**CSE-209: Computer Organization & Architecture [3.00]**

Credit Hours 3

**Fundamentals of Computer Design**: Introduction, definition of performance, quantitative principles of computer design, job of a computer designer, fallacies and pitfalls, historical perspectives.

**Processor Design**: Introduction, Processor organization, information representation, number formats.

**Instruction Sets**: Instruction formats, instruction types.

**Fixed point arithmetic**: Addition, subtraction, multiplication, division.

**ALU Design**: Basic ALU organization, floating point arithmetic, arithmetic processors, stack computers.

**Control Design**: Introduction, instruction sequence, instruction interpretation.

**Hardwired Control**: Design methods, multiplier control unit, CPU control unit.

**Micro Programmed Control**: Basic concepts, control memory optimization, multiplier control unit, Micro **programmed Computers**: Conventional and Nano programmed computers.

**Memory Organization**: Review of primary and secondary memories; memory hierarchies.

**High-speed Memories**: Interleaved memories, caches, associative memories.

**System Organization**: Communications, Introduction, bus control.

**IO Systems**: Programmed IO, DMA and interrupts, IO processors.

**Parallel Processing**: Introduction and types of parallel processors, performance consideration.

**Pipeline Processors and Systolic Arrays**: Pipeline structures, vector supercomputers, data flow computers.

**Multiprocessors**: Multiprocessor architectures, fault-tolerant computers.

**References:**

1. Null, Linda, and Julia Lobur. “Essentials of Computer Organization and Architecture”, Jones & Bartlett, 7th Edition, December 17, 2017.
2. Stojcev, M. “Computer Organization and Architecture - William Stallings”, Prentice Hall, 10th Edition, April 13, 2019.
3. David A. Patterson, John L. “Computer Organization and Design, the Hardware Software Interfacing - Hennessey”, Morgan Kaufmann: 10th Edition, November 10, 2018.
4. Hossler, F. E., Douglas, J. E. “Computer Architecture and Organization Douglas John Hayes”, Glencoe McGraw-Hill, 8th Edition, September 3, 2018.
5. Carter N. “Scam’s Outline of Computer Architecture”, Glencoe McGraw-Hill, 3rd Edition, December 26, 2011.