

University of Jordan
Faculty of Engineering and Technology
Summer Semester 2004/2005

Course Title: Assembly Language and Microprocessors
Course No.: 0907331
Prerequisite: Microcontrollers [0907233] or Computer Organization [0907232]
Location: 001 Computer Engineering
Times: 11:30 - 12:30 pm Sun Mon Tue Wed Thu

Instructor: Dr. Mohammed Hawa
Office: E 306
Telephone: 5355000 ext 2817
Email: hawa@ju.edu.jo
Office Hours: 12:30 - 1:00 pm Sun, 11:00 - 11:30 am Tue, 1:00 - 2:00 pm Wed
Course Web Site: <http://fetweb.ju.edu.jo/staff/EE/mhawa/331>

Principal Textbook:

- *The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium 4: Architecture, Programming and Interfacing* by Barry B. Brey, Prentice Hall, 6th Edition, 2003.

Other References:

- *The 80x86 IBM PC and Compatible Computers (Volume I and II): Assembly Language, Design and Interfacing* by Muhammad Mazidi and Janice Mazidi, Prentice Hall, 4th Edition, 2003.
 - *The 8088 and 8086 Microprocessors: Programming, Interfacing, Software, Hardware and Applications* by Walter A. Triebel and Avtar Singh, Prentice Hall, 4th Edition, 2003.
 - *Assembly Language for Intel-Based Computers* by Kip R. Irvine, Prentice Hall, 4th Edition, 2003.
 - *Emu8086 Software Program:* An 8086 Assembler with integrated 8086 Microprocessor Emulator. Available at: <http://www.emu8086.com>. An additional **Hardware Emulation Kit** is available at the course Website.
 - *Intel® x86 Basic Instruction Sheet:* Available at the course Website.
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Course Objectives:

The objective of this course is to introduce undergraduate students to programming at the Assembly and machine instruction level. Students will develop a comprehensive understanding of the *Intel® x86* instruction set and the related programming principles by writing and debugging Assembly programs that can perform I/O hardware control, basic arithmetic and BCD calculations, various logic operations and string manipulations.

Course Outline:

1. Introduction to Microprocessors and Evolution of the *Intel®* Microprocessor. **1 Hr**
2. Architecture and Software Model of the 8088 and 8086 Microprocessors: **4 Hrs**
Registers, the Stack, *Physical* and *Logical* Memory Addresses.
3. Assembly Language Programming Concepts. **1 Hr**
4. The MOV instruction and the 8088/8086 *memory addressing modes*. **2 Hrs**

5. 8088/8086 Programming – <i>Data Transfer</i> instructions.	3 Hrs
6. 8088/8086 Programming – <i>Arithmetic and Logic</i> instructions.	5 Hrs
7. 8088/8086 Programming – <i>Flow-control, Subroutine-handling</i> and <i>String</i> instructions.	7 Hrs
8. Converting Instructions into Machine Code.	2 Hrs
9. Writing Assembly Programs: Exercises and Homeworks.	7 Hrs
10. Using Assembly Language with C/C++.	1 Hr
11. 8088/8086 Memory and Input/Output Interfacing: Microprocessor Control Signals and Bus Cycles.	6 Hrs
12. Introduction to Memory Subsystem Design: Memory Banks.	2 Hrs
13. Introduction to Input/Output Interface Circuits and IN/OUT instructions.	1 Hr
14. Introduction to the Interrupt Interface of the 8088/8086 Microprocessors.	1 Hr
15. The difference between <i>Real-Mode</i> and <i>Protected-Mode</i> Memory models and Memory Paging.	1 Hr
16. Introduction to the 80386, 80486, and Pentium® Processor Families.	1 Hr

Grades Composition and Letter Grades:

First Exam	25%	(Sunday July 31, 2005)
Second Exam	25%	(Wednesday August 17, 2005)
Final Exam (Comprehensive)	50%	(Saturday September 3, 2005)

The mapping from your final score to your letter grade for the course (e.g., A, B+, B etc) will be determined at the end of the semester by an appropriate curve based on the overall performance of the class.

Classroom Conduct: Students are expected to be punctual, alert, and prepared for class. Students will be considerate of other students, which includes being quiet for the duration of the class period except when he or she has something to contribute to the class. Students are encouraged to ask questions in class in an orderly manner. **Cellular phones** are *not* allowed in class.

Attendance: Attendance is *highly encouraged*. I reserve the right to award extra credit for perfect attendance. To that end, attendance will be collected at random lectures.

Exam Procedures: All exams will be closed book except for the *x86 instruction sheet*. No scratch paper is allowed. Problems must be worked in detail in order to receive full credit.

Students may use calculators during exams. Laptop computers are not allowed, though.

All exams (including the final exam) should be considered cumulative (since course material tends to build on previous material), but each exam (including the final exam) will concentrate on material not yet tested. You will be held responsible for all reading material assigned, even if it is not explicitly covered in lecture notes.

No makeup exams will be allowed. In case of illness and in rare cases of other conflicts with scheduled examinations, students with documented excuses will have their final exam count proportionately more of their total grade. For excused absences, you need to provide me with a written explanation **within one week** before or after the exam.

Academic misconduct will not be tolerated. It will result in a failing grade and may result in further disciplinary action by the University.