Gyanmanjari
Innovative University

Subject: Basic Computer Organization - MCAXX11507

Type of course: Value Added Courses (VAC)

Prerequisite: Basic Knowledge of Computer

Rationale:

This course is intended to teach the basics involved in data representation and digital logic circuits used in the computer system. This includes the general concepts in digital logic design, including logic elements, and their use in combinational and sequential logic circuit design. This course will also expose students to the basic architecture of processing, memory and i/o organization in a computer system.

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

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				Theory Marks		Practical Marks		CA	
CI	T	P	C	ESE	MSE	V	P	ALA	
2	0	0	2	60	30	10	00	50	150

Legends: CI-ClassRoom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	**Case Studies :** Prepare case studies of real-world applications of computers, such as the role of computers in medical diagnosis, weather forecasting, or financial modeling. upload it on Moodle.	10
2	**Presentations:** Students will create presentations to explain complex computer concepts in a creative and engaging way. and upload it on Moodle.	10
3	**MCQ Test :** A MCQ test will be taken on the moodle platform.	10
4	**Assignment :** Assignment of 10 questions will be given; Students have to upload the solved assignment on the moodle.	10
5	**Attendance**	10
	Total	50

Course Content:

Sr. No	Course content	Hrs	% Weightage
1	**Introduction to Digital Logic:** a) Understand the difference between all gates and their operations. (Boolean Algebra, Logic Gates (AND,OR,NOT, NAND, NOR and XOR) ,Creating Combinational Circuit using Logic Gates)	5	10
2	**Basic of Computer Architecture:** a) Understand architecture of computer b) Understand about bus interconnection and their uses. c) Understand PCI Express. (Organization and Architecture,Computer Structure and Function,Computer components,Interconnection Structures,Bus Interconnection,Point-to-Point Interconnection,USB,PCI Express)	5	15

3	**Central Processing Unit:** a) Understand how the instruction cycle works. b) Understand about working of input and output devices. c) Understanding about DMA. (Processor organization,Register Organization, CPU Bus Structure,Instruction Cycle,Input and Output,External Devices,I/O Modules, DMA , Interrupt driven I/O, Programmed I/O)	5	25
4	**Introduction to Operating System and Systems Software's:** a) Understanding about OS. b) Understanding about all functions and also their uses. c) Understand CPU scheduling algorithm. (Operating System Overview,Introduction to Scheduling, Functions of Compilers/Interpreters,Cross Compilers (*), Loaders, Linkers, METHODS OF PROCESS SCHEDULING (FCFS,SJF, SRTN,RR, Non Preemptive Priority, Preemptive Priority)	5	25
5	**Computer Memory System Overview:** a)Understand all different types of memory. b) Creating cache memory design also understands their size and address. c) Understanding internal memory and their uses. d) Understanding external memory and their (Characteristics of Memory ,The Memory Hierarchy, **Cache Memory:** Cache Memory Principles, Elements of Cache. **Design**: Cache Addresses, Cache size, Mapping function, replacement algorithms, write policy, line size, number of caches, **Internal Memory**: Semiconductor Main Memory, Error correction ,Flash memory, DDR DRAM, Newer non-volatile solid-state Memory Technologies, **External Memory:** Magnetic Disk, RAID ,Solid State Drives, Optical memory, Magnetic Tape)	8	25

Suggested Specification table with Marks (Theory):60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	50%	25%	25%	00%	00%	00%

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course the students should be able to:	
CO1	Students should be able to understand Digital Logic, all gates and their operation.
CO2	Students should be able to understand Computer Architecture, bus interconnection and PCI Express.
CO3	Students should be able to express Central Processing and DMA , I/O Modules.
CO4	Students should be able to include Operating System and Systems Software's CPU scheduling algorithm.
CO5	Students should be able to understand Computer Memory System- cache memory design and Mapping function.

Instructional Method:

The course delivery method will depend upon the requirement of content and the needs of students. The teacher, in addition to conventional teaching methods by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment.
Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in the laboratory.

Reference Books:

[1] "Operating Systems: Internals and Design Principles", 9th Edition, Pearson

Author: William Stallings

[2] Digital Logic and Computer Design, PHI

Author: Morris Mano

[3] Todd Austin, Structured Computer Organization, 6th Edition, Pearson

Author: Andrew S. Tanenbaum,

[4] Computer Fundamentals, Pearson Education

Author: Anita Goel