SYLLABUS FOR INFORMATION & COMMUNICATION TECHNOLOGY SYSTEM MAINTENANCE TRADE			
FIRST YEAR			
Duration	**Reference Learning Outcome**	**Professional Skills (Trade Practical) With Indicative Hours**	**Professional Knowledge (Trade Theory)**
Professional Skill 50Hrs; Professional Knowledge 14 Hrs	Identify various basic Electrical Components and perform measurement of current, voltage using multimeter following safety precautions.	**Familiarization with the Institute and Safety** 1. Visits to workshops, labs, office, stores etc., of the institute. (5 hrs) 2. Demonstration of safety precaution. (5 hrs) 3. Demo of first aid practice. (5 hrs) 4. Demo of artificial respiration and practice. (5 hrs) 5. Demo of electrical safety precautions. (5 hrs)	• Punctuality and Discipline expected of trainees. Course duration, methodology and structure of the training program. • About the institute and infrastructure. • Safety in moving and shifting heavy and delicate equipments. • First aid. • Artificial respiration. • Electrical safety.(07 hrs.)
		Basic concepts of Electricity 6. Identify specification of types of fuses. Identification and specification of type of switches. (3 hrs) 7. Identification of meter types and measuring range. (3 hrs) 8. Construct a simple circuit using AC/ DC supply, lamp, fuse and switch. (4 hrs) 9. Measure circuit voltage and current using voltmeters and ammeters. (3 hrs) 10. Measure voltage and current using Multi-meter (analog-digital). (4 hrs) 11. Use Multimeter to check fuses,	• Concept of current and voltage. AC, DC Supply indicating lamps. Different types of Fuses and their applications. Different types of connectors used in electrical and electronic applications. Different types of switches used in electrical and electronic applications. • Circuit voltage and current. Measuring circuit voltage and current using voltmeters and ammeters. AC and DC meters. • Measuring instruments, MC, MI type, Ammeter, Voltmeter, Multimeter for measuring voltage and current.

		lamps and switches. (4 hrs) 12. Measure DC and AC power using V-I method and using power meter. (4 hrs)	Construction, characteristics/ features and specification. Digital Multimeter. • Meaning of Circuit and basic electrical circuits. • Meaning of resistance, continuity and continuity testers. Multimeter for checking continuity. • Concept of Power and measurement using V&I meter and Power meter. (07 hrs.)
Professional Skill 50Hrs; Professional Knowledge 14 Hrs	Perform different functions of Resistors including Soldering, De-soldering practice.	**Resistors. Soldering and De-soldering** 13. Identify different types of resistors from physical appearance. (4 hrs) 14. Identify resistor value and tolerance using colour code. (4 hrs) 15. Measuring resistance using Multimeter. (4 hrs) 16. Soldering and de-soldering techniques, practice using hook-up wires. Soldering resistors on Tag board. (4 hrs) 17. Verification of Ohms Law and Kirchhoff's Laws. (5 hrs) 18. Soldering resistors on PCB. (5 hrs) 19. De-soldering practice. (5 hrs) 20. Experiment using P.T.C and NTC resistors. (5 hrs) 21. Experiment to check VDR's. (5 hrs) 22. Experiment to check LDR's. (5 hrs) 23. Test Pots, Presets. (4 hrs)	• Classification, characteristics and application of different types of resistors.-carbon film, metal film, wire wound, cermets and surface mounted. • Colour coding of resistors. Calculating Imeasuring resistance value and its tolerance value. Wattage of resistors, specific resistance and their importance. • Resistors in series and parallel. • Soft soldering and precautions to be taken for making a good solder joint. Types of solder and need of soldering paste. • Ohms law and Kirchhoff's Laws. • Printed circuit boards and its application. • De-soldering tools. • Temperature dependent resistors and their applications.(PTC and NTC) . • Voltage dependent resistors (VDR). • Photoelectric effect, Light

			Dependent resistors. • Variable resistors, pots, presets, types and application. Log and Linear resistors. (14 hrs.)
Professional Skill 50Hrs; Professional Knowledge 14 Hrs	Recognize different types of Inductors, measure Inductance and uses of Transformer.	**Inductance** 24. Identification of different types of inductors and its specifications. (5 hrs) 25. Measure inductance using LCR meter.Calculate inductive reactance at different input signal frequencies. (8 hrs) 26. Demo on self and mutual induction. (7 hrs) 27. Check step down transformers. (8 hrs) 28. Rewind a transformer to given specification using winging machine. (7 hrs) 29. Finding losses and efficiency of given transformers. (8 hrs) 30. Identifying and testing high frequency transformers used in electronic circuits. (7 hrs)	• Definition of inductance. Properties. Types of inductors and their application. • Inductive reactance, measuring inductance and inductive reactance. Meaning of lead, lag. Effect of inductor on power factor. Frequency dependence of inductive reactance. • Self and Mutual inductance. Coefficient of coupling. • Transformers. Turns ratio. Transformer winding. Winding machines. • Transformer losses and efficiency. • Uses, losses, efficiency type of cores and uses for LF, HF, VHF transformer. • Transformers used in high frequency applications. (14 hrs.)
Professional Skill 50Hrs; Professional Knowledge 14 Hrs	Measure Capacitance and find resonance value of a circuit.	**Capacitance and Resonance circuits** 31. Identify of different types of capacitors from colour code and typographic code. (5 hrs) 32. Test working condition of capacitor. Measure capacitance using RLC meter. (8 hrs) 33. Measure capacitive reactance at different frequencies. (12 hrs) 34. Measure capacitance and capacitive reactance of, capacitors in series and capacitors in parallel. (12 hrs) 35. Find the resonance frequency of	• Working principle of capacitors. Electrostatic action, dielectric constant. Unit of capacitance and capacitive reactance. Types of Capacitors-electrolytic, ceramic, polyester, tantalum, mica, surface mounted. Colour coding, and tolerance. • Measuring capacitance and capacitive reactance. • Behaviour of capacitance at different frequencies. • Capacitors in series and parallel.

