AMITY UNIVERSITY
— UTTAR PRADESH —

L	T	P/S	SW/FW	TOTAL CREDIT UNITS
3	1	2	0	5

Course Title: COMPUTER ORGANIZATION AND ARCHITECTURE
Credit unit: 05
Course Level: U G
Course Code: CSE301

Course Objectives:

This course deals with computer architecture as well as computer organization and design. Computer architecture is concerned with the structure and behavior of the various functional modules of the computer and how they interact to provide the processing needs of the user. Computer organization is concerned with the way the hardware components are connected together to form a computer system. Computer design is concerned with the development of the hardware for the computer taking into consideration a given set of specifications.

Pre-requisites: Digital Electronics

Course Contents/Syllabus:

	Weightage (%)
Module I : Register Transfer Language	**25**
Register Transfer, Bus and Memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic shift Unit.	
Module II: Basic Computer Organizations and Design	**20**

Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Design of Accumulator Logic. Hardwired and Microprogrammed control: Control Memory, Address Sequencing, Design of Control Unit	
Module III : Central Processing Unit	**20**
Introduction, General Register Organization, Stack Organization, Instruction representation, Instruction Formats, Instruction type, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer RISC and CISC Computer Arithmetic: Introduction, Multiplication Algorithms, Division Algorithms, Floating-Point Arithmetic Operations	
Module IV : Memory and Interasystem Communication and Input output organization	**20**
Memory: Memory types and organization Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware Intrasystem communication and I/O :Peripheral Devices, Input-Output Controller and I/O driver, IDE for hard disk, I/O port and Bus concept, Bus cycle, Synchronous and asynchronous transfer, Interrupt handling in PC, Parallel Port, RS – 232 interface, Serial port in PC, Serial I/O interface, Universal serial bus IEEE 1394, Bus Arbitration Techniques, Uni-bus and multi-bus architectures EISA Bus, VESA Bus.	
Module V: Pipelining, Vector Processing and Multiprocessors	**15**
Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors. Multiprocessors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration, Interprocessor Communication and Synchronization, Advanced computer architecture, Pentium and Pentinum –Pro, Power PC Architecture	

COMPUTER ORGANIZATION AND ARCHITECTURE LAB

1. Simulation using ORCAD
2. To simulate Half Adder circuit
3. To simulate Full Adder Circuit

4. To simulate the logical part of a simple Arithmetic logical Unit
5. To simulate a 4-bit binary adder-subtractor circuit .
6. To simulate and study the tristate buffer
7. To simulate the common bus using tri-state buffers and decoder
8. To simulate the common bus using multiplexers.
9. Study of instruction set of 8085 microprocessor
10. Open Ended program :Designing of various type parser
11. Study of 8085 Microprocessor

Student Learning Outcomes: After completion of this course student will be able to

- Build a firm foundation in hardware fundamentals.
- Design, implement, and evaluate a computer-based system, process, component, or programme to meet desired needs
- Students will go a long way toward helping them to become better computer scientists.
- Design and build Computer Architecture.

Pedagogy for Course Delivery:
1. Classroom teaching using White board and Presentations.
2. Assignments and Tutorials for continuous assessment.

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	Total
80	20	100

Theory Assessment (L&T):

Components (Drop down)	Continuous Assessment/Internal Assessment				End Term Examination
	Attendance	Class Test	Home Assignment	Case Discussion	
Weightage (%)	5	10	7	8	70

Lab Assessment

Components (Drop down)	Continuous Assessment/Internal Assessment				End Term Examination
	Attendance	Lab Record	Performance	Viva	
Weightage (%)	5	10	10	5	70

Text & References:
1. Morris Mano, Computer System Architecture, 3rd Edition – 1999, Prentice-Hall of India Private Limited.
2. Harry & Jordan, Computer Systems Design & Architecture, Edition 2000, Addison Wesley, Delhi

Reference Book:
1. *WIliam Stallings, Computer Organization and Architecture, 4th Edition-2000, Prentice-Hall of India Private Limited.*
2. *Kai Hwang-McGraw-Hill, Advanced Computer Architecture.*