PART A: Introduction				
Program: **Diploma**		Class: **B.Sc.**	Year: **II Year**	Session: **2022-23**
Subject: **Computer Science**				
1.	Course Code	**S2-COSC1G**		
2.	Course Title	**Computer Maintenance & Troubleshooting**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Generic Elective**		
4.	Pre-Requisite (if any)	This course is **open for all**		
5.	Course Learning Outcomes(CLO)	**After completing the course, student will be able to –** • Identify and understand the hardware components in the computer system. • Install, configure and update Operating Systems, device drivers and softwares. • Install, configure and maintain various components in computer system and peripheral devices. • Diagnose faults, repair and maintain computer system and its peripherals. • Do preventive maintenance of computer system and its peripherals.		
6.	Credit Value	**Theory – 4 Credits**	**Practical – 2 Credits**	
7.	Total Marks	Max. Marks : **30+70**	Min. Passing Marks: **33**	

PART B: Content of the Course		
No. of Lectures (in hours per week): 2 Hr. per week		
Total No. of Lectures: **60 Hrs.**		
Module	**Topics**	**No. of Lectures**
I	**Inside the PC**: Core Components, Identify different type and generation of computer, Identify devices required for using laptops, Identify components which makes the system and specify its importance. Identify various types of ports and its connecting devices. Identity different types of cards like Display card, PCI card, E-net card, Switching Mode Power Supply (SMPS) etc. and their functions. **Motherboard:** Definition, Components/connections in motherboard, functional block diagram, slots, etc. Types/Form Factors (AT, Baby AT, ATX, LPX, NLX, BTX) Expansion Buses (Definition, Bus Architecture (PC/PC-XT, PC-AT/ISA, EISA, MCA, VESA Local (VL) Bus, PCI, Combination of Bus Systems, AGP – Accelerated Graphics Port, Universal Serial Bus (USB), IEEE 1394 Fire Wire- A Bus Standard **Central Processing Unit (CPU)**: CPU Speeds, Word Size, Data Path, Internal Cache memory, Slots and sockets, CISC vs RISC processor, CPU	10

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	chips, preprocessors, Generations. **System Controller:** Definition, Basic Input Output System: Services, Bios Interaction, CMOSRAM. **Chipsets** : Definition, Advantage, North and South Bridge **System Memory** : definition, memory sizes, speeds and shapes (DIP, ZIP, SIPP, SIMM,DIMM, RIMM), Memory modules (Dynamic RAM, SDRAM, DDR SDRAM, SLDRAM,DRDRAM, Fast Page Mode (FPM) DRAM, Extended Data Out(EDO) DRAM)	
II	**Hard Disk Drive and Controller, Hard Disk Interfaces** - SPEED (RPM), EIDE, Serial ATA, SCSI, SAS, USB and IEEE 1394 (Firewire), RAID, Solid State Drive (laptop), **Disk Basics** - Heads, Tracks, Sectors, Cylinders, Cluster, Landing zone, MBR, Zone bit recording, Disk performance Characteristics: Seeks and Latency, Data Transfer Rate. **Hard Disk Controller** - Functional Blocks, HDC Functions, **DVD Drives** - Types, Recording, Construction, Interfacing, DVD. **Drive Performance Criteria** - Data Transfer Rate, Access time, Cache/buffer, Blu-ray disk specification	8
III	**Input Devices** - Keyboard operation, Keyboard Types, Types of Key switches (Membrane, mechanical, rubber dome, capacitive) Keyboard interfaces. **Mouse** - Types, Operation, Interfaces **Scanner** - Scanner Types, Image quality measurement, OCR Application. **Camera** – Video Conferencing equipment **Joy Stick** – Play stations **Microphone** – Video Conferencing equipment	10
IV	**Output Devices** - Monitor and Display Adapters Video Basics (CRT parameters), VGA monitors. **Digital Display Technology**- Thin Displays, Liquid Crystal Displays, Plasma Displays, Light Emitting Displays, Graphics Cards: Components of a card, Accelerated Video cards, CGA, EGA, VGA. **Types of Printers** - Printer Interfaces, sharing of printers with other computers **Ink-jet Printer** - Parts, working principle **LaserJet Printer** - Parts, working principle **Plotters** – A4, A3 Size, Large Format Printers **Speakers** - Video Conferencing equipment	10
V	**Trouble Shooting and Preventive Maintenance** - Functions, IPL Hardware, Test Sequence, Error messages. **Troubleshooting**: Possible problems and diagnosis in Motherboard, Keyboard, Hard Disk Drive, Printers and other parts, Preventive maintenance tools.	10
VI	**Operating System** – Types of Operating System Microsoft, IoS, Linux, Open Source, Installation and Trouble shooting of Operating System.	8
VII	**Anti-Virus** – Role of Antivirus in the IT environment in office.	2