		a given Series and parallel resonance circuit. (13 hrs)	• Meaning of Resonance. Application of resonance. Series and parallel resonance circuits. (07 hrs.)
Professional Skill 50Hrs; Professional Knowledge 14 Hrs	Test and use Diode to construct basic Electronic components.	**Electronic Components** 36. Identify terminals of different types of diodes. Record its specifications referring to diode data sheet. (5 hrs) 37. Plot forward and reverse characteristics of diode Testing working condition of diodes. (7 hrs) 38. Construct and test a half wave and full wave diode rectifiers. (9 hrs) 39. Construct and test a Bridge rectifier with and without filter. (9 hrs) 40. Construct a bridge rectifier with capacitance input filter. (10 hrs) 41. Draw Zener diode characteristics, Simple voltage regulator using zener diode. (10 hrs)	• Semiconductor, intrinsic and extrinsic semi conductors, P and N type semiconductor. Development of P.N. junction barrier potential. Effect of temperature. Breakdown voltage. • Different types of Diodes. Diode terminals. Diode specifications using data book. • Forward and reverse characteristics of diode. Testing diodes using Multimeter. • Half wave and Full wave rectifiers using diodes. Transformer requirements. Calculating output DC, ripple factor. • Bridge rectifier. Calculating output DC, ripple factor. • Filters for rectifiers. Calculating output DC, ripple factor. • Zener diode-Its characteristics and application for voltage regulation. Calculating the series resistor for required current rating. • Specifications of a regulated power supply and testing a power supply for its specifications. (14 hrs.)
Professional Skill 50Hrs;	Recognize different types of Transistors and use it as	**Transistor and Amplifiers** 42. Identify types of transistors based on their physical	• Working principle of PNP, Bipolar transistors. Types of transistors and applications.

Professional Knowledge 14 Hrs	Amplifiers in electronic circuit.	appearance. Identify the leads of the given assorted types of transistors. (15 hrs) 43. Quick test given transistors using Multimeter. Identify opens, shorted junctions. (15 hrs) 44. Wire and find the gain of amplifiers in - CB, CE, CC configurations. (20 hrs)	Leads of transistors and their identification. • Forward and reverse bias of transistor Junction. General values of junction resistances. Quick testing a transistor-using Multimeter. • Transistor configuration - CB, CE, CC, alpha, beta. Types of Biasing of transistor amplifiers, comparison and applications. Thermal runaway. Steady and Dynamic characteristics. Testing- get frequency response, gain bandwidth product, signal to noise ratio. (14 hrs.)
Professional Skill 25Hrs; Professional Knowledge 07 Hrs	Construct and test of an application circuit using different types of Semiconductors.	**Special Semiconductors- FET** 45. Construct and test a JFET amplifier. (02 hrs) 46. Construct and test a MosFET application circuit. (03hrs) 47. Construct and test a relaxation oscillator using UJT. (05hrs) 48. Construct and test an application circuit using SCR. (05hrs) 49. Construct and test an application circuit using DIAC. (05hrs) 50. Construct and test an application circuit using TRIAC. (05hrs)	• Field effect transistors, types, working principle, applications. • Working principle and application of UJT. • Working principle and application of SCR. • Working principle and application of TRIAC. • Working principle and application of DIAC.(07 hrs.)
Professional Skill 50Hrs; Professional Knowledge 14Hrs	Assemble and test various Power Supply circuit.	**Power supply** 51. Practice on identifying and using the controls on a regulated power supply. (5 hrs) 52. Assemble and test a series regulated power supply. (7 hrs)	• Unregulated, regulated DC Power supply specifications. Application of different types of power supply for specific application types. • Series regulator using transistor.

