## Course No: MCA-2T1
## Course Title: Advanced Computer Systems

**Unit I**

Computational Models : Introduction , Interpretation of the concept of a computational model , Relationship between , the concepts of computational model , programming language and architecture , Basic Computational models , The Von , Neumann computational model ,Key concepts related to computational models , Granularity , typing . The concept of computer architecture : Evolution and interpretation of the concept of Computer Architecture at different levels of abstraction. The concept of computer architecture at multilevel hierarchical framework.Extensions , Description of Computer Architectures.

**Unit II**

Introduction to Parallel Processing , : Basic Concepts about program , process, thread , process and treads in languages , concurrent and parallel execution , concurrent and parallel programming languages, Types and levels of Parallelism , Classification of Parallel architectures , Basic Parallel Techniques , Relationship between languages and parallel architectures . Introduction to Instruction level Parallel Processors , Evolution and overview , dependencies , instruction scheduling , preserving sequential consistency , the speedup potential of ILP Processing , Pipelined Processors , Basic Concepts , Design space of Pipelines , Pipelined instruction Processing , Pipelined execution of integer and Boolean instructions , Pipelined Processing of loads and stores.

**Unit III**

VLIW , Basic Principles ,Overview of Proposed and Commercial VLIW , Superscalar processing , introduction , parallel decoding , superscalar instruction issue , shelving , register renaming , parallel execution , preserving the sequential consistency of instruction execution and exception processing ,Implementation of superscalar CISC processor using a superscalar RISC core. Processing of control transfer instructions. The branch problem ,basic approaches . Guarded exception.Code Scheduling of ILP.

**Unit IV**

Introduction to data-[parallel architectures , connectivity , SIMD Architecture , fine and coarse grained SIMD architectures , Associative and neural architectures ,Data Parallel pipelined and systolic architectures , vector architectures , Introduction to MIMD architectures , Multi threaded architectures , Distributed Memory MIMD architecture , Shared memory MIMD architectures..

**Text Book :** Advanced Computer Architecture DEZSO SIMA , TERENCEMountain , PETER KACSUK , Pearson Education, Fifth Indian reprint 2004.

**Reference Books :**

V.C. Hamacher. A.G. Vranesic and S. G. Zaky: "Computer Organization", Tata McGraw Hill.

J.P. Hayes: "Computer Architecture and Organization", McGraw Hill.

Morris Mano: "Computer System Architecture", Pearson Education ,3/e.