Course Code	21CSS201T	Course Name	COMPUTER ORGANIZATION AND ARCHITECTURE	Course Category	S	Engineering Sciences	L	T	P	C
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Pre-requisite Courses	*Nil*	Co-requisite Courses	*Nil*	Progressive Courses	*Nil*
Course Offering Department	*School of Computing*	**Data Book / Codes / Standards**	*Nil*		

Course Learning Rationale (CLR):	***The purpose of learning this course is to:***
CLR-1 :	*Understand the Fundamentals of computers, Memory operations and Addressing Modes*
CLR-2 :	*Know about Functions of Arithmetic and Logic unit*
CLR-3 :	*Explore the Operations of Control Unit, Execution of Instruction and Pipelining*
CLR-4 :	*Classify the Need for Parallelism, Multicore and Multiprocessor Systems*
CLR-5 :	*Understand the Concepts and functions of Memory unit, I/O unit*

Course Outcomes (CO):	***At the end of this course, learners will be able to:***	**Program Outcomes (PO)**												**Program Specific outcomes**		
		1	2	3	4	5	6	7	8	9	10	11	12			
		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern Tool Usage	The engineer and society	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*	*2*	-	-	-	-	-	-	-	-	-	-	*1*	-	-
CO-2:	*Apply Boolean algebra as related to designing computer logic ,through simple combinational and sequential logic circuits*	*3*	*2*	-	-	-	-	-	-	-	-	-	-	-	*2*	-
CO-3:	*Examine the detailed operation of Basic Processing units and the performance of Pipelining*	*3*	-	-	-	-	-	-	-	-	-	-	-	-	-	*1*
CO-4:	*Analyze concepts of parallelism and multi-core processors.*	*3*	-	-	-	-	-	-	-	-	-	-	-	-	*2*	-
CO-5:	*Classify the memory technologies, input-output systems and evaluate the performance of memory system*	*3*	*2*	-	-	-	-	-	-	-	-	-	-	-	*3*	-

Unit-1 - Introduction to Number System and Logic Gates	***9 Hour***
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	***9 Hour***
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	***9 Hour***

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 ***9 Hour***
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 ***9 Hour***
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,ZvonkoVranesic,SafwatZaky,ComputerOrganization,5thed.,McGraw-Hill,2015* 2. *KaiHwang,FayeA.Briggs,ComputerArchitectureandParallelProcessing",3rded.,McGrawHill,2016* 3. *GhoshT.K.,ComputerOrganizationandArchitecture,3rded.,TataMcGraw-Hill,2011* 4. *P.Hayes,ComputerArchitectureandOrganization,3rded.,McGrawHill,2015.*	5. *WilliamStallings,ComputerOrganizationandArchitecture–DesigningforPerformance,10thed.,Pearson Education,2015* 6. *DavidA.PattersonandJohnL.HennessyComputerOrganizationandDesign-AHardwaresoftwareinterface,5thed.,Morgan Kaufmann,2014*

Learning Assessment

	Bloom's Level of Thinking	*Continuous Learning Assessment (CLA)*				*Summative Final Examination (40% weightage)*	
		Formative CLA-1 Average of unit test (50%)		*Life-Long Learning CLA-2 (10%)*			
		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**
1. *Mr.Saminath Sanjai, Borqs Technologies,Inc. Bengaluru*		1. Dr.K.Vijaya, Dr.Anitha D, SRMIST