5.4 COMPUTER ARCHITECTURE AND HARDWARE MAINTENANCE

L T P

4 - 4

RATIONALE

The subject provides the students with the knowledge of detailed organization of currently available personal computers in order to understand their functioning .The students will also get familiar with Architecture of multi processor systems.

LEARNING OUTCOMES

After undergoing the subject, students will be able to:

- use CPU, register and stack.
- compare micro programmed and hardwired control.
- compare RISC and CISC architecture.
- understand memory hierarchy and memory types.
- explain the function of BIOS.
- illustrate multi processor systems.
- set-up, diagnose problems troubleshoot & Maintained the computer components.

DETAILED CONTENTS

1. Hardware Organisation of computer system (10 periods)
   - 1.1 CPU organisation: general register organisation, stack organisation, instruction formats(three address, two address, one address, zero address and RISC instruction). Addressing modes: Immediate, register, direct, in direct, relative, indexed.
   - 1.2 CPU Design:Microprogrammedvs hard wired control.
   - 1.3 Reduced instruction set computers: CISC characteristics, RISC characteristics, and their comparison.

2. Memory organisation (10 periods)

2.1 Memory Hierarchy
2.2 RAM and ROM chips, Memory address map, Memory connections to CPU.
2.3 Auxillarymemory: Magnetic disks and magnetic tapes.
2.4 Associative memory
2.5 Cache memory
2.6 Virtual memory
2.7 Memory management hardware
2.8 Read and Write operation

3. Arithmetic Operations (08 periods)

3.1 Introduction, Addition, Subtraction, Multiplication and Division algorithm.

4. I/O Organization (10 periods)

4.1 Basis Input output system(BIOS)
- Function of BIOS
- Testing and initialization
- Configuring the system

4.2 Modes of Data Transfer
- Programmed I/O : Synchronous, asynchronous and interrupt initiated.
- DMA data transfer

5. 8085 Microprocessor: Introduction, Architecture, Pin diagram, Comparison with 8086. (6 periods)

6. Architecture of multi processor systems (12 periods)

6.1 Forms of parallel processing
6.2 Parallel processing and pipelines, basic characteristics of multiprocessor
6.3 General purpose multiprocessors
6.4 Interconnection networks: time shared common bus, multi port memory, cross bar switch, multi stage switching networks and hyper cube structures.

LIST OF PRACTICALS

1. Demonstration of following:
(i) motherboard
(ii) Key board & Keyboard decoder
(iii) Video Adapter & display controllers
(iv) Floppy Drive, CD Drive and Hard Disk.
(v) Multifunction Input/Output controllers
(vi) Assembly of PC

2 Troubleshooting & repair of following equipment:

(i) Dot Matrix Printer, Laser, Inkjet Printer.

(ii) Digital Plotter

(iii) C. P. U.

(iv) Disk Drive

3. Trouble Shooting of

(i) Network

(ii) Power Supplies.

INSTRUCTIONAL STRATEGY

Since the subject is theoretical one, the practical aspects should be taught along with the theory instruction. The students should be given quiz tests and asked to give seminars on small topics. There is sufficient time in the subject and the students can be taken to laboratory for demonstration.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Viva-voce

LIST OF RECOMENEDED BOOKS

1. Computer Architecture and Organisation by Moris Mano
2. Computer Architecture by J.P.Hayes
3. Structured Computer Organisation by Tanenbaum Andrew S, PHI
4. e-books/e-tools/relevant software to be used as recommended by AICTE/NITTTR, Chandigarh.

Websites for Reference:

http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (in periods)	Marks Allotted (%)
1.	10	20
2.	10	20
3.	08	10
4.	10	20
5.	06	10
6	12	20
Total	**56**	**100**