

Computer System Architecture

Course Information:

Code: EC-220
Credit Hours: 4 (3 + 1)
Class: DE-36 (CE)
Instructor: Dr. M. Usman Akram
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<http://biomisa.org/usman/>

Course Home Page:

<http://biomisa.org/usman/computer-system-architecture>

Class Hours:

Monday (1415-1600)	DE-36 CE (A)	CRC-14
Thursday (1320-1410)	DE-36 CE (A)	CRC-14
Tuesday (1320-1410)	DE-36 CE (B)	CRC-15
Thursday (1055-1240)	DE-36 CE (B)	CRC-15

Lab Hours:

Monday (0800-1040)	DE-36 CE (A)	Electronics Lab
Thursday (0800-1040)	DE-36 CE (B)	Electronics Lab

Office Hours:

Monday	(1000-1230)
Friday	(1000-1100)

Semester:

Fall 2015

Text:

- Computer Organization and Design The Hardware/Software Interface, David Patterson & John Hennessy, 5th Edition, 2013

Reference

- Computer Architecture A Quantitative Approach, John Hennessy & David Patterson, 5th Edition, 2012
- Computer Organization and Architecture, William Stallings, 9th Edition, 2012

Prerequisites by Topic:

- Basic knowledge about computer organization
- Concepts related to digital design and number system

Course Objective:

The main objective of this course is to give students an understanding about computer organization and architecture. This course also intends to enable students to understand the following concepts

1. How are programs written in a high-level language, such as C or Java, translated into the language of hardware and how does the hardware execute the resulting program?
2. What is the interface between the software and the hardware, and how does software instruct the hardware to perform needed functions?
3. What determines the performance of a program, and how can a programmer improve the performance?
4. What techniques can be used by hardware designers to improve the performance?

Grading:

Sessional Exams:	20%
Quizzes (4-6):	10%
Numerical assignments:	08%
Lab	15%
Final Presentation/Project:	07%
Final Exam:	40%

Quizzes:

Ten-minute surprise quizzes will be given periodically

Computer Assignments, Labs & Project/Presentation:

For computer assignments, sharing of programming tips and discussing general concepts is allowed. Collaborating on program writing is not. A term-project/presentation will be conducted in groups. One to three students can form a group. It is very important to have hands on with assembly and C language.

Seminar & Guest Lectures:

A series of multiple seminars and guest lectures will be arranged mostly in last half of the semester to give you people an understanding of practical applications related to this course.

Topical Outline:

- Introduction to computer organization and architecture
- Computer Abstractions and Technology
- Architecture and Microarchitecture
- Instructions: Language of the computer
- MIPS architecture
- Arithmetic for computers

- CPU Performance
- The processor: Datapath and Control
- Pipelining & Microcoded Microarchitecture
- Cache and control hazards
- Main Memory Organization
- External Memory and I/Os