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VIII	**OEM Applications** – Installation of OEM applications and trouble shooting.	2

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

- D Balasubramanian, Computer Installation and Servicing, Tata McGraw Hill Education Private Limited
- Mark Minasi, The complete PC Upgrade & Maintenance Guide, BPB Publications
- GovindRajalu, IBM PC and clones, Tata McGraw Hill Education Private Limited
- Books published by M.P. Hindi Granth Academy, Bhopal

Suggestive digital platform web links

https://www.chtips.com/hindi/computer-hardware-tutorials.php
http://nji.gov.ng/images/Workshop_Papers/2017/IT_Workshop/s3.pdf
http://www.gcmishra.yolasite.com/resources/Repairing%20Computer.pdf
http://www.mphindigranthacademy.org/

Suggested equivalent online courses

https://urbanareas.net/info/training/computer-repair/

Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks : 100
Continuous Comprehensive Evaluation (CCE) : 30 marks University Exam (UE) : 70marks

Internal Assessment : Continuous Comprehensive Evaluation (CCE):30	Class Test Assignment/Presentation	Total 30
External Assessment : University Exam Section: 70 Time : 03.00 Hours	**Section(A)** : Objective Questions **Section (B) :** Short Questions **Section (C) :** Long Questions	Total 70

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PART A: Introduction				
Program: **Diploma**		Class: **B.Sc.**	Year: **II Year**	Session: **2022-23**
Subject: **Computer Science**				
1.	Course Code	**S2-COSC1R**		
2.	Course Title	**Computer Maintenance & Troubleshooting Lab**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Generic Elective**		
4.	Pre-Requisite (if any)	This course is **open for all**		
5.	Course Learning Outcomes(CLO)	**After completing the course, the students shall be able to –** 1. Identify and understand the hardware components in the computer system. 2. Install, configure and update Operating Systems, device drivers and softwares. 3. Install, configure and maintain various components in computer system and peripheral devices. 4. Diagnose faults, repair and maintain computer system and its peripherals. 5. Do preventive maintenance of computer system and its peripherals.		
6.	Credit Value	**Practical – 2 Credits**		
7.	Total Marks	Max.Marks : **100**	Min. Passing Marks: **33**	

PART B: Content of the Course		
No. of Lab.Practicals (in hours per week): **1 Hr. per week**		
Total No. of Lectures: **30 Hrs.**		
	Suggestive List of Practicals	**No. of Labs.**
	1. Identify basic components of a personal computer - • Prepare a list of various computer peripherals. (e.g. CPU, Mother Board, RAM, Hard Drive, Optical Drive, Solid State Drive, Monitor, Keyboard, Mouse, Speaker, Web cam, Printer, Scanner, microphone, speakers, modem, projector etc). • Identify common ports, associated cables, and their connectors. • Observe various connectors, ports back and front side of the computer. Write their purpose and specifications. (e.g. Power, PS/2 keyboard and mouse, Serial and parallel, USB, VGA, LAN, Audio & microphone,	30

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	Firewire, HDMI, games, SATA etc.)
	• Identify major components including motherboards, memory, drives, peripheral cards and devices, BIOS, and Windows operating system.
	• Observe the various components on the motherboard, identify it. Also observe their interconnection and arrangement inside the case. Detach and attach the cables and components.
	• In case of PC and motherboard. Carryout detailed study on all the components and devices on the given motherboard.
	  • Processor socket, Chipsets,
	  • Memory module slots, BIOS, CMOS
	  • FDD, HDD connectors
	  • Different types of expansion slots (ISA, EISA, PCI, PCI express, AGP, Express Card & PC
	  • Card (or PCMCIA) etc.)
	  • Add-on-cards (audio, graphics, I/O, TV tuner, network etc.)
	  • Cables in a computer system (IDE Ribbon cable, SATA cable etc)
	  • Connections for button, indicator lights etc.
	• Observe various types of memory modules (SIMM, DIMM, SO-DIMM, RIMM, SO-RIMM).
	• Also observe impact of removal of memory modules from the system, start it and re insert memory module and restart system.
	• Disassemble the PC carefully. Assemble the same PC you have disassembled and boot the system. Observe the procedure of assembling a computer system.
	• Observe the different types of motherboards, form factors and write the difference between the desktop motherboard and laptop motherboard (e.g Full size AT, baby AT, ATX, LPX, NLX etc).
	• Add additional facilities like the network capabilities, and gaming capabilities by adding Graphic Accelerator card. Install the given driver and test the computer for proper functioning. Remove the drivers for some devices like sound, display, network etc. and again install them and check the proper functioning of computer.
	• Upgrade the given PC by adding RAM and additional Hard Disk.
	• Observe, search and write the specifications of CD/DVD drive, HDD,	