		53. Assemble and test a shunt regulated power supply. (7 hrs) 54. Assemble and test a fixed voltage regulator using 3pin IC. (7 hrs) 55. Assemble and test a variable voltage regulator using IC. (8 hrs) 56. Assemble a simple inverter and converter for use with emergency lamp. (8 hrs) 57. Identify the parts and controls of a UPS. Practice switch-on and switch-off procedures. (8 hrs)	Short circuit protection. Overload protection. • Shunt regulators using transistors. • Fixed Voltage regulators using IC's. • Variable voltage regulators using IC's. • Mains voltage stabilizers. • Inverters and converters. • Un-interrupted power supply, types and applications. (14 hrs.)
Professional Skill 50Hrs; Professional Knowledge 14 Hrs	Construct all digital circuit using logic gates and verify truth table.	**Digital Electronics** 58. Identify the specifications of given digital IC's referring to data books. (2 hrs) 59. Verify the truth table of two input OR, NOR, AND, NAND, NOT gates. (3 hrs) 60. Verify of truth table of multiple input logic gates. (3 hrs) 61. Verify the truth table of XOR and XNOR Gates. (3 hrs) 62. Realization of different gate type using NAND gates. (3 hrs) 63. Verification of Boolean laws. (3 hrs) 64. Realization of half adder & full adder using NAND gates. Realization half subtractor and full subtractor using NAND gates. (3 hrs) 65. Verification of truth table of 7483- 4bit adder. (3 hrs) 66. Verifying encoder/ decoder/ multiplexer/ demultplexer IC truth tables. (3 hrs)	• Number systems and conversions. Classification of digital IC's. Use of data book for identification of digital IC's. • Basic LOGIC GATES and truth table. Boolean algebra. • Logic families, logic levels, propagation delay. Multiple input gates. • XOR, XNOR gates and application. • Simplification of Boolean equations. • Combinational logic circuits. g) Half adder, full adder, parallel binary adder, half subtractor, fullsubtractor. • Commercially available adders/ subtractors. • Comparator, decoders, encoders, multiplexer, demultiplexer. • Parity generators / checkers. RS Flip - Flop, JK flip-flop, Master-Slave flip-flops.

		67. Realization and verification of truth table of RS, JK and MS- JK flip-flop. (3 hrs) 68. Realization and verification of D-flip flop. (3 hrs) 69. Realization and verification of up & down (sync/async) counter. (3 hrs) 70. Verification of A/D & D/A converter. (3 hrs) 71. Realization of shift registers using FF. (3 hrs) 72. Verification of Right-shift, Left-shift registers. (3 hrs) 73. Verification of Serial-in-parallel out and parallel in serial out of data. (3 hrs) 74. Representation of logic function's truth table using K-Map. (3 hrs)	• Types of triggering and applications. D flip-flops. • Counters, ripple, synchronous, up-down, scale-n counters. • Principles of A/D & D/A converter. Commercially available A/D & D/A converters. Applications. • Shift registers. Types, applications. • Commercially available shift registers and applications. • Conversion of serial data into parallel and vice-versa. • Concept of Karnaugh Map (K-Map). (14 hrs.)
Professional Skill 25Hrs; Professional Knowledge 07 Hrs	Familiarize charging of acid battery and verify connections.	**Battery** 75. Familiarize with the lead acid battery, Charging of batteries, Series parallel connection of batteries. (25 hrs)	• Lead acid cell, its construction and chemical changes during charging and discharging. Battery charging methods. Maintenance free batteries. Lithium cell, Ni-cad cells their construction and applications. (07 hrs.)
Professional Skill 50Hrs; Professional Knowledge 14 Hrs	Verify internal parts of CRO and use it to measure voltage, frequency, modulation of modulator/ transmitter.	**Oscilloscope** 76. Identify CRO front panel controls. (6 hrs) 77. Measure of DC/AC voltages and frequency using CRO. (6 hrs) 78. Identify the internal parts of a CRO and CRT. (6 hrs) 79. Calibrate a given CRO. (7 hrs)	• Working principle and application. • Precautions to be taken while measuring voltages using CRO. • Internal parts of a CRO. Construction and function of CRT and its associated circuitry. • Simple Calibration procedures care and maintenance. (07 hrs.)

	Latest trends in interface

			• Applications under windows accessories. • Windows Help. • Finding files, folders, computers. • Control panel. Installed devices and properties. (07 hrs.)
Professional Skill 75Hrs; Professional Knowledge 21 Hrs	Customize Operating System and maintain system application software.	**Data Backup** 159. 3 types of media to use when backing up your data, and when each method is appropriate. (2 hrs) 160. How to create automated backups to ensure you always have a recent backup. (2 hrs) 161. Learn how to manually backup data. (2 hrs) 162. How to make an exact copy (clone) of a hard drive. (2 hrs) **Hardware Troubleshooting** 163. The danger in not diagnosing problems first. (3 hrs) 164. Learn how to test your RAM. (4 hrs) 165. Check your hard drive for errors. (4 hrs) **PC Cleaning** 166. The best cleaning supplies to use. (2 hrs) 167. How to increase airflow and increase your computer's lifespan. (2 hrs) 168. How to clean your computer. (2 hrs)	• Utilities for recovering data from defective/bad hard disks. • Introduction to removable storage devices, Bulk data storage devices-magnetic, optical, magneto optical drives, WORM drives. • CD ROM drives- Technology, Types of CD drives, working principle application. • Technology, working principle, capacity, media of DAT Drive and back-up procedures. • Technology, working principle, capacity, media of DVD ROM drive. • Technology, working principle, capacity, media of CD WRITER and use different modes of writing on a CD. Using of utility for CD writing. (07 hrs.)
		Hard Drives 169. Partitioning hard disk (primary and extended partitions). (2 hrs) 170. Hard Drive Failures. (2 hrs)	• What's Inside a Hard Drive? • How Hard Disks Work. • Inside: Hard Drive Motherboard. • Desktop Hard Drive Buyer's

