Catalog Description
Introduction to computer organization. Signed and unsigned number representation, character representation, ASCII codes. Assembly language programming, instruction format and types, memory and I/O instructions, dataflow, arithmetic, and flow control instructions, addressing modes, stack operations, and interrupts. Datapath and control unit design. RTL, microprogramming, and hardwired control. Practice of assembly language programming. 
Prerequisite: COE 200 and ICS 201

Instructor Dr. Aiman H. El-Maleh. Room: 22/318 Phone: 2811 Email: aimane@ccse.kfupm.edu.sa

Office Hours SMW 11:00-12:00 PM (and by appointment)

Course Objectives
1. Be proficient in assembly language programming in general and for the x8086 processor family in particular. The student should be able to analyze, debug, test and understand assembly language programs and implement algorithms in assembly language.

2. Understand the basic components in a CPU design. The student should be able to design a small CPU starting from the instruction set.

Course Learning Outcomes

The student should be able to:

1. Explain how an instruction is fetched from memory and executed.

2. Explain the relationship between the representation of machine level operation at the binary level and their representation by a symbolic assembler.

3. Explain why a designer adopted a given instruction format, such as the number of addresses per instruction and variable length vs. fixed length formats.

4. Write small programs and fragments of assembly language code to demonstrate an understanding of machine level operations.

5. Implement some fundamental high-level programming constructs at the machine-language level.

6. Use computer simulation packages to investigate assembly language programming.
7. Compare alternative implementations of datapaths.

8. Discuss the generation of control signals using hardwired and microprogrammed implementations.

Text Books & References:


- Online material: http://assembly

Grading Policy

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory</td>
<td>20%</td>
</tr>
<tr>
<td>Programming Assignments</td>
<td>15%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Exam I</td>
<td>15% (Thursday March 24, 9:30AM)</td>
</tr>
<tr>
<td>Exam II</td>
<td>20% (Thursday May 12, 9:30AM)</td>
</tr>
<tr>
<td>Final</td>
<td>20%</td>
</tr>
</tbody>
</table>

- Assignments are to be submitted in class in the specified due date.
- Late assignments will be accepted but will be penalized 10% per each late day.

Course Topics

1. *Introduction and Information Representation.* 6 lectures

2. *Assembly Language Concepts.* 6 lectures

3. *8086 Assembly Language Programming.* 20 lectures

4. *CPU Design.* 12 lectures

5. *Instruction Set Formats.* 1 lecture
   Fixed vs. variable instruction format. Examples of instruction formats.