Program : **Diploma in Computer Hardware Engineering**	
Course Code : **3151**	Course Title: **Computer System Architecture**
Semester : **3**	Credits: **4**
Course Category: **Program Core**	
Periods per week: **4 (L:4 T:0 P:0)**	Periods per semester: **60**

Course Objectives:

- This course is designed to get a thorough knowledge of internal and external components of desktop and laptop computers.
- Students will be able to describe the functioning of a computer system and also outline the features of 8086 microprocessor and assembly language program.

Course Prerequisites:

Topic	Course code	Course name	Semester
Basic knowledge on computers		Introduction to IT Systems Lab	1

Course Outcomes:

On completion of the course student will be able to:

COn	Description	Duration (Hours)	Cognitive Level
CO1	Demonstrate basic structure of a computer, Motherboard components of desktop & laptop computers and BIOS settings.	14	Understanding
CO2	Demonstrate peripheral and storage devices of a computer	14	Understanding
CO3	Explain working of processing unit	15	Understanding
CO4	Illustrate 8086 Microprocessor Architecture and assembly language programming	15	Understanding
	Series Test	2	

CO – PO Mapping:

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO1	3						
CO2	3						
CO3	3						
CO4	3						

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline

	Description	Duration (Hours)	Cognitive Level
CO1	Demonstrate basic structure of a computer, motherboard components in desktop computers & laptop computers and BIOS settings		
M1.01	Illustrate the functional units of a computer with block diagram	2	Understanding
M1.02	Compare Von Neumann and Harvard architecture	2	Understanding
M1.03	Explain Bus structures	2	Understanding
M1.04	Demonstrate motherboard components of desktop computer	3	Understanding
M1.05	Demonstrate motherboard components of laptop computer	2	Understanding
M1.06	Demonstrate BIOS settings	3	Understanding
Contents: Functional units of a computer- Block diagram Computer Architecture –Von Neumann & Harvard, Interconnection structures- Bus structures Desktop motherboard components: Motherboard form factors, Chipset, CPU Socket types, CPU fan &Heatsink mounting points, Connectors for integrated peripherals, CMOS Backup battery, Bus & Interconnection slots, South bridge, North bridge, AGP slots, IDE & SATA Connectors- Features, Memory slots, Switches & Jumpers Overview of SMPS and its features Laptop Motherboard Components: Top panel, Base panel, Touchpad, Palm rest assembly, Hinges, Processors, Primary Memory and Secondary Storage, Screen, Graphics andSound Card, Batteries BIOS: Define booting & understand the concept of multi-os booting, BIOS – settings & configuration			
CO2	Demonstrate peripherals and storage devices of a computer		
M2.01	Demonstrate input & output device of a computer system	4	Understanding

M2.02	Explain I/O transfers	3	Understanding
M2.03	List memory hierarchy	2	Understanding
M2.04	Demonstrate different types of memory devices	5	Understanding
	Series Test – I	1	

Contents: List & Explain different categories of input &output devices: Physical connection, Virtual connection, Shared, and Dedicated.
I/O transfers: Program controlled, interrupt driven and DMA controlled.
Introduction to computer memory system, Memory characteristics & Hierarchy.
Different types of memory – Primary memory: Semiconductor memory technology, SRAM cell, DRAM cell, Cache memory concepts & levels.
Secondary memory – Direct access, Random access and Sequential access storage devices, Virtual Memory concept in Linux and Windows

CO3	Explain the working of processing unit		
M3.01	Illustrate processor structure & functions	4	Understanding
M3.02	Illustrate control unit design	4	Understanding
M3.03	Illustrate instruction cycle	4	Understanding
M3.04	Outline pipe lined & parallel processor concepts	3	Understanding

Contents: CPU structure and functions, Processor Organization, ALU, Data Paths, Register Organization
System bus structure: Data, Address and Control buses.
Processor control, Micro-operations, Hardwired control, Microprogrammed control.
Instruction Cycle - Instruction Fetch and Execute – Interrupts, Dataflow
Introduction to Pipe lined processing &Parallel processing.

CO4	Illustrate Microprocessor Architecture & assembly language programming		
M4.01	Define microprocessor and familiarize the features of 8086	4	Understanding
M4.02	Illustrate the internal block diagram of 8086	3	Understanding
M4.03	Illustrate addressing Modes	3	Understanding
M4.04	Demonstrate 8086 assembly language program	5	Understanding
	Series Test – II	1	

Contents: Role of Microprocessor in Micro Computer – Features of 8086, Internal Block Diagram of 8086 – Execution Unit – Bus Interface Unit- Addressing Modes.
The instruction set of 8086-Simple assembly language programs

Text / Reference

T/R	**Book Title/Author**
T_1	William Stallings, *Computer Organization and Architecture,* Pearson Education, 8th ed.
T_2	Morris Mano, *Computer System Architecture*, Prentice Hall Of India- 2002
T_3	Carl Hamachar, *Computer Organization*, McGraw Hill, 5th ed.
T_4	Lyla B Das, *The x86 Microprocessors- Architecture, Programming and Interfacing,* Pearson
R_1	Stephen J.Bigelow, Troubleshooting, Maintaining and Repairing PCs, TMH, Fifth Edition.
R_2	D Balasubramanian., Computer installation and servicing. TMH, 2010
R_3	Complete A+ Guide to IT Hardware and Software: AA CompTIA A+ Core 1 (220-1001) & CompTIA A+ Core 2 (220-1002)
R_4	Joel Rosenthal, PC Repair and Maintenance- Fire wall Media, First Edition
R_5	Manahar Lotia, Pradeep Niar, Modern Computer Hardware Course BPB Publication ,2011
R_6	Robert Bruce and Co O' Reilly, PC Hardware in a nutshell, Shroff Publishers and Distributors -2008

Online Resources

Sl.No	**Website Link**
1	https://nptel.ac.in/courses/
2	https://www.khanacademy.org
3	https://ocw.mit.edu/courses