

**COLLEGE OF ELECTRICAL AND MECHANICAL ENGINEERING**  
**NATIONAL UNIVERSITY OF SCIENCES AND TECHNOLOGY**

**Title** : **EC 202 Computer System Architecture**  
**Credits** : **3 (3,0)**  
**Instructor** : **Brig @ Rafiuddin**

**Objectives** : The objective of the course is to gain basic understanding of computer system architecture which includes computer arithmetic, register transfer language and microoperations, common bus system design, design of arithmetic logic unit, design of hardwired control unit and microprogrammed control unit, instruction sets and addressing modes, memory system design, cache memory, virtual memory system, input/output interface and operations. Advanced topics such as parallel processing and pipeline processing etc. will also be covered.

**Course** :  
1. Introduction to Computer System Architecture and Digital Computers.  
2. Register transfer language. Arithmetic, logic and shift microoperations.  
3. Common bus system design and memory transfers. Tristate buffers.  
4. Binary data. Arithmetic operations on signed binary numbers. Overflow detection circuit design.  
5. Design of Arithmetic Logic Unit and Control Unit. Hardwired Control Unit, Microprogrammed Control Unit.  
6. Microprocessor organization, microprocessor sequencing. Memory cycle, memory read cycle, memory write cycle.  
7. Microprocessor instruction set and addressing modes. Types of microprocessor instructions, machine language, introduction to assembly language.  
8. Stack operations, Subroutines, Interrupts, Priority Interrupt.  
9. Memory system design, memory hierarchy, primary memory ( RAM. ROM ), secondary memory. Function table of RAM & ROM, memory address map. Interfacing microprocessor with memory.  
10. Cache memory. Different designs of cache memory system.  
11. Virtual memory system. Address mapping using pages.  
12. Input/Output Interface, memory mapped input/output, isolated input/output. Parallel peripheral interface, serial communication interface, dedicated interface components. Direct memory access.  
13. Introduction to parallel processing. Pipeline processing.

**Texts** :  
1. M. Morris Mano , “Computer System Architecture”, Third edition, Prentice Hall,  
2. M. Morris Mano “Digital Logic and Computer Design” , Second Edition, Prentice Hall.

**References** :  
1. David A. Patterson and John L. Hennessy, “Computer Organization and Design The Hardware/Software Interface, Second Edition, Morgan Kaufman Publishers.

**Prerequisites** :  
1. Logic and Sequential Circuit Design.

**Grading Policy** :

Quiz	15%
First mid-term exam	15%
Second mid-term exam	15%
Final Exam	50%
Assignment	5%