		171. How To Troubleshoot a Noisy Hard Drive.(2 hrs) 172. How to Format a Hard Drive. (2 hrs) 173. How to Completely Erase a Hard Disk Drive. (2 hrs) 174. Installation and configuration of storage devices. Integration of PATA and SATA drivers. (3 hrs) 175. Recover emails, files, and data from a crashed hard drive or computer. (2 hrs) **Virus Removal** 176. How to run a full system scan. (1 hr) 177. How to fix your browser from redirecting to other websites (browser hijack). (1 hr) 178. Using a modern anti-virus utility. (2 hrs) 179. When utilities don't fix everything, how to manually remove a virus. (2 hrs) 180. 2 specific things to disable when trying to get rid of a nasty virus. (2 hrs) 181. 2 special utilities that work wonders. (2 hrs)	Guide. • What is RAID? Using Multiple Hard Drives for Performance and Reliability. • Partitioning hard disk (primary and extended partitions). • Learn how to prevent your PC from getting malware. • All the different types of malware and how they attack your PC. • The difference between Anti-Virus and Anti-Spyware software. (07 hrs.)
		System Utilities 182. How to check to see if your hard drive has bad sectors. (1 hr) 183. Fix the master boot record. (2 hrs) 184. How to run an in-place installation. (1 hr) 185. Using Task manager and Event Viewer. (2 hrs)	• Bad Sectors in Hard disk, Master Boot Record, in-place installation, Registry fixing, performance level check, Shortcut fixing, Fixing Startup process, log, etc. • Users and user account. Privileges, scope, permissions etc. • Concept of Virtual Machine.

		186. Using System Monitor and Performance Logs. (2 hrs) 187. Configure config.sys file. (2 hrs) **User Account Customization** 188. How to create and configure user accounts in Windows XP, Vista, 7/8. (2 hrs) 189. Make Changes to an Account. (2 hrs) 190. Changing the storage location of the personal folders. (1 hr) 191. Changing the storage location of installed software. (1 hr) 192. Setting up Parental Controls in Windows XP,Vista,7, 8. (2 hrs) 193. How to Use Fast User Switching in Windows. (2 hrs) 194. View Hidden Files and Folders. (1 hr) 195. Lock Down Windows 7 / 8 With User Account Control. (2 hrs) 196. How to Delete User Accounts in Windows. (2 hrs)	(07 hrs.)
Professional Skill 75Hrs; Professional Knowledge 21 Hrs	Install Operating System and all other application software.	**Windows Update & Device Driver** 197. How to find your system version in Windows, Linux. (2 hrs) 198. Installing a service pack. (3 hrs) 199. How to perform a Windows Update. (2 hrs) **Software Installation** 200. Installing a software program in windows. (3 hrs) 201. How to run a file from MS-DOS. (3 hrs) 202. Extracting or uncompressing a compressed file. (2 hrs) 203. How to compress or make files into one file. (2 hrs)	• Version of a software, Service pack, Updating of OS, Different configurations of Computer system and its peripherals, Compatible with different hardware/ software. Software Installation – • Pre-installation –Prerequisites, Install procedure, Rollback or Un-install procedure, Tests. • Post-installation – Backup procedure & specifications, Restore procedure, Periodical view check.

		204. Extracting files from the Windows cabinets. (2 hrs) 205. Uninstalling Windows software. (3 hrs) 206. Unable to remove a program from Windows Add/ Remove programs. (3 hrs)	• Awareness of legal aspects of using computers such as copyright, patent etc. (07 hrs.)
		Installing Hardware Drivers 207. How To Update Drivers in Windows.(1 hr) 208. How To Roll Back a Driver in Windows. (2 hrs) 209. Familiarization with Device manager. (2 hrs) 210. Interfacing with cellphone, tablet PC, synchronization of contacts. (2 hrs) **Windows Utilities** 211. How to Repair Corrupted Files Problems. (2 hrs) 212. How to check for corrupted files. (2 hrs) 213. Restore your machine back to normal. (2 hrs) 214. Hard disk is filling up, what should one do? (2 hrs) 215. Where's the disk space? (2 hrs) 216. Top 15 Ways to Speed Up the Computer. (2 hrs) 217. How to Automatically Clean and Organize the Desktop, Downloads, and Other Folders. (2 hrs) 218. 5 Simple Rules To Keep Files Organized. (2 hrs) 219. 5 Reasons - Computer Is Running Slow. (2 hrs)	• What is a Driver? • What hardware device drivers should be updated? • What is a Device manager? • Computer Maintenance Tips and Tricks to Backup, Scan and Clean. • Power on self test, Peripheral diagnostics, general purpose diagnostics, Operating system diagnostics. • Hardware boot process, Windows boot process. (07 hrs.)
		Junk File Removal 220. How to Remove Junk Files. (1	• Junk files, deleted files, configuration of internet

