

CS8491 COMPUTER ARCHITECTURE

L T P C 3 0 0 3

UNIT I OVERVIEW & INSTRUCTIONS 9

Eight ideas – Components of a computer system – Technology – Performance – Power wall – Uniprocessors to multiprocessors; Instructions – operations and operands – representing instructions – Logical operations – control operations – Addressing and addressing modes.

UNIT II ARITHMETIC OPERATIONS 7

ALU - Addition and subtraction – Multiplication – Division – Floating Point operations – Sub word parallelism.

UNIT III PROCESSOR AND CONTROL UNIT 11

Basic MIPS implementation – Building data path – Control Implementation scheme – Pipelining – Pipelined data path and control – Handling Data hazards & Control hazards – Exceptions.

UNIT IV PARALLELISM 9

Instruction-level-parallelism – Parallel processing challenges – Flynn's classification – Hardware multithreading – Multicore processors³⁶

UNIT V MEMORY AND I/O SYSTEMS 9

Memory hierarchy - Memory technologies – Cache basics – Measuring and improving cache performance - Virtual memory, TLBs - Input/output system, programmed I/O, DMA and interrupts, I/O processors.

TEXT BOOK:

1. David A. Patterson and John L. Hennessey, "Computer organization and design", Morgan Kaufman / Elsevier, Fifth edition, 2014.

REFERENCES:

1. V. Carl Hamacher, Zvonko G. Varanescic and Safat G. Zaky, "Computer Organisation", VI th edition, Mc Graw-Hill Inc, 2012.

2. William Stallings "Computer Organization and Architecture", Seventh Edition, Pearson Education, 2006.

3. Vincent P. Heuring, Harry F. Jordan, "Computer System Architecture", Second Edition, Pearson Education, 2005.

4. Govindarajalu, "Computer Architecture and Organization, Design Principles and Applications", first edition, Tata McGraw Hill, New Delhi, 2005.

5. John P. Hayes, "Computer Architecture and Organization", Third Edition, Tata Mc Graw Hill, 1998.

6. <http://nptel.ac.in/>.