MC5101 COMPUTER ORGANISATION

DETAILED SYLLABUS

OBJECTIVES:

- To understand the various number systems
- To become familiar with Boolean algebra
- To study the different types of combinational and sequential circuits
- To comprehend the basis operations that happen in a CPU
- To learn the data path and control path implementation
- To become familiar with the memory hierarchy design and I/O design

UNIT I DIGITAL FUNDAMENTALS

Number Systems and Conversions – Boolean Algebra an Simplifications – Minimization of Boolean Functions – Karnaugh Map, Quine McClusky Method. Logic Gates – NAND NOR implementation.

UNIT II COMBINATIONAL AND SEQUENTIAL CIRCUITS

Design of Circuits –Adder /Subtracter – Encoder – Decoder – MUX /DEMUX – Comparators, Flip flops – Triggering – Master – Slave Flip Flop – State Diagram and Minimization – Counters - Registers

UNIT III BASIC STRUCTURE OF COMPUTER

Functional Units - Basic Operational Concepts – Bus structures – Performance and Metrics – instruction and instruction sequencing – Hardware Software Interface – Addressing modes – Instruction Sets – RISC and CISC – ALU Design – Fixed point and Floating-point operations

UNIT IV PROCESSOR DESIGN

Processor basics –CPU Organization – Data Path Design – Control Design – Basic concepts – Hardwired control – Micro Programmed control – Pipe control – Hazards super scale operations

UNIT V MEMORY AND I/O SYSTEMS

Memory technology – Memory Systems- Virtual Memory – Caches – Design Methods – Associative memories – Input /output system – Programmed I/O – DMA and interrupts – I/O devices and Interfaces

REFERENCES:

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, "Computer Organization and Embedded Systems", Sixth Edition, Tata McGraw Hill, 2012.

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3. Charles H. Roth, Jr., "Fundamentals of Logic Design", Jaico Publishing House, Mumbai, Fourth Edition 1992.

4. David A. Patterson and John L. Hennessy, "Computer Organization and Design: The Hardware/Software Interface", Second Edition, Morgan Kaufmann, 2002.Morris Mano "Digital Design", Printice Hall of India 1997

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