20CYS103	COMPUTER SYSTEM AND HARDWARE ESSENTIALS	L-T-P-C: 2-0-3-3

Prerequisites: Nil

Course Objectives

- Computer hardware essentials is designed to introduce students to a basic understanding of the different types of computing devices, computer components (CPU, memory, power supplies, etc.), and operating systems as well as maintaining and troubleshooting the basic hardware and software issues.
- It also introduces building a fully functional Linux-based computer using Raspberry Pi and other components.

Course Outcomes

CO1: Understanding the working principles of different computing devices (desktop computers, laptops, etc.).
CO2: Understand PC and laptop hardware components.
CO3: Understand peripheral devices, storage devices, displays and connection interfaces and troubleshoot common hardware issues.
CO4: Understand the procedure for Installation of OS - Linux and supporting, upgrading and troubleshooting OS related issues.
CO5: Understand the concepts of Physical Computing and related use cases.

CO-PO Mapping

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1			1								3	2
CO2	3	2			1								3	2
CO3	2	1											3	2
CO4	1	1			2								3	2
CO5	1	1			1				2	2	1	1	3	2

Syllabus

Unit 1

Components of Computer System: Computer Memory: Secondary storage device types, Basic Principles of operation: Sequential Access device, Direct Access device -Magnetic disks, Optical disks, memory storage devices, Ports: Serial and Parallel Ports, Specialized Expansion Ports: SCSI,

USB, MIDI, Expansion Slots and Boards, PC Cards, Plug and Play, HDMI ports, networking ports. System software: bootstrap module, configuration, OS loading: typical Linux virtual machine. Installing a Linux virtual machine. Using package manager to install/update software. Understanding disk partitions and obtaining partition information using system tools. Obtaining essential system resource utilization and information using system tools and proc file system: disk utilization, memory utilization, process information, CPU utilization.

Unit 2

Operating System: Introduction, Objectives, classification and functions of Operating System, Basics of popular operating system (LINUX, WINDOWS). Kernel prompt, Shell commands. The User Interface: Task Bar, Icons, Menu, Running an Application. Operating System Simple Setting: Changing System Date and Time, Changing Display Properties, To Add or Remove a Windows Component, Changing Mouse Properties, Adding and removing Printers. File and Directory Management: Creating and renaming of files and directories, Common utilities. Interrupts statements in various OS and its uses.

Unit 3

Number systems - Signed and Unsigned numbers arithmetic, Binary, Decimal, Octal, Hex, BCD etc. Introduction to logic circuits: Variables and functions, Inversion- Truth tables - Logic Gates and Networks - Boolean algebra - Synthesis using gates - Design examples - Optimized implementation of logic functions: Karnaugh map - Strategy for minimization - Minimization of product of sums forms - Incompletely specified functions - Multiple output circuits - Tabular method for minimization. Combinational circuit building blocks: Multiplexers - Decoders - Encoders, Sequential circuit building blocks: Flipflops-SR, JK, D and T- Registers - Counters
- A simple sequential circuit design example from state diagram.

Textbook

Brookshear JG. Computer science: an overview. Eleventh Edition, Addison-Wesley Publishing Company; 2011.

Reference(s)

1. *Norton, Peter. Introduction to computers. Sixth edition, Tata McGraw-HILL, 2008.*
2. *Wakerly JF. Digital Design Principles and Practices. Fourth Edition, Pearson Education; 2008.*
3. *Sinha, Pradeep K., and Priti Sinha. Computer fundamentals. BPB publications, 2010.*
4. *Givone DD. Digital Principles and Design.Tata McGraw Hill Publishing Company Limited; 2003.*
5. *Mano MM, Ciletti MD. Digital Design with Introduction to the Verilog HDL.Fifth Edition, Pearson Education; 2015.*
6. *Silberschatz A, Gagne G, Galvin PB. Operating system concepts. Ninth Edition, Wiley; 2012.*
7. *Cobbaut P. Linux Fundamentals. Samurai Media Limited; 2016.*

8. *Halsey M. Windows 10 Troubleshooting. Apress; 2016.*
9. *Soyinka W. Linux Administration: A Beginner's Guide. Fifth Edition, Mc Graw Hill Professional;2008.*
10. *Englander, Irv. The Architecture of Computer Hardware, System Software, and Networking. An Information Technology Approach (2009): 11.*

Evaluation Pattern

Assessment	Internal	External
Periodical 1	10	
Periodical 2	10	
Continuous Assessment (Theory) (CAT)	15	
Continuous Assessment (Lab) (CAL)	30	
End Semester		35

*CA – Can be Quizzes, Assignment, Projects, and Reports.