	motherboard, RAM chips, Power supply, Microprocessor chip, Add on cards. Prepare complete specifications of the latest system configuration available in the market. • Observe the power supply (SMPS) and measure their voltage levels of a given SMPS. Measure various voltage levels, such as motherboard, storage devices and fan etc. using multi-meter. • Do a detailed study on all the components and devices on the given power supply. Observe different types of switch mode Power Supply – AT, ATX, NLX. Record the different types of power connectors on the motherboard with their voltage rating. • Observe various secondary storage systems- Hard Disk, Flash drives, CD/ DVD drive. Open drives and draw the internal structure of them. • Observe the various techniques for low level and high level formatting of Hard Disk. Format the given Hard Disk using any one technique and create three partitions, two for operating system and one for data. • Observe the procedure for installing Operating System like win7/win8/win10 with partition formatted in previous practical in one partition (ntfs, gpt). Try booting PC. • Learn the content of boot.ini after the installation process. Now install unix Operating System like Linux /Ubuntu/ centos/ fedora/ red hat in another partition. Create dual booting ory : definition, memory sizes, speeds and shapes (DIP, ZIP, SIPP, SIMM,DIMM, RIMM), Msystem try booting PC. Learn the content of boot.ini after the installation process. • Open at least 2 to 3 different types of keyboard and mouse and observe the internal circuits. • Observe and write steps to troubleshoot, maintain and clean the diskette drives, keyboard, mouse, etc. • Observe different types of printers (dot matrix, inkjet & laser, multifunction, plotter). Install driver and interface the printers with PC/Laptop on any operating system (connect the printer to one PC directly using USB/Serial/Parallel ports as per the availability; test the functioning of the printer.) Write detailed comparative analysis of different types of printer available in the market and suggest a printer with good features and best price as per need. Justify your printer selection. • Observe the interfacing, installation and working of various devices	

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	such as scanner, projector, web cam etc. Connect all these devices with the given PC, install & test them. • Identify how to disable unused devices to decrease security risks. • Change booting of computer with different secondary storage CD, HDD, USB etc. • Identify the problem in the given PC, using the given troubleshooting sequence, fix the issue, • Record the given problem, and produce proper documentation of your work • Recognize common symptoms associated with diagnosing and troubleshooting PCs and utilize Windows built-in diagnostic tools. • Identify general troubleshooting techniques and strategies • Use scandisk, control panel, boot-up menu, and startup disk as diagnostic tools. • Access Microsoft Knowledge Base on the Internet to solve common problems. • Identify the common problems associated with shutdown, configuration, and cabling. • Identify problems associated with heating and cooling of the internal components. • Identify problems with installing internal devices such as hard drive, tape drives, or CD-ROM drive. • Recognize and interpret the meaning of common error codes and startup messages. • Recognize windows-specific printing problems and corrections. • Log boot ups and events. • Perform hard drive file system maintenance. • Identify Anti-virus software and applications. • Utilize Internet to download device drivers: Installation of drivers of various devices from the internet. • Demonstrate to remove/uninstall unwanted software applications. • Operate and maintain registry file.	

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PART C: Learning Resources
Textbooks, Reference Books, Other Resources
Suggested Readings
• D Balasubramanian, Computer Installation and Servicing, Tata McGraw Hill Education Private Limited • Mark Minasi, The complete PC Upgrade & Maintenance Guide, BPB Publications • GovindRajalu, IBM PC and clones, Tata McGraw Hill Education Private Limited • Books published by M.P. Hindi Granth Academy, Bhopal
Suggestive digital platform web links
http://nji.gov.ng/images/Workshop_Papers/2017/IT_Workshop/s3.pdf http://www.gcmishra.yolasite.com/resources/Repairing%20Computer.pdf http://www.mphindigranthacademy.org/
Suggested equivalent online courses
https://urbanareas.net/info/training/computer-repair/

Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Internal Assessment	Marks	External Assessment	Marks
Class Interaction /Quiz		Viva Voce on Practical	
Attendance		Practical Record File	
Assignments (Charts/ Model Seminar / Rural Service/ Technology Dissemination/ Report of Excursion/ Lab Visits/ Survey / Industrial visit)		Table work / Experiments	
TOTAL	30		70

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