

**UNIT 1      BASICS OF LOGIC DESIGN      9**

Basic Logic functions – synthesis of logic functions – Minimization of Logic Expressions – K Maps – Synthesis with NAND and NOR gates – Encoders / Decoders – Multiplexers/ Demultiplexer- Flipflops – Registers - Up down counters.

**UNIT 2      ISA AND ALU DESIGN      9**

Components of the Computer – ISA : Language of the computer - Hardware Software Interface – Assessing and understanding performance. Arithmetic for Computers - Fixed point and floating point operations - ALU design – Adder – Fast Adder – Multiplication – Division – Floating point operations.

**UNIT 3      PROCESSOR DATA PATH AND CONTROL      9**

Processor – Data path and control – Building a datapath – Simple and multicycle implementations – Instruction sequencing – Execution of Complete Instructions – Hard wired control – Microprogrammed control.

**UNIT 4      PIPELINING      9**

Pipelining – Pipelined data path – Pipelined control – Data hazards and forwarding – Branch hazards – Model of a pipeline – Exceptions – Advanced pipelining.

**UNIT 5      MEMORY AND I/O      9**

Memory technology – Memory systems – Virtual memory – Caches – Design methods – Associative memories – Input/Output systems – Programmed I/O – DMA and Interrupts – I/O Devices and Interfaces.

**REFERENCES**

1. David A Patterson and John L. Hennessy, “ Computer Organization and Design, The Hardware/Software Interface”, Morgan Kaufmann / Elsevier, Third Edition, 2005.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, “Computer Organization”, Tata McGraw Hill, Fifth Edition, 2002
3. Morris Mano, “Digital Design”, Prentice Hall of India, 1997
4. William Stallings, “ Computer Organization and Architecture – Designing for Performance”, Pearson Education, Seventh Edition, 2006.