

Course Code : CSE 213: Computer Organization and Architecture  
 Credit Hour : 3.0  
 Pre-requisite (if any) : Structured Programming  
 Course Synopsis : Fundamental concepts underlying modern computer organization and architecture; machine level representation of data, instruction sets, computer arithmetic, CPU structure and functions, memory system organization and architecture, system input/output, multiprocessors, and digital logic.

### Mapping of Course Objectives, Learning Outcomes, Teaching Learning and Assessment

	Course objectives	Course learning outcomes	Teaching learning activities	Assessment
1.	To make students understand the basic organization of modern computer systems and how computer programs are organized, stored, and executed at the machine level.	a) Understand the basics of computer hardware and how software interacts with computer hardware b) Understand how computers represent and manipulate data	Lecture, Discussion and homework	Assignment
2.	To make students understand the operation of fixed and floating-point arithmetic units	a) Understand computer arithmetic and convert between different number systems b) Explain the operation of fixed-point and floating-point arithmetic circuits	Lecture, Discussion	Quiz
3.	To make students analyze an instruction-set architecture and propose a data path and control unit implementation.	a) Understand basics of Instruction Set Architecture (ISA) – MIPS b) Identify the steps needed to execute machine instructions of an instruction set architecture c) Identify the data path elements needed to implement a specific instruction set, and explain how data path elements and control units are implemented in hardware	Lecture, Discussion and homework	Assignment
4.	To make students understand how instruction pipelining enhances processor performance.	a) Explain the principle of pipelining and the interdependencies between pipelining and instruction set design b) Analyze and evaluate computer performance	Lecture, Discussion and homework	Assignment

5	To make students understand the basic organization of the memory hierarchy.	a) Identify the main components of the memory hierarchy and explain how caches increase the apparent speed of memory b) Explain how virtual memory increases the apparent size of memory and supports the enforcement of memory protection mechanisms	Lecture, Discussion	Quiz
6.	To make students understand the basics of Digital Computer Logic.	Use Boolean algebra as related to designing computer logic, through simple combinational and sequential logic circuits	Lecture, Discussion and homework	Assignment
7.	To make students understand multicore & shared multiprocessors.	Compute speedup for parallel processing programs	Lecture, Discussion	Presentation & Viva

### Mapping of Course LO and Generic Skills

Learning Outcome (LO) of the course	Generic Skills* (Appendix-1)									
	1	2	3	4	5	6	7	8	9	10
1.	✓									
2.	✓									
3.		✓								
4.	✓									
5.	✓									
6.	✓									
7.	✓									

Assessment Method	(%)
Class attendance	10
Class tests	20
Midterm Exam	30
Final Exam	40

### Lecture Schedule:

Lectures	Topics
1	Introduction to Computer abstractions and technology
2	Computer systems performance
3	Instruction Set Architecture (ISA); MIPS
Quiz 1	
4	Signed / unsigned number representations
5	Representing instructions
Mid Term Examination	
6	Central Processing Unit: datapath and control
7	Memory and Memory Hierarchy
8	Virtual memory
9	Storage
10	Input-Output organization
Quiz 2	
11	Multiprocessors and clusters
12	Digital computer logic
Presentation & Viva	
Semester Final Examination	

- References : 1. David Patterson and John Hennessy, “Computer Organization and Design: The Hardware/Software Interface”, 4th ed., Morgan Kaufmann, 2011
- Grading System : As per the approved Grading scale of Metropolitan University (appendix-2).
- Conditions for Students :
1. Assignments must be submitted on time
  2. Any excuses for re-class test and re-mid is strongly prohibited
  3. Must attend at least 70% classes to appear at the final examination