

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

B.E. THIRD YEAR

ELECTRONICS & COMMUNICATION

(In Force June 2006)

SEMESTER – V

EC 505: DIGITAL COMPUTER ARCHITECTURE

Teaching Scheme		Examination Scheme				
Theory Hrs.	Practical Hrs.	Theory Hrs.	Theory Marks	Pract./ Viva Marks	Term Work Marks	Total Marks
4	2	3	100	25	25	150

SYLLABUS

1. **Computer Abstraction and Technology:** Introduction, below your program, Under the Cover.
2. **Instructions:** Language of Computer, Operations of the Hardware, Operands of the computer hardware, Representing instructions in the computer, Logical operations, Instructions for making decision, supporting procedures in computer hardware, communicating with people. MIPS addressing to 32 bit immediate and addresses, Translating & starting a program, Compiler optimization & working, Implementing Object oriented language, Arrays versus pointers.
3. **Arithmetic for computers:** Signed and unsigned numbers, Addition and subtraction, Multiplication, Division, Floating point.
4. **Assessing and understanding Performance:** CPU performance & its factors, Evaluating Performance, Real world examples.
5. **The Processor Data Path & Control:** Logic Design convention, Building Data path, A simple Implementation Scheme, A Multi Cycle Implementations, Exceptions, Microprogramming, An Introduction to Digital Design using Hardware Design Language.
6. **Enhancing Performance with Pipelining:** An overview, A Pipelined Data path, Pipelined Control, Data Hazards & Forwarding, Data hazards and Stalls, Branch Hazards, HDLs to Describe and Model a Pipeline.
7. **Memory Hierarchy:** Basics of Cache, measuring and improving performance of Cache, Virtual Memory, A common framework of memory hierarchies.
8. **Storage, Networks & other peripherals:** Disk Storage and Dependability, Networks, Busses and other connection, interfacing I/O Devices, I/O Performance Measures, Designing an I/O Systems.
9. **Multiprocessor and Clusters:** Programming Multiprocessors, Multiprocessor connected by single bus, Multiprocessor connected by Network, Clusters, Network Topologies, Multiprocessor Inside a chip and Multithreading.

REFERENCE BOOKS:

1. Computer Organization and Design – The Hardware and software interface by David Patterson & John Hennessy (Morgan & Kaufman)
2. Computer Architecture and Organization by John Hayes (McGH)
3. Computer Architecture from Microprocessor to Supercomputers by Behrooz Parhami (Oxford Press)
4. Computer Organization and Architecture – Designing for Performance by William Stallings (Prentice Hall of India)
5. Computer System Architecture by M.Morris Mano (PHI)