XII. Course Policies

- **Exams:** All exams (including the final exam) will be open book exams. The final exam will be comprehensive, covering material from the entire course, although the last third of the course will be emphasized.
- **Makeups:** There will be no make-up for the first and second exams. In case of medical/ or other disabling emergencies, the instructor should be notified before the midterm and his approval for missing the midterm should be obtained before the midterm. If for any reason the instructor could not be reached, the department secretary should be notified before the midterm. The phone number is 535-5000 Extension 23000.
- **Grading Corrections:** Ask the instructor for any grading correction requests within a week of returning the exam papers. After that, your grade will not be adjusted. If you find any mistake in grading, please let the instructor know. Your grade will not be lowered.
- **Class Attendance:** Class attendance will be taken. University regulations regarding attendance will be strictly enforced. If you miss class, you must obtain the covered material from a willing classmate and or the course web site. The instructor will not be available (during office hours or other times) to repeat material covered in class.
### XIII. Sections and Instructors

<table>
<thead>
<tr>
<th>Sec</th>
<th>Meeting Time</th>
<th>Room</th>
<th>Instructor</th>
<th>Office Hours</th>
<th>E-mail, Homepage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sun, Tue, Thu 11:00 – 12:00</td>
<td>Civil 102</td>
<td>Dr. Ramzi Saifan</td>
<td></td>
<td><a href="mailto:saifan_cie@hotmail.com">saifan_cie@hotmail.com</a></td>
</tr>
<tr>
<td>2</td>
<td>Mon, Wed 8:00 – 9:30</td>
<td>Civil 002</td>
<td>Dr. Iyad Jafar (Coordinator)</td>
<td>Sun, Tue, Thu 10:00- 11:00 Mon 9:30 – 10:30</td>
<td><a href="mailto:Iyad.jafar@ju.edu.jo">Iyad.jafar@ju.edu.jo</a> <a href="http://www.driyad.ucoz.net">http://www.driyad.ucoz.net</a></td>
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