SARDAR RAJA COLLEGE OF ENGINEERING

DEPARTMENT OF COMPUTER APPLICATIONS

Subject Name : COMPUTER ORGANIZATION

Subject Code : MC9211

Year : I – MCA

Semester : I

Mrs. K.SASIKALA

Asst.Prof / MCA

MC9211 COMPUTER ORGANIZATION **L T P C 3 0 0 3**

UNIT I DIGITAL FUNDAMENTALS **8**

Number Systems and Conversions – Boolean Algebra and Simplification – Minimization of Boolean Functions – Karnaugh Map, Logic Gates – NAND – NOR Implementation.

UNIT II COMBINATIONAL AND SEQUENTIAL CIRCUITS **10**

Design of Combinational Circuits – Adder / Subtractor – Encoder – Decoder – MUX / DEMUX – Comparators, Flip Flops – Triggering – Master – Slave Flip Flop – State Diagram and Minimization – Counters – Registers.

UNIT III BASIC STRUCTURE OF COMPUTERS **9**

Functional units – Basic operational concepts – Bus structures – Performance and Metrics – Instruction and instruction sequencing – Hardware – Software Interface – Addressing modes – Instructions – Sets – RISC and CISC – ALU design – Fixed Point and Floating point operation.

UNIT IV PROCESSOR DESIGN **9**

Processor basics – CPU Organization – Data path design – Control design – Basic concepts– Hard wired control - Micro programmed control– Pipeline control – Hazards-Super scalar operation.

UNIT V MEMORY AND I/O SYSTEM **9**

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.

TOTAL = 45 Hours

TEXT BOOKS:

1. Morris Mano, “Digital Design”, Prentice Hall of India, 1997.
2. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, Firth Edition, “Computer Organization”, Tata McGraw Hill, 2002.

REFERENCES:

1. Charles H. Roth, Jr., “Fundamentals of Logic Design”, Jaico Publishing House, Mumbai, Fourth Edition, 1992.
2. William Stallings, “Computer Organization and Architecture – Designing for Performance”, Sixth Edition, Pearson Education, 2003.
3. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software interface”, Second Edition, Morgan Kaufmann, 2002.
4. John P. Hayes, “Computer Architecture and Organization”, Thrid Edition, Tata McGraw Hill, 1998.

Description:

- Digital fundamentals gives information about the number system conversion and also describes about logic gates, NAND and NOR operatios.
- The combinational and sequential circuits deals with encoding and decoding techniques. The State diagrams are used to know about the data flow in the circuits.
- A command set, is the basic set of commands, or instructions, that a microprocessor understands. One of the principal characteristics that separates RISC from CISC microprocessors is the size of the instruction set -- RISC microprocessors have relatively small instruction sets whereas CISC processors have relatively large instruction sets.
- A pipelined processor allows multiple instructions to execute at once, and each instruction uses a different functional unit in the datapath.

Objectives:

1. Students will learn the fundamentals of computer organization and its relevance to classical and modern problems of computer design
2. Students will be able to identify where, when and how enhancements of computer performance can be accomplished.
3. Students will learn the sufficient background necessary to read more advance texts as well as journal articles on the field.

Micro Lesson Plan

Hours	Lecture Topics	Text Book
UNIT I DIGITAL FUNDAMENTALS		
1	Number Systems and Conversions	
2	Boolean Algebra	
3	Simplification	
4	Minimization of Boolean Functions	T1
5	Karnaugh Map	
6	Logic Gates	
7	NAND	
8	NOR Implementation	
UNIT II COMBINATIONAL & SEQUENTIAL CIRCUITS		
9	Design of Combinational Circuits	
10	Adder & Subtractor	
11	Encoder & Decoder	
12	MUX & DEMUX	
13	Comparators, Flip Flops	T1
14	Triggering – Master – Slave Flip Flop	
15	State Diagram	
16	Minimization	
17	Counters	
18	Registers	
UNIT III BASIC STRUCTURE OF COMPUTERS		
19	Functional units	
20	Basic operational concepts	
21	Bus structures – Performance and Metrics	
22	Instruction and instruction sequencing	T2
23	Hardware – Software Interface Addressing modes	
24	Instructions – Sets	
25	RISC and CISC	
26	ALU design	
27	Fixed point and Floating point operation	
UNIT IV PROCESSOR DESIGN		
28	Processor basics	
29	CPU Organization	
30	Data path design	
31	Control design	T2
32	Basic concepts	
33	Hard wired control & Micro programmed control	
34	Pipeline control	
35	Hazards	

36	Super scalar operation	
UNIT V MEMORY AND I/O SYSTEM		T2
37	Memory technology	
38	Memory systems	
39	Virtual memory – Caches	
40	Design methods	
41	Associative memories	
42	Input/Output system	
43	Programmed I/O	
44	DMA and Interrupts	
45	I/O Devices and Interfaces.	