		hr) 221. How to completely remove "deleted" files. (1 hr) 222. How to clear web browser cache Firefox, Internet Explorer, Chrome. (1 hr) 223. 5 steps to clean up your computer files. (1 hr) 224. Personalize your Windows XP-based PC. (1 hr) **Linux OS** 225. Using a Linux Live CD. (4 hrs) 226. Why you want a Linux Live CD. (4 hrs) 227. Use Ubuntu Live CD to Backup Files from Your Dead Windows Computer. (4 hrs) 228. Using a live CD as your Linux Desktop. (4 hrs) **Outlook Configure & Backup** 229. Configure outlook. (1 hr) 230. Backup and Restore Outlook. (1 hr) 231. How to restore the Outlook default installation, toolbars and settings. (1 hr) 232. Restore Deleted Items from an Outlook PST-file. (1 hr)	browser. • Introduction to UNIX/LINUX and its structure. • Files and Processes in Linux. • Directory structure of Linux O.S. • Outlook - Add and use contacts, Calendar basics, Recall and replace sent messages, Send automatic replies when you're out of the office, The ins and outs of BCC, Use Instant Search to find Calendar items, Use Instant Search to find contacts, Use Instant Search to find messages and text, Add holidays to your calendar, Create or delete a search folder, Import and export vCards to Outlook contacts, Make the switch to Outlook 2013, Reach out with contact groups (distribution lists), Send or delete an email stuck in your outbox, Take calendars to the next level, Track email with read receipts, Password protect your mailbox, Use rules to manage your email. (07 hrs.)
Professional Skill 50Hrs; Professional Knowledge 14 Hrs	Assemble and replace hardware components of Laptop PC.	**Laptop PCs** 233. Identification of laptop sections and connectors. (03 hrs) 234. Assembling and disassembling a Laptop. (08 hrs) 235. Checking of various parts of a laptop. (03 hrs) 236. Checking of batteries and adaptors. (02 hrs)	• Introduction of laptop and comparison of various Laptops. • Block diagram of laptop & description of all its sections. • Study of parts of a laptop. • Input system: Touchpad, Trackball, Track point, Docking station, Upgrade memory, hard disk, replacing battery,

		237. Replacing different parts of laptops. (8 hrs) 238. Upgrading RAM, HDD and other parts. (05 hrs) 239. Testing, fault finding and troubleshooting techniques. (05 hrs) 240. POST codes and their meaning, fixing of problems based on codes. (05 hrs) 241. Enabling support for SATA technology. Installation of OS using SATA technology drivers. (05 hrs) 242. Laptop troubleshooting. (03 hrs) 243. Latest Tools & Gadgets For Desktop/ Laptop Repairs. (03 hrs)	Configuring wireless internet in a laptop. • Latest Tools & Gadgets For Desktop/ Laptop Repairs. (14 hrs.)
Professional Skill 25Hrs; Professional Knowledge 07 Hrs	Replace/ install SMPS and troubleshoot its faults.	**SMPS** 244. Remove the SMPS from PC cabinet. Identify the types of output connectors of SMPS. (05 hrs) 245. Identify output voltages using colour coding. Measure voltage levels. Test power cable and fuse. (05 hrs) 246. Open and cleaning the cooling fan and other parts. (05 hrs) 247. Fix the SMPS inside the PC cabinet and test PC. (05 hrs) 248. Use of Debug Card Post Error & Code, SMPS Tester, PCI slot testing tool. (05 hrs)	• DC power source to PC. Need for SMPS. Specifications. Rating of SMPS based on type of motherboard and devices used. (AT/ ATX, Micro ATX, mini ATX). • Color coding adopted. Types of connectors used. Output voltage levels. Measuring technique. • Precautions to be taken while cleaning the internal area of SMPS. • Precautions to be taken while fixing the SMPS inside the cabinet. (07 hrs.)
Professional Skill 50Hrs; Professional	Familiarize and upgrade various components of Motherboard.	**Motherboard/ System board** 249. Remove the mother board from PC cabinet. Identify the main components on the	• Mother board function, types, Main components on the mother board and their interconnection. Functional

Knowledge 14 Hrs		motherboard. (3 hrs) 250. Identify the form factor of the mother board. (2 hrs) 251. Identify the chipset used. (2 hrs) 252. Identify the number of slots available for add-in cards (ISA, PCI, AGP). (2 hrs) 253. Identify the type of processor connector (slot/ socket/ dual). (2 hrs) 254. Identify the BIOSROM, make, version. (3 hrs) 255. Identify the jumper settings (if any) on the mother board. (2 hrs) 256. Identify the types of slots available for memory modules. (3 hrs) 257. Identify the connectors for Hard disk (IDE). (3 hrs) 258. Identify the connector for FDD. (2 hrs) 259. Identify the connector for COM1, Com2. (3 hrs) 260. Identify the connectors for PS/2. (3 hrs) 261. Identify the connectors for USB. (3 hrs) 262. Identify the connectors for Game port. (3 hrs) 263. Identify the connector for parallel port (Centronics). (3 hrs) 264. Identify the connector for Keyboard (in exclusively available). (3 hrs) 265. Identify the specifications of the Lithium battery. (3 hrs)	description of mother board, Specification and variation. Precautions to be taken before removing the mother board from PC cabinet. • Form factor of mother board. • Meaning and function of chips sets. Manufacturers, comparison, importance of quality chip set for performance of PC. • Bus standards-evolution, speed, latest trends (ISA, PCI, AGP, new trends). • Types of processor connectors, examples of latest processor connectors, number of pins. f) Function of BIOS, manufacturers of BIOS. • IDE ports available .Primary, secondary. Number of drives that can be connected. Methods of adding SCSI drives. • Details of FDD connector on mother board. • Facility for serial Communication ports on mother board. • Facility for PS/2 Communication ports on mother board. • Meaning and advantage of USB ports. Facility for USB Communication ports on mother board. • Facility for game ports on mother board. • Facility for parallel Communication port on mother

