Devi Ahilya University, Indore, India Institute of Engineering & Technology				**II Year B.E. (Electronics and Telecommunication Engg.)**			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
ETR4C1	**L**	**T**	**P**	**L**	**T**	**P**	**Total**
COMPUTER ORGANIZATION AND ARCHITECTURE	**3**	**1**	**0**	**3**	**1**	**0**	**4**
Duration of Theory Paper: 3 Hours							

Learning Objectives:

- To understand the structure, function and characteristics of computer systems.
- To understand the design of the various functional units and components of computers.
- To identify the elements of modern instructions sets and their impact on processor design.
- To explain the function of each element of a memory hierarchy,
- To identify and compare different methods for computer I/O.

Prerequisite(s): Knowledge of logic circuits - combinational and sequential

COURSE CONTENTS

Unit I: Computer Organization

Computer types, Structure with basic computer components, Function in brief with instruction fetch and execute, Interrupts and I/O communication, Interconnection structure, bus interconnection, Multiple Bus hierarchies, Elements of bus design
Performance metrics and measurement

Unit II: Computer Memory System

Characteristics of memory system, Memory hierarchy, Cache Memory- Cache memory principles, Elements of cache design- cache address, size, mapping functions, replacement algorithms, write policy, Internal Memory- semiconductor memory, External Memory- Hard Disk organization, RAID

Unit III: Input and Output System

I/O modules- Module function and I/O module structure, Programmed I/O , Polling I/O, Interrupt driven I/O , DMA function, Synchronous and Asynchronous serial data communication, Computer peripherals like keyboard, mouse, printer, scanner and display devices

Unit IV: Processor Organization

Evolution of Intel processor architecture- 4 bit to 64 bit, Control unit Hardwired and microprogrammed, concept of pipelining , Study of microprocessor 8085,Functional pins and Register organization, Memory mapped I/O and I/O mapped I/O schemes,

Unit V: Instruction Set and Assembly Language Programming

Addressing modes and Formats- immediate, direct, indirect, register, register indirect, displacement and stack, Instruction Cycle machine cycle and Data flow, 8085 instruction set and assembly programming, Time delay concept , stack and subroutines, Interrupt handling, Instruction set architecture RISC and CISC

Learning Outcomes:

On completion of the course, student will be able to :

- Demonstrate computer architecture concepts related to design of modern processors, memories and I/Os.
- Analyze the performance of commercially available computers.
- To develop logic for assembly language programming

BOOKS RECOMMENDED

[1] William Stallings, "*Computer Organization and Architecture*", Prentice Hall of India, Sixth Edition.
[2] A. Tannenbaum, "*Structured Computer Organization*", Pearson Education, 2002.
[3] Patterson & Hennessy, "*Computer Organization and Design*", Morgan Kaufmann, 2007
[4] Ramesh S. Gaonkar, "*Microprocessor, Architecture, Programming, and Applications with the 8085"*, Penram International Publication, 5/e