College of Computer Science and Information Systems | **Department of Computer Science**

Course Code : 222CSS-4 | **Computer Organization and Architecture**

Contact Hour : 4(0) | **Prerequisite : N/A**

Coordinator -

2. Course Description

This course introduced the basic structure of computers relating the computer basic units, organization and design such as interconnection, memory, input/output, operating systems, arithmetic and logic unit, and registers with computer instructions and addressing modes.
It also discusses on machine instructions, MIPS and programs, performance enhancements, floating point operations, basic processing unit, multiprocessing, pipeline concepts and distributed architectures and the latest technologies in computing.

3. Course Learning Outcomes

SL	By the end of this course, students should be able to:	Linkages to POs
1.	Recognize the current architecture of computer systems (data representation, performance enhancement, CPU, memory hierarchy design, I/O design).	a(W),i(W)
2.	Describe the basic processing units of computer.	a(W)
3.	Apply conversion formula among different number systems used in digital computers.	a(S),j(S)
4.	Discuss the latest technology in computer science with modern Architecture.	i(W)
5.	Compare different types of instruction set architectures and addressing modes.	a(S),i(S)

4. Learning Resources

Text	1. Kip R. Irvine, Assembly Language for Intel-Based Computers, Pearson Education, Inc, Latest Edition. 2. William Stalling, Computer Organization and Architecture: Designing for Performance.
Reference	Carl Hamacher, Zvonko Vranesic and Safwat Zaky, Computer Organization, McGraw Hill, 5th Edition, ISBN 7-111-10-346-7
Reference	M. Morris Mano, Computer System Architecture, 3rd edition, Prentice Hall, ISBN 0131755633
Other	John L. Hennessy and David A. Patterson, Computer Architecture- A quantative approach, 4th Edition, ISBN 13:978-0-12-370490-0

5. Course Content : The list below provides a summary of the material that will be covered during the course

Week	Topics	References Book / Others Source	Special Event	Tutorial Activities	Lab Activities
1.	Introduction to computer organization; Basic computer components: processor, memory, bus, input and output devices.	Textbook-1, Ref. book-1,		Section Review 1.3.7 (Irvine	
2.	Fetch cycle and Execution cycle. Performance assessment, Instruction execution, MIPS	Textbook-1		Review Question 1.1-1.5 (Stallings)	Lab Activity 1

3.	Assembly language concepts: Assembly language program structure: statements, directives; Instruction formats, op-codes and operands.	Text book-1	Quiz-1	Section Review 2.1.5 (Irvine) Section Review 2.2.5 (Irvine)	Lab Activity 2
4.	Memory segmentation: logical and physical addresses; addressing mode.	Text book-1			Lab Activity 3
5.	Memory segmentation: logical and physical addresses; addressing mode	Text book-1	Midterm-1 10/03/2016		Lab Activity 4
6.	Data movement instructions; arithmetic instructions and flags, Interrupt.	Text book-1		Section Review 3.1.10 (Irvine)	Lab Activity 5
7.	Number Systems (decimal, hexadecimal and binary) and their basic conversions.	Ref. book-1,			Lab Activity 6
8.	Number Systems (decimal, hexadecimal and binary) and their basic conversions.	Ref. book-1,			Lab Activity 6
9.	Unsigned and signed Integer representation, integer arithmetic	Textbook-1, Ref. book-2	Quiz-2		Lab Activity 7
10.	Basic ALU architecture and components (Combinational circuits, Half adder, full adder), Decoders, Encoders, Flip flops	Textbook-1, Ref. book-2,	Midterm-2 21/04/2016		Lab Activity 8
11.	Architecture of error detection and correction components.	Textbook-1			Lab Activity 8
12.	Introduction to Pipelining, Multiprocessing, RISC, CISC.		Assignment		Lab Activity 9
13.	Logical and bit manipulation operations; Compare, jump, Conditional statements and loop instructions.				Lab Activity 10
14.	Theory Revision		Final Lab Exam		Final Lab Exam

6. Evaluation Scheme: The following list is the contribution of course components to the final grade for the course.

Component	Weight (%)
Quiz 1	5%
Quiz 2	5%
Mid Term 1	15%
Mid Term 2	15%
Lab Performance	5%
Assignment 1	5%
Lab Final	10%
Final Exam	40%
Total	100


COLLEGE OF COMPUTER SCIENCE
NAJRAN UNIVERSITY