

Course Title	Computer Organization and Design	Course No	To be filled by the office		
Specialization	Computer Engineering	Structure (IPC)	3	0	3
Offered for	UG and DD	Status	Core <input checked="" type="checkbox"/>		Elective <input type="checkbox"/>
Course Objectives	The course aims to introduce various aspects of computer organization such as Instruction format, Instruction codes, Addressing Modes, processor design and hierarchical memory design, Input and Output Interface design using Programmed Controlled and Interrupt Control way				
Course Outcomes	Students will be able to interface and program various components such as Memory, I/O, etc. with the processor.				
Contents of the course	<p>Introduction: function and structure of a computer, functional components of a computer, performance of a computer system. Instruction set architectures – CISC and RISC architectures.(5)</p> <p>Instructions: Language of the Computer, Operations of the Computer Hardware, Operands of the Computer Hardware, Representing Instructions in the Computer, Logical Operations Instructions for Making Decisions, addressing Modes, Parallelism & Instructions. (5)</p> <p>Arithmetic Design: – Carry look ahead adder, Wallace tree multiplier, Floating–point adder/subtractor, Division. (5)</p> <p>The Processor: Logic Design Conventions, Building a Datapath, A Simple Implementation Scheme (3)</p> <p>An Overview of Pipelining, Pipelined Data path and Control, Data Hazards: Forwarding versus Stalling, Control Hazards, Exceptions and Parallelism via Instructions. (7)</p> <p>Memory Hierarchy: Introduction, Memory Technologies (SRAM, DRAM), The Basics of Caches, Measuring and Improving Cache Performance, Dependable Memory, Virtual Machines, Virtual Memory, A Common Framework for Memory Hierarchy, Using a Finite-State Machine to Control a Simple Cache, Parallelism and Memory Hierarchies: Cache Coherence, Parallelism and Memory Hierarchy: Redundant Arrays of Inexpensive Disks and Implementing Cache Controllers. (9)</p> <p>Input/Output Unit: access of I/O devices, I/O ports, I/O control mechanisms – Program Controlled I/O. Interrupt controlled I/O and DMA controlled I/O; I/O interfaces – Serial port, parallel port, USB port, SCSI bus, PCI bus; I/O peripherals – Keyboard, display, secondary storage devices. (8)</p>				
Textbook	<p>1. Patterson and Hennessy, “Computer Organization and Design,” Morgan Kaufmann, 5th Edition, 2013.</p> <p>2. C. Hamacher, Z. Vranesic, and S. Zaky, “Computer Organization,” Tata McGraw Hill, 5th Edition, 2002.</p>				
References	<p>1. J. P. Hayes, “Computer Architecture and Organization,” Tata McGraw Hill 1998.</p> <p>2. M. J. Murdocca, V. P. Heuring, “Computer Architecture and Organization - An Integrated Approach,” John Wiley & Sons Inc., 2007.</p> <p>3. A. S. Tanenbaum, “Structured Computer Organization,” Prentice Hall,5th Edition, 2006.</p>				