Course Type	Course Code	Name of Course	L	T	P	Credit
DC5	CSC207	**Computer Architecture**	3	0	0	9

Course Objective
To provide fundamental knowledge about computer architecture which includes ILP, TLP, DLP and Memory design.
Learning Outcomes
Enhance the ability to understand different techniques in computer architecture.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction: Fundamentals of Quantitative Design and Analysis: Introduction, Classes of Computers, Defining Computer Architecture, Trends in Technology, Power, Energy and Cost, Measuring, Reporting, and Summarizing Performance, Amdahl's law, processor performance equation, and Quantitative Principles of Computer Design.	8	Understanding the importance of Computer architecture and other quantitative parameters
2	Instruction set Architecture: Introduction, Classifying Instruction Set Architectures, Memory Addressing, Type and Size of Operands, Operations in the Instruction, Instructions for Control Flow, Encoding an Instruction Set, CISC and RISC processors.	3	Understanding basics of instruction set architectures and related topics
3	Pipelining: Introduction, Pipeline Hazards, Pipelining Implemented and hardness Pipeline for floating-point operations, its hazards and minimization	4	Learning pipelining techniques and methods to overcome pipeline hazards.
4	Branch prediction techniques: delayed branches, 1-bit and 2-bit predictors, Global and local predictors, Tournament predictors, return address stack	6	How prediction techniques solve bench hazard problems
5	Instruction-Level Parallelism (ILP): Dynamic Scheduling: Examples and the Algorithm, Hardware-Based Speculation, Exploiting ILP Using Dynamic Scheduling, Multiple Issue, and Speculation, Limitations, Multithreading.	8	Learning advanced topics in instruction level parallelism like dynamic techniques.
6	Instruction-Level Parallelism (ILP): Loop unrolling, VLIW and Trace scheduling	3	Learning compiler techniques to address various related to ILP
7	Thread-Level Parallelism: Flynn's classification of computers, Introduction Centralized Shared-Memory Architectures. Memory Coherence, Synchronization, Models of Memory Consistency.	7	Learning topic like coherence problem and memory consistency
8	Introduction, Cache Optimizations and Performance:	3	Understanding the importance of memory hierarchy in computer architecture and cache optimization techniques.

Text Books:

John L. Hennessy and David A Patterson, Computer Architecture, Morgan Kauffnman, 5th Edition, 2012

Reference Books:

1. William Stallings, Computer Organization and Architecture, Prentice Hall of India, 9th Edition, 2012.