CP9113 ADVANCED COMPUTER ARCHITECTURE

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UNIT I PIPELINING AND ILP 9

Fundamentals of Computer Design - Measuring and Reporting Performance - Instruction Level Parallelism and Its Exploitation - Concepts and Challenges - Overcoming Data Hazards with Dynamic Scheduling – Dynamic Branch Prediction - Speculation - Multiple Issue Processors – Case Studies.

UNIT II ADVANCED TECHNIQUES FOR EXPLOITING ILP 9

Compiler Techniques for Exposing ILP - Limitations on ILP for Realizable Processors - Hardware versus Software Speculation - Multithreading: Using ILP Support to Exploit Thread-level Parallelism - Performance and Efficiency in Advanced Multiple Issue Processors - Case Studies.

UNIT III MULTIPROCESSORS 9

Symmetric and distributed shared memory architectures – Cache coherence issues - Performance Issues – Synchronization issues – Models of Memory Consistency - Interconnection networks – Buses, crossbar and multi-stage switches.

UNIT IV MULTI-CORE ARCHITECTURES 9

Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture – IBM cell architecture.- hp architecture.

UNIT V MEMORY HIERARCHY DESIGN 9

Introduction - Optimizations of Cache Performance - Memory Technology and Optimizations - Protection: Virtual Memory and Virtual Machines - Design of Memory Hierarchies - Case Studies.

TOTAL - 45

REFERENCES

1. John L. Hennessey and David A. Patterson, " Computer Architecture – A quantitative approach", Morgan Kaufmann / Elsevier, 4th. edition, 2007.
2. David E. Culler, Jaswinder Pal Singh, "Parallel Computing Architecture : A hardware/ software approach" , Morgan Kaufmann / Elsevier, 1997.
3. William Stallings, " Computer Organization and Architecture – Designing for Performance", Pearson Education, Seventh Edition, 2006.