Course Syllabus
Gyanmanjari Diploma Engineering College
Semester-5 (Diploma)

Subject: Computer Organization and Architecture-DETIT15216

Type of course: Major (Core)

Prerequisite: Basic knowledge of Electronics.

Rationale:

This course is designed to provide details of the computer system as a whole and its functional components as part of their characteristics, working principles, performance, and internal and external communication. Interactions including system bus, different types of memory and input/output organization with Processor. This course also covers hardware architectural issues and assembly language programming. On top of that, the students are also introduced to the increasingly important area of hardware evolution and working fundamentals of processors.

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	
3	0	0	3	60	30	10	-	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.)

Course Content:

Sr. No	Course Content	Hrs.	% Weightage
1	**Basics of Computer Organization and Architecture** Overview of computers and basic CPU structure, Basics of Digital Electronics-Flip Flops, Registers, Shift registers, Various Registers used in CPU & its applications, Types of Buses used in CPU.	04	12%
2	**8085 Microprocessor** Classify Evolution of intel Processors, 8085 Pin Diagram & Pin Functions, 8085 Microprocessor Architecture, 8085 General Purpose Registers, 8085 Flag Register, 8085 Instruction Execution.	12	25%
3	**8085 Assembly Language Programming** Instruction format opcode & operands, Machine Language Instruction Format: 1-Byte, 2-Byte & 3-Byte, 8085 Addressing Modes, Data Transfer Instructions, Arithmetical Instructions, Logical Instructions, Branching & Looping Instructions, Stack Instructions, I/O and Machine Control Instructions.	15	30%
4	**Memory Organization** Memory classifications, Memory Hierarchy, Various types of Main memories, Various types of Auxiliary memories, Cache Memory, Virtual Memory.	08	18%
5	**Input-Output Organization** Input-Output Interface, Various Modes of Data Transfer with I/O, CPU-IOP communication.	06	15%

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	**Memory Devices:** Students have to get their hands on various types of memory devices like Floppy Drives, Magnetic Tapes etc. available in the old days to understand its working and the evolution from that memory to currently available disks after the completion students have to upload charts and documents with photographs on GMIU web portal.	10

2	**Micro Project:** Students have to make a micro project on theoretical concepts learned in class after the completion of the micro project students have to upload images on GMIU web portal. [Group of 3 Students]	10
3	**Case Study:** Students have to analyze case studies of real computer architectures and their applications in current technologies after the completion of the case study students have to upload a pdf of the case study on GMIU web portal.	10
4	**ChipShift: Evolution of Micro Brain:** Students have to conduct a comparison-based case study on various microprocessors, from early models like Intel 8085, 8086, Zilog Z80, and Motorola 68000 to modern processors such as Intel Core i9, AMD Ryzen, ARM Cortex, Apple M1/M2, and RISC-V. They must analyze the evolution in terms of architecture, clock speed, data and address bus width, power efficiency, and real-life applications. After completing the study, students must prepare comparison diagrams with relevant photographs or screenshots, and upload on the GMIU web portal.	10
5	**Behind the Bytes: The Memory Game:** Students have to explore and understand various types of memory systems including Auxiliary Memory (such as HDDs, SSDs, Magnetic Tapes, and Optical Discs), Cache Memory (L1, L2, and L3 cache levels), and Virtual Memory (paging, segmentation, and memory mapping). They are expected to study the purpose, working mechanism, access speed, cost, and role of each type of memory in enhancing system performance. As part of the activity, students will prepare comparative charts, labeled architecture diagrams, and concise explanation documents highlighting real-world applications. After completing the activity, students have to upload documents on the GMIU web portal.	10
	Total	50

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 %	40%	40%	20%	-	-	-

Course Outcome:

After learning the course the students should be able to:	
CO1	Analyze computer systems at the hardware level, including CPU components & circuits, buses, and registers.
CO2	Examine 8085 Architecture and its working.
CO3	Perform Assembly language programming using 8085 Instruction Set.
CO4	Identify various parts of a system memory hierarchy.
CO5	Visualize CPU-I/O Communication and working.

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 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] Microprocessor Architecture, Programming and Application with 8085, Ramesh S. Gaonkar, 5th Edition, Prentice Hall.

[2] Microprocessor and Interfacing Programming and Hardware, Douglas V. Hall, McGraw-Hill, International Edition.

[3] Computer System Architecture, Mano, M. Morris, Pearson, Latest Edition.

[4] Computer Architecture and Organization, Ghoshal, Subrata, Pearson, Latest Edition.

[5] Computer Architecture, Parhami, Behrooz; Oxford, Latest Edition.