Program : **Diploma in Electronics Engineering / Electronics and Communication Engineering / Biomedical Engineering**	
Course Code : **6048**	Course Title: **Computer Hardware and Data Communication Lab.**
Semester : **6**	Credits: **2.5**
Course Category: **Program Core**	
Periods per week: **4 (L:0, T:1, P:3)**	Periods per semester: **60**

Course Objectives:

- To provide hands-on experience in handling, configuring and installing Computer systems, laptops, accessories, printers, networks, etc.
- To familiarize the concepts and methods of preventive maintenance and troubleshooting of computers and accessories.

General Instructions:

1. ESD safe working environment in the laboratory shall be provided.
2. ESD safe methods for handling components shall be followed.
3. The students shall familiarize with the concept of structured networking and shall follow industrial practices while implementing networks.

Course Prerequisites:

Topic	Course code	Course name	Semester
Concepts of Electronics	3043	Electronic Circuits	3
Concepts of Digital Electronics	3044	Digital Electronics	3
Concepts of Microprocessors/ Microcontrollers.	4041	Microcontroller and Applications	4

Course Outcomes:

On completion of the course, the student will be able to:

COn	Description	Duration (Hours)	Cognitive level
CO1	Build computer desktop system by organizing computer spare parts, installing and configuring operating system.	14	Applying
CO2	Apply concept of structured networking to implement and configure computer networks.	14	Applying
CO3	Apply the knowledge of computer hardware to maintain and trouble shoot computers, printers and networks.	8	Applying
CO4	Apply proper methods for preventive maintenance and troubleshooting of UPS, and utilize solar energy.	18	Applying
	Lab Exam	6	

CO – PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3		3				
CO2	3		3				
CO3	3	3					
CO4	3						

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

Course Outline:

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**Build computer desktop system by organizing computer spare parts, installing and configuring operating system.**		
M 1.01	*Illustrate SMPS, Motherboards, Operating System and ESD safety measures* Contents :- Basics of SMPS, Types, Voltage levels, SMPS testing, Types of Motherboards, identification of Ports, form factors, Add on cards, Need for OS installation, Types of OS, Basics of ESD, ESD prevention methods	4 (T)	Understanding

M 1.02	Identify blocks, pin configuration and voltage levels of computer SMPS.	1.5	Applying
M 1.03	Identify connectors, ports, Add-on cards and IO devices of a desktop and laptop computer system.	1.0	Applying
M1.04	Identify different block of an ATX or later generation of motherboard.	1.0	Applying
M1.05	Build desktop computer system, install and configure Windows operating system. (Follow ESD safe procedures)	2.5	Applying
M1.06	Apply Linux installation procedures to configure computer system.	2.5	Applying
M1.07	Utilize add-on cards, printers, scanners, and configure for windows and Linux OS.	1.5	Applying
CO2	**Apply concept of structured networking to implement and configure computer networks.**		
M2.01	*Illustrate Computer Networking, topology, LAN setup and study data communication concepts.* Contents :-Need for networking, Topologies, Protocols, networking components, Types of media-wired & wireless, LAN setup, concept of ip addressing, internet sharing, resource sharing, Remote desktop	4(T)	Understanding
M2.03	Demonstrate network components – Switches (managed and unmanaged), routers, Wifi Routers, patch cord, patch panel, network rack, UTP cables, Fiber optic cables and accessories.	2	Understanding
M2.04	Build patch cord T -568 B to T – 568 B and T -568 A to T – 568 B.	2	Applying
M2.04	Develop structured networking using managed and unmanaged switches.	2	Applying
M2.04	Organize routers and computers for wireless networking.	2	Applying
M2.05	Construct computer networks for internet, static IP addressing, Dynamic IP addressing. Study File/Resource sharing and remote login	2	Applying
	Lab Exam – I	3	
CO3	**Apply the knowledge of computer hardware to maintain and trouble shoot computers, printers and networks.**		
M3.01	*Illustrate computer hardware maintenance and trouble shooting*	2(T)	Understanding

	Contents:- Motherboard organization, BIOS, POST, POST codes, error codes, types of printers and scanners.		
M3.02	Identify various components of the mother board and troubleshoot faulty computer system.	2	Applying
M3.03	Organize step by step procedures to trouble shoot a faulty computer system.	2	Applying
M3.05	Identify steps for preventive maintenance of a computer system, printer and scanner.	2	Applying
CO4	**Choose proper methods for preventive maintenance and troubleshooting of UPS.**		
M4.01	*Make use of UPS maintenance and solar energy harvesting* Contents :- Block diagram of UPS, Types of UPS-on-line, off-line, UPS loading capacity & backup time calculation, Types of batteries, maintenance of batteries, Battery charging – Line charging & Solar charging, Solar panels, Solar charge controllers.	5(T)	Understanding
M4.02	Identify various types of UPS, batteries, solar panels and charge controllers	2	Applying
M4.03	Capacity test and maintenance of batteries	2.5	Applying
M4.04	Load test and efficiency calculation of UPS	2.5	Applying
M4.05	Study Solar power harvesting and up gradation of UPS/Inverter to solar charging, solar panel installation, Charge controller installation	3	Applying
	Open Ended Experiments	3	
	Lab Exam – II	3	

**** - Suggested Open Ended Projects**

(Open ended experiments are recommended for compulsory inclusion in Continuous Internal Evaluation. Students shall perform open-ended experiments as a team of 5.

- Perform preventive maintenance of computer systems in the campus.
- Perform preventive maintenance of campus network.
- Perform routine maintenance of UPSs available in the campus.
- Perform routine maintenance of printers available in the campus.
- Perform feasibility study to install a solar UPS/Inverter in the campus.

Text / Reference:

T/R	Book Title/Author
T1	Alan Clemets, Oxford University Press,The Principles of Computer Hardware
R1	Ron Gilster, Tata McGraw -Hill, PC Hardware – a beginners guide
R2	Larry L Peterson, Bruce S Davie, Elsevier, Computer Networks
R3	Paul Gill, CRC Press, Electrical Power Equipment Maintenance and Testing, Second Edition

Online Resources:

Sl.No	Website Link
1	https://www.tutorialspoint.com/computer_fundamentals/index.htm
2	https://www.javatpoint.com/hardware
3	http://www.codesandtutorials.com/hardware/