CS-03: COMPUTER FUNDAMENTALS AND EMERGING TECHNOLOGY

Objectives:

- Bridge the fundamental concepts of computers with the present level of knowledge of the students.
- Familiarize peripheral devices, internal and external parts of computer system.
- Understand Number System like binary, hexadecimal and octal number systems and their arithmetic.

Prerequisites:

- Basic Computer Literacy

Unit No.	Topics	Details

1	**Introduction to Computers**	• Basics of Computers
		  ○ What is Computer?
		  ○ Characteristics of Computer
		  ○ Data Processing Cycle (Data → Process →information)
		• Classification of Computer by Data Processed
		  ○ Analog, Digital and Hybrid Computers
		• Classification of Computer by Processing Capabilities
		  ○ Micro, Mini, Mainframe and Super Computers
		• History and Generations of Computers
		  ○ First to Fifth Generation Computers
		• Simple Model of Computer
		  ○ Input Devices
		  ○ CPU (Central Processing Unit)
		  ○ Arithmetic & Logic Unit
		  ○ Control Unit
		  ○ Internal Memory
		• Output Devices
		• Secondary Storage Devices

	Internal/External parts used with Computer Cabinet	• Introduction to Mother board
		• Types of Processors.
		  ○ Dual Core, Core 2 Duo, i2, i3, etc ....
		• Memory structure and Types of Memory
		  ○ RAM (SRAM, DRAM, SO, DDR, etc.)
		  ○ ROM (ROM, PROM, EPROM, EEPROM, etc.)
		• Slots: ISA Slots / PCI Slots / Memory Slots
		• Sockets
		• Cables: Serial Cable / Parallel Cable / USB Cable

		• Ports: USB / Serial / Parellel / PS2 / HDMI • Power Devices: UPS • Graphic Cards, Network card, Sound Card

2	**Input Devices**	• Introduction
		• Types of Input Devices
		  ○ Keyboard / Mouse / Trackball / Glide - Pad / Game Devices Joystick, etc.) / Light Pen / Touch Screen / Digitizers and Graphic Tablet / Mic (Sound Input) / Camera (Photo and Video Input) / POS (Point of Sale) Terminal (Scanners, etc)
		  ○ MIDI(Musical Instrument Digital Interface) Keyboard,
		  ○ Wireless Devices (Keyboard, Mouse, etc)
		• Types of Scanners
		  ○ OCR, OMR, MICR, OBR

	Data Storage	• Introduction
		• Types of Magnetic Storage Devices
		  ○ Floppy Disk / Hard Disk (SATA, SSD) / Magnetic Tape / Magnetic Disks
		• Storage Mechanism of Magnetic Storage Devices
		  ○ Tracks / Sectors / Clusters / Cylinders
		• Reading / Writing Data to and from Storage Devices
		• Seek Time / Rotational Delay - Latency / Access
		• Time /Response Time
		• Other Storage Devices
		  ○ USB - Pen Drive / CD / DVD / Blu-Rav Disk etc.
		  ○ Flash Memory, Cloud Storage(Like Google Drive, OneDrive etc.)

3	**Output Devices**	• Types of Output Devices
		• CRT Display Units
		• Monitor
		• Non CRT display Units
		• LCD / LED / Plasma Displays
		• Types of Printers Impact and Non Impact Printers
		• Plotters
		• Other Devices
		  ○ Fascimile(FAX)
		  ○ OLED (Organic LED)
		  ○ Headphone
		  ○ SGD (Speech Generating Device)

		○ COM (Computer Output Microfilm) ○ Google Glass
4	**Numbering System and Codes**	• Introduction to Binary Codes / ○ Nibble / Bit / Byte / Carry Bit / Parity Bit / Sign Bit ○ KB / MB / GB / TB / HB (etc .... • Types of Numbering System ○ Binary / Octal/Decimal / Hex-Decimal • Conversion ○ Binary to Octal, Decimal and Hexa-Decimal ○ Decimal to Binary, Octal and Hexa-Decimal ○ Octal to Binary, Decimal and Hexa-Decimal ○ Hexa-Decimal to Binary, Octal and Decimal • Binary Arithmetic ○ Addition ○ Subtraction (1's Compliment and 2's Compliment) ○ Division ○ Multiplication ○ Types of Codes: ASCII/BCD / EBCDIC / Unicode • Parity Check: ○ Event Parity System / Odd Parity System
	Languages, Operating Systems and Software Packages	• Introduction • Translator (Assembler / Compiler / Interpreter) • Types of Languages ○ Machine Level Language ○ Assembly Level Language ○ High Level Language (3GL, 4GL, 5GL, etc.) • Types of Operating Systems ○ Batch Operating System ○ Multi Processing Operating System ○ Time Sharing Operating System ○ Online and Real Time Operating System • Uses and applications of Software Packages ○ Word Processing Packages ○ Spread Sheet Packages ○ Graphical Packages ○ Database Packages I ○ Presentation Packages ○ Animation / Video / Sound Packages

5	**Emerging Technologies and Virus**	• Different Communication methods
		  ○ GIS / GPS / CDMA / GSM
		• Communication Devices
		  ○ Cell Phones / Modem / Infrared / Bluetooth / WiFi/LiFi/SLM(Spatial Light Modulator)
		• Virus
		  ○ Introduction to Virus and related terms
		  ○ Origin and History
		  ○ Types of Virus
		  ○ Problems and Protection from Virus
		• Cloud Computing
		  ○ What is Cloud Computing?
		  ○ Characteristic & Service Models(Iaas, Paas, Saas)
		  ○ Architecture
		  ○ Security & Privacy

	Important Terms and Acronyms	• ATM • Backup / Restore • Hard Copy / Soft Copy • Bus / Data Bus • Buffer and types / Spooling • Cursor / Pointer / Icon • E-Mail I Attachment • CLil GUI • Compiler and its types • Drive I Directory (Folder) / File / Path • Menu / Popup Menu / Toolbar • Shutdown / Reboot / Restart • Syntax / Wild Card Characters • Optical Fiber (Fiber Optic) . • Net meeting • Printing Speed (CPS, CPM, LPM, DPI, PPM) • Peripherals

Seminar - 5 Lectures
Expert Talk - 5 Lectures
Test - 5 Lectures

Total Lectures 60 + 15 = 75

Reference Books:

1. Computer Fundamentals – By P.K.Sinha.
2. Fundamental of IT for BCA – By S.Jaiswal.
3. Engineering Physics – By V.K.Gaur.
4. Teach Yourself Assembler – By Goodwin.

Course Outcome:

- ✓ Able to explore the fundamental concepts of computers
- ✓ Able to Understand peripheral devices, internal and external parts of computer system.
- ✓ Able to Understand Number System like binary, hexadecimal and octal number systems and their arithmetic.
- ✓ Able to recognize the emerging technologies
- ✓ Able to differentiate the types of virus

Additional Topics (Not to be asked in examination):

Student should be aware of followings

- To Format Hard Disk
- Installation of OS, multi-OS and other packages
- Use of DOS commands
- Operating of Accounting Software