|  |  |
| --- | --- |
| **Computer Architecture** | **Module Title:** |
| **CAP 223** | **Module ID:** |
| **CAP 221** | **Prerequisite:** |
| **4** | **Level:** |
| **3 (3+0+1)** | **Credit Hours:** |

**Module Description:**

This course focuses on the design of the CPU and computer system at the architectural (or functional) level: CPU instruction sets and functional units, data types, control unit design, interrupt handling and DMA, I/O support, memory hierarchy, virtual memory, and buses and bus timing. Introduction to digital systems: What constitutes a general-purpose computer; design of a minimal hardwired CPU. Assembly level machine organization: System buses, timing, arbitration, and bus protocol; the general fetch-execute cycle with interrupts; multiple bus systems. Memory system organization & architecture: Memory design and hierarchy; alignment; L1 and L2 caches; paging and virtual memory. Interfacing, communication External storage devices: magnetic and optical. Buffering of I/O, polling, interrupt-driven I/O, interrupt-driven I/O with DMA. Functional organization: integer and floating-point units, CPU instruction sets and addressing modes, RISC; CISC, long instruction word RISC processors, use of multiple functional units, pipelining.

**Module Aims:**

This course focuses on the design of the CPU and computer system at the architectural level.

**Learning Outcomes:**

* Understand all the basic concepts of information technology and its related terminologies.
* The ability to search through the Internet effectively.
* The ability to fully utilize an e/mail service
* Knowledge of e/learning and distance education systems and how they work and their benefits
* This course requires the student to demonstrate the following
* Apply the factors that contribute to computer performance
* Identify the characteristics of CISCS, RISC, and VLIW processors.
* Analyze multilevel caches systems
* Analyze the effect of memory and memory hierarchy on performance.
* Analyze Input/output systems.
* Identify the characteristics of multicore, multiprocessors, and clusters

**Textbook:**

William Stallings, Computer Organization and Architecture (6th edition)

Hennessy / Patterson, Computer Architecture: A Quantitative Approach