		266. Identify any other special component available on the mother board. (3 hrs) 267. Identify the connectors for front panel switches and display. (2 hrs)	board. • Type of connectors in which keyboards cab be used, old type full size DIN connector. • Need of Lithium battery. Its specifications. Replacement procedure. Effect of removing the battery from mother board. • Other special components available on mother boards such as integrated devices/ drivers.(14 hrs.)
Professional Skill 50Hrs; Professional Knowledge 14 Hrs	Recognize different types of memory devices, chips and its structure.	**Possible upgrading/ changing components on the mother board** 268. Replace the weak/ dead battery on the mother board. (5 hrs) 269. Replace/ upgrade RAM memory modules. (5 hrs) 270. Replacing/ upgrading Processor. (5 hrs) 271. Carryout Jumper setting on mother board. (5 hrs) 272. Changing CMOS set-up and setting system level password. (5 hrs)	• Effect of weak/ dead battery on PC performance. Identifying weak/ dead battery. Precautions to be taken before replacing the battery. Setting to be done after replacing the battery. • Organization of RAM, types of RAM's, Module types, pins, replacement procedure and precautions. Compatibility of memory modules to the motherboard. • Type of processors, generation, features, speed, popular manufacturers. Advantages and possibility of upgrading Processor of a PC. Motherboard/ Chipset/ speed/ connector/ power/other compatibility criteria for upgrading processor. • Precautions to be taken while removing and placing processor in sockets and slots. • Types of jumper settings on motherboard. Its functions and effects.

			• CMOS set-up features. Need and procedure for changing the CMOS set-up. Updating Flash BIOS. (07 hrs.)
		Memory 273. Identification of different types of memory devices. (8 hrs) 274. Identification of memory chips. (8 hrs) 275. Identification of SIMM and DIMM memory modules, number of pins, type. (9 hrs)	• Memory devices, types & principle of storing. Data organization 4 bit, 8 bit, word. • Semiconductor memories, RAM, ROM, PROM,EMPROM, EEPROM, Static and dynamic. • Example of memory chips, pin diagram, pin function of popularly used RAM, EPROM, and EEPROM Chips in PC's. (07 hrs.)
Industrial Visit/ Project Work **Broad Areas:** a) Disassemble a given Desktop / Laptop PC totally following the safety precautions. b) Reassemble the Desktop / Laptop PC and test for its satisfactory performance. c) Install Operating System and necessary driver, taking backup and restore system. d) Rectify a defective system and make it as smooth working system. e) Troubleshoot / Repair /Replace an SMPS/RAM. f) Check Hard disk error, partition, format different types of Hard disk drives.			

SYLLABUS FOR INFORMATION & COMMUNICATION TECHNOLOGY SYSTEM MAINTENANCE TRADE			
SECOND YEAR			
Duration	**Reference Learning Outcome**	**Professional Skills (Trade Practical) with Indicative hrs.**	**Professional Knowledge (Trade Theory)**
Professional Skill 25Hrs; Professional Knowledge 09 Hrs	Install and customize Linux operating system.	**Linux operating system** 276. Installing UNIX/ LINUX. (05 hrs) 277. Preparing functional system UNIX/ LINUX. (05 hrs) 278. Adding new users, software, material components. (05 hrs) 279. Making back-up copies of the index and files. (05 hrs) 280. Dealing with the files and indexes. (05hrs)	• Basic Linux commands. • Linux file system, The Shell, Users and file permissions, VI editor, X window system, Filter Commands, Processes, Shell Scripting. (09 hrs.)
Professional Skill 100Hrs; Professional Knowledge 36 Hrs	Install Printer, Scanner and troubleshoot their faults.	**Printers & Plotters** 281. Testing front panel controls. Interface pins, cables, measurement of voltages and waveforms. (2 hrs) 282. Installing a printer and carrying self- test. (2 hrs) 283. Replacing ribbon in a DMP. (1 hr) 284. Refilling ribbon tape of DMP. (2 hrs) 285. Testing and rectifying defective cable. (2 hrs) 286. Removing and cleaning printer head. (1 hr) 287. Replacing a new printer head. (2 hrs) 288. Testing and servicing Printer power supply. (2 hrs) 289. Changing rollers and other	• Types of printers, Dot Matrix printer's laser printer, Ink jet printer, line printer. Block diagram and function of each unit head assembly, carriage, and paper feed mechanism. Front panel controls and interfaces. Pin details of interface port. • Installation of a printer driver. And self-test. • Ribbon types used. • Refilling of ribbons. • Printer cable testing defects, effect and servicing. • Printer head, types, cleaning procedures. • Precaution to be taken while removing and replacing printer

