

Engineering Science Courses

Course Code	21CSSS201T	Course Name	COMPUTER ORGANIZATION AND ARCHITECTURE						Course Category	S	Engineering Sciences															L 3	T 0	P 0	C 3
Pre-requisite Courses	Nil						Co-requisite Courses	Nil						Progressive Courses	Nil														
Course Offering Department		Computer Science and Engineering						Data Book / Codes/Standards						Nil															
Course Objectives:		The purpose of learning this course is to:						Learning			Program Learning Outcomes (PLO)																		
CLR-1	Understand the Fundamentals of computers, Memory operations and Addressing Modes						1-6																						
CLR-2	Know about Functions of Arithmetic and Logic unit						Level of Thinking (Based on Bloom's Taxonomy)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15				
CLR-3	Explore the Operations of Control Unit, Execution of Instruction and Pipelining									Problem Analysis																			
CLR-4	Classify the Need for Parallelism, Multicore and Multiprocessor Systems									Design & Development																			
CLR-5	Understand the Concepts and functions of Memory unit, I/O unit									Analysis, Design, Documentation, Modern Tool Usage																			
Course Outcomes (CO):		At the end of this course, learners will be able to:									Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3									
CO-1	Identify the computer hardware and how software interacts with computer hardware						3	75	70	3	2	-	-	-	-	-	-	-	-	-	-	1	-	-					
CO-2	Apply Boolean algebra as related to designing computer logic through simple combinational and sequential logic circuits						3	75	70	3	2	-	-	-	-	-	-	-	-	-	-	-	2	-					
CO-3	Examine the detailed operation of Basic Processing units and the performance of Pipelining						2	75	70	3	-	-	-	-	-	-	-	-	-	-	-	-	-	1					
CO-4	Analyze concepts of parallelism and multi-core processors.						3	75	70	3	-	-	-	-	-	-	-	-	-	-	-	-	2	-					
CO-5	Classify the memory technologies, input-output systems and evaluate the performance of memory system						3	75	70	3	2	-	-	-	-	-	-	-	-	-	-	-	3	-					
Unit 1: Introduction to Number System and Logic Gates: Number Systems- Binary, Decimal, Octal, Hexadecimal; Codes- Grey, BCD,Excess-3, ASCII, Parity; Binary Arithmetic- Addition, Subtraction, Multiplication, Division using Sign Magnitude,1's compliment, 2's compliment, BCD Arithmetic; Logic Gates-AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.																													
Unit 2 : Basic structure of computers: Functional Units of a computer, Operational concepts, Bus structures, Memory addresses and operations, assembly language , Instructions, Instruction sequencing, Addressing modes. Case study: 8086.																													
Unit 3: Design of ALU: De Morgan's Theorem, Adders, Multiplier – Unsigned, Signed, Fast, Carry Save Addition of summands; Division–Restoring and Non-Restoring; IEEE 754 Floating point numbers and operations.																													
Unit 4: Control Unit: Basic processing unit, ALU operations, Instruction execution, Branch instruction, Multiple bus organization, Hardwired control, Generation of control signals, Micro-programmed control; Pipelining: Basic concepts of pipelining, Performance, Hazards-Data, Instruction and Control, Influence on instruction sets.																													
Unit 5: Parallelism: Need, types , applications and challenges, Architecture of Parallel Systems-Flynn's classification; ARM Processor: The thumb instruction set, Processor and CPU cores, Instruction Encoding format, Memory load and Store instruction, Basics of I/O operations. Case study: ARM 5 and ARM 7 Architecture.																													
Learning Resources	1. CarlHamacher,VzonkoVranesic,SafwatZaky,ComputerOrganization,5 th ed.,McGraw-Hill,2015 2. KaiHwang,FayeA.Briggs,ComputerArchitectureandParallelProcessing,3 rd ed.,McGrawHill,2016 3. GhoshT.K.,ComputerOrganizationandArchitecture,3 rd ed.,TataMcGraw-Hill,2011 4. P.Haves,ComputerArchitectureandOrganization,3 rd ed.,McGrawHill,2015.											5. WilliamStallings,ComputerOrganizationandArchitecture–DesigningforPerformance,10 th ed.,Pearson Education,2015 6. DavidA.PattersonandJohnL.HennessyComputerOrganizationandDesign-AHardwaresoftwareinterface,5 th ed.,Morgan Kaufmann,2014																	

Learning Assessment	Continuous Learning						
	Bloom's Level of Thinking	CLA – 1 (45%)		CLA – 2 (15%)		Final Examination(40%)	
		Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	30%	-	30%	-	30%	-
Level 2	Understand	30%	-	30%	-	30%	-
Level 3	Apply	20%	-	20%	-	20%	-
Level 4	Analyze	20%	-	20%	-	20%	-
Level 5	Evaluate	-	-	-	-	-	-
Level 6	Create	-	-	-	-	-	-
	Total	100%		100%		100%	

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr.Saminath Sanjai, Borqs Technologies,Inc. Bengaluru		1.Dr.K.Vijaya, Dr.Anitha D, SRMIST