THE HASHEMITE UNIVERSITY
Faculty of Engineering
Computer Engineering Department
Course Syllabus

Course Title: Computer Organization
Department: Computer Engineering
Prerequisite(s): Assembly Language and Microprocessor Systems (110408330)

Course Number: 110408340
Designation: Compulsory

Instructor: Dr. Bassam Jamil

Instructor's Office: E3056

Instructor's e-mail: bassam@hu.edu.jo
Office Hours: TBD
Lecture Time: Su, Tue, Th 9-10

Class Room:

Course description:

This course introduces the students to theoretical and practical concepts relevant to the structure and design of modern digital computers. The course covers computer architecture from gate-level logic through processor design to multiprocessor and network issues. Also, the course includes reduced instruction set computer architectures (RISC); using the MIPS central processor as an example. The lectures will discuss in depth the design concepts that are the basis for current computers design. Students will learn design techniques and evaluation metrics used to characterize each computer design. Students will be exposed to the computer architecture, its operation and control, the organization and interface requirements for a computer system, the structures and operations of standard hardware components associated with a computer system, processing unit organization, I/O organization and peripherals to a computer system. Special emphasis is given to basic pipelining, main-memory organization and memory hierarchy. Finally, these concepts will be evaluated through design problems in the assignments, two short and final exams.

Textbook(s):

- *Computer Organization and Design: The Hardware/Software Interface*, 4th Edition, David Patterson and John Hennessy, Morgan Kaufmann. ISBN: 978-0-12-374493-7, 2012.

Other required material:

- *Computer Organization and Design: The Hardware-Software Interface,* Second Edition, David Patterson and John Hennessy.
- *Introduction to RISC Assembly Language Programming*, John Waldron, ISBN 0-201-39828-1 (published by Addison-Wesley).
- *Computer Organization and Architecture: Designing for Performance,* 7th Edition, William Stallings, published by Prentice Hall, July 2005.

Course objectives:

- The ability to use a hierarchical (layered) approach to understand a complex system (Hardware and Software structure: processing unit organization, input/output organization and design of a simple computer).
- To learn the organizational paradigms that determines the capabilities and performance of computer systems.
- Become sufficiently well acquainted with the principles of computer architecture to be able to make intelligent use of computers for designing and simulating engineering systems, components, and devices.
- Acquire a basic knowledge of assembler language.
- The ability to learn design techniques and evaluation metrics used to characterize each computer design.
- The ability to distinguish between hardware and software techniques in designing datapath and control unit of computer systems.
- The ability to explore the memory hierarchy system and how to interface it to a computer.
- The ability to use appropriate computer design procedures.
- The ability to work in groups to do design problems in the assignments and the projects.

Special notice:

- There will be NO consideration for rescheduling the tests and exams individually. Completed proofs are required for emergency and/or exceptional situations.
- For communicate with me, please try to see me in person during the office hours. Otherwise, send me an email and clearly specify your name, course, section, etc. I will not respond to emails that I do not know the author or emails that have no manners.

Topics covered:

- **Computer Abstractions and Technology**   Chapter 1   (2 Weeks)
  (Sec. 1.1 to 1.4)

- **Instructions: Language of the Computer**   Chapter 2   (2 1/2 Weeks)
  (Sec. 2.1 to 2.7 & 2.10)

- **Arithmetic for Computers**   Chapter 3   (1 1/2 Weeks)
  (Sec. 3.1 to 3.4)

  - *Review and First Exam*   *(1/2 Week)*

- **The processor**   Chapter 4   (4 Weeks)
  (Sec. 4.1 to 4.9)

  - *Review and Second Exam*   *(1/2 Week)*

- **Exploiting Memory Hierarchy**   Chapter 5   (3 Weeks)
  (Sec. 5.1 to 5.3 & 5.5)

  - *Review and Final Exam*   *(1/2 Week)*

Exams:

There will be two short exams dated as shown below, and one comprehensive final exam will be held at the end of the semester as scheduled by the University for the lecture:

- All exams are CLOSED-BOOK exams.
- Exams will cover the assigned reading materials and discussed materials in the lectures.
- There will be no make-up exams (in very special circumstances, written excuse and official proofs are required for making-up exams).
- Exam solutions will be discussed in class. Written solutions will NOT be distributed.
- The final exam will be held during the examination period. The exam will include questions from all the topics discussed in class, and in the lab. The final exam must be written in pen, closed-book, no calculators, no electronic translators, and no scrap paper.
- **You are training to be a professional engineer**. Consequently, we expect you to behave like a professional. A professional engineer is polite, considerate and respectful of others. It is rude, inconsiderate, and disrespectful to your fellow students and to the professor to talk in class. No one can learn if you are chatting to your neighbor!

- 🔴 **First Exam**: Monday March 12, 2012. All calculations must be done by hand, with all work shown, in order to receive full credit. The exam will cover the topics assigned as shown above.

- 🔴 **Second Exam**: Monday April 16, 2012. All calculations must be done by hand, with all work shown, in order to receive full credit. The exam will cover the topics assigned as shown above.

Class Participations:

Students are required to attend the class lectures. Attendant sheets will be circulated for signatures at the beginning of each lecture. Coming to the lecture late and leaving the lecture early are NOT allowed.

Grading Plan:

First Exam	(25 Points)	March 12
Second Exam	(25 Points)	April 14
Final Exam	(50 Points)	Will be announced by the registrar

Prepared by Dr. Sa'ed , updated by Dr. Bassam