		mechanical parts. (2 hrs) 290. Tracing the control board and identifying defective components. Servicing of control board. (2 hrs) 291. Replacement of toner cartridge of laser printers. (2 hrs) 292. Refilling toner cartridge of laser printers. (2 hrs) 293. Drum cleaning and replacement in of laser printers. (2 hrs) 294. Testing and servicing Printer power supply of laser printers. (2 hrs) 295. Changing mechanical parts of laser printers. (2 hrs) 296. Tracing the control board circuit and identifying defective components. Servicing of control board of laser printers. (2 hrs) 297. Replacement of ink cartridge of desk jet/ inkjet printers. (2 hrs) 298. Refilling ink cartridge of desk jet/ inkjet printers. (2 hrs) 299. Drum cleaning and replacement in desk jet/ inkjet printers. (2 hrs) 300. Testing and servicing Printer power supply of desk jet/inkjet printers. (2 hrs) 301. Changing mechanical parts of desk jet/inkjet printers. (2 hrs) 302. Tracing the control board and identifying defective components. Servicing of	head assembly. • Pinter power supply, circuit analysis, defects, servicing. Circuit, function, probable defects, servicing. • Carriage motor assembly, paper feed assembly, sensors. Procedure for dismantling and replacing mechanical parts. • Printer control board, circuit, function, probable defects, servicing. • Working principle of LASER printer. • Toner cartridge, types, replacing toner cartridges • Refilling toner cartridges, equipment available for refilling and procedure. • Printer drum, function, cleaning and replacing procedure. • Power supply in laser printers, circuit, defects, servicing. • Mechanical parts and sensors on laser printer, function, replacement procedure. • Control board(s) in laser printer, circuit diagram, defects and servicing procedure. • Working principle of Inkjet/ Deskjet printers. Type of ink used and replacement of ink cartridge. • Refilling of ink, equipment available, quality of refilled cartridges. • Printer drum, function, cleaning and replacing procedure.

		control board of deskjet/ inkjet printers. (2 hrs) 303. Connecting and using high speed line printers. (2 hrs) 304. Replacing spares of line printers. (2 hrs) 305. Self-test procedures in printers. (2 hrs) 306. Use of diagnostics software for serving printers. (2 hrs)	• Power supply in inkjet printers, circuit, defects, servicing. • Mechanical parts and sensors on inkjet printer, function. • Working principle of Plotter and its common faults. (18 hrs.)
		Scanner & MFD 307. Scanner - Installation, configuration, using Automatic Document Feeder (ADF), OCR. (6 hrs) 308. Barcode Scanner - Installation and configuration. (6 hrs) 309. Network Scanner - Installation and configuration. (6 hrs) 310. Troubleshooting of Scanner. (6 hrs) 311. Multifunction Printer - Installation, Replacing supplies and spares, troubleshooting. (8 hrs) 312. Passbook Printer - Installation, calibration, configuration & troubleshooting. Replacement of Supplies and maintenance. (6 hrs) 313. Network Printer – Installation and configuration, troubleshooting. (6 hrs) 314. How to update the flash of Motherboard, printer, scanner and modem etc. (6 hrs)	• Working principles of Network Scanner. • Working principles of Multifunction Printer. • Working principles of Passbook printer. • Working principles of High Speed Printer. • Working principles of Line Printer. • Working principles of Network Printer. • Working principles of Print Server. (18 hrs.)
Professional	Install/Replace	**Monitor, Display Card and Driver**	• Types of monitor, Monochrome

Skill 50 Hrs; Professional Knowledge 18 Hrs	Display Driver Card, perform servicing and configure various display unit.	315. Identify the type of monitor connected to PC. Specifications, front panel controls and settings. (6 hrs) 316. Identify the specifications of the display driver card installed in the PC. (6 hrs) 317. Remove the display driver card and identify the main components and connectors on the display driver card. (6 hrs) 318. Replace the display driver card and re-install. (before practicing this skill set, the already installed driver should be removed from device manager). (6 hrs) 319. Change the exiting display card with a different card given and install. (6 hrs) 320. Servicing of monitors, changing fuses, adjusting colors, brightness and contrast. Setting resolution, loading drivers. Checking and replacing components on the PCB. Checking and adjusting LCD Monitors. (8 hrs) 321. Install, configure and operate LCD Projector. (6 hrs) 322. Install and Configure Touch Pad. (6 hrs)	and color, CGA, EGA, VGA, SVGA, Digital Analogue, interlaced non-interlaced. Specifications and Comparison of Monitors. Front panel controls brightness, contrast, and horizontal and vertical height settings. • Display cards, bus standards, types CGA, EGA VGA, SVGA, AGP, memory and drivers. •

Skill 50 Hrs; Professional Knowledge 18 Hrs	Sound Card and set properties to adjust sound quality.	323. Identify the specifications of the installed sound card in the PC. (6 hrs) 324. Identify and adjust the playback and recording properties of sound card/ driver. (6 hrs) 325. Remove the sound card from PC and identify the main components on the card. (6 hrs) 326. Replace the card and reinstall the sound card and set properties. (7 hrs) 327. Change the existing sound card with a different card given and install. (6 hrs) 328. Connect the speaker and microphone, adjust the controls for better quality sound and testing. (7 hrs) 329. Interconnect laptop to a multimedia projector and carryout adjustments. (6 hrs) 330. Replace battery pack in laptops and carryout general maintenance. (6 hrs)	16/32 bit stereo moNo. • Frequency response, sound files format, compression and decompression. • Principle of working and functional units of sound card. • Installation procedure of sound cards. Setting playback and recording features. • Main components on a sound card and its working. • Properties and specification of sound cards. • Information and resources required before installation of sound card. • Type of speaker and microphone, frequency response, control adjustments, cable and connectors of speaker. • Laptops, advantages, essential difference in construction, additional features, PCMCIA cards. • General maintenance procedures and replacement of battery. (18 hrs.)
Professional Skill 50 Hrs; Professional Knowledge 18 Hrs	Perform maintenance and servicing of UPS.	**UPS** 331. Identify the specifications of UPS. (6 hrs) 332. Switch-on and Switch-off procedure of UPS. (6 hrs) 333. Measurement of Input/ output voltage/ current levels, battery charge level. (6 hrs) 334. Identifying status of UPS from front panel indicators. (6 hrs)	• Study of typical working UPS circuit, explanation of each stage involved. Voltage, current, frequency and KVA specifications. • Controls of different type of UPS: On-line, Off- line, Line interactive etc. • Typical circuit blocks. • Routine maintenance of battery

		335. Carryout routine maintenance of battery, battery terminals, loose contacts etc. (6 hrs) 336. Test UPS as per specification. Verification of back-up time. (6 hrs) 337. Circuit tracing and fault finding practice. (6 hrs) 338. Servicing of UPS by simulating more likely faults and systematic approach to identify and rectify them. (8 hrs)	and UPS. • Back-up time, its dependence on battery, load and its calculations. • Possible problems in UPS, fault finding procedures. • Simulated faults and serving of UPS. (18 hrs.)
Professional Skill 25Hrs; Professional Knowledge 09Hrs	Install and configure Modem, System Resources, Add on Cards, Cables & Connectors.	**Modem** 339. Installation and configuration of different types of Modem e.g. DSL, ADSL, Data Card, Dongle etc. (08 hrs) **System Resources** 340. Practice on setting IRQ, DMA, Memory Address, I/O address, Resource Conflict, Plug & Play. (08 hrs) **Practice on Add on Cards, Cables & Connectors** 341. AGP, PCI Express, TV Tuner Card, DVR card, Video Capture, SCSI. USB, NIC, Fire wire, Card reader, network storage, Game video card, Camera etc. (09 hrs)	• Modem Fundamentals. • Band width, baud rate, wireless communication, synchronous/ asynchronous transmission. • IRQ, DMA, Memory Address, I/O address, Resource Conflict, Plug & Play Concept. • Different latest Add on Cards - (Identification in terms of I/O slot and connectors). (09 hrs.)
Professional Skill 125Hrs; Professional Knowledge 45Hrs	Upgrade, maintain and troubleshoot PC.	**POST Code** 342. Rectify the serial, parallel and USB problem by reinsertion or replacement. (3 hrs) 343. Rectify the printer's problem by reinsertion or replacement. (3 hrs)	• Recognize POST error message code as an indication of a serial, parallel and USB problem. • Recognize POST error message code as an indication of a printer's problem. • Recognize POST error message

		344. Rectify the MODEM problem by reinsertion or replacement. (3 hrs) 345. Rectify the windows start-up problem by reinsertion or replacement. (4 hrs) 346. Rectify the illegal operational problem by reinsertion or replacement. (3 hrs) 347. Rectify the virus protection utility problem by reinsertion or replacement. (3 hrs) 348. Rectify the networks problem by reinsertion or replacement. (3 hrs) 349. Rectify the external devises problem by reinsertion or replacement. (3 hrs)	code as an indication of a MODEM problem. • Recognize POST error message code as an indication of a windows start-up problem. • Recognize POST error message code as an indication of an illegal operational problem. • Recognize POST error message code as an indication of a virus protection utility problem. • Recognize POST error message code as an indication of a networks problem. • Recognize POST error message code as an indication of an external devises problem. (09 hrs.)
		Upgrading of System 350. Mother board, Memory, CPU, Graphic Card, BIOS up-gradation, Additional features, Updating of System Software & Application Software (Requirement & How to update). (30 hrs) **Practice on Backup Drives** 351. Pen Drive U3 format, Zip Drive, Tape Drive, USB External Drive (HDD, CD/ DVD writer), Types, capacity, interface connector, write protection, Troubleshooting, Interface, Installation, casing for external drive. (20 hrs)	• Understand the limitation of a PC and scope for upgrading. • Understand technical specifications for PC upgrading. • Introduction to removable storage devices, Bulk data storage devices magnetic, optical, magneto optical drives, WORM drives. • Minor repairs and maintenance of CD ROM drives. • Technology, working principle, capacity, and media of ZIP drives. • Important parts and functions of a ZIP drive. • Minor repairs and maintenance of ZIP drive. • Important parts and functions of DAT drive.

			• Minor repairs and maintenance of DAT drive. • Important parts and functions of DVD ROM drive. • Minor repair works on a DVD ROM drive. • Minor repair works on a CD WRITER. • Technology, working principle, capacity, and media of Magneto-Optical Disk (MOD) drives. Applications. • Important parts and functions of MOD drive. • Minor repair works on MOD. • Latest trends in backup devices/ media. (18 hrs.)
		Maintenance and Troubleshooting of PC 352. Running diagnostics program to identify the health and defects of a PC. Check system performance using third party utilities. Use benchmarking utilities to benchmark systems. (3 hrs) 353. Identify the defect in PC from the audible and observable symptoms such as beep sounds, post messages. Hanged keyboard, erratic display etc., and corrective action. (3 hrs) 354. Tracing the circuit of a KB. (3 hrs) 355. Troubleshooting defects related to Keyboard and its related ports loose	• Safety precautions in handling PC, sub-assemblies and components, Important points to be considered while purchasing and replacing components. Concept of Preventive and corrective maintenance. Tools required, Active & Passive Maintenance, Maintenance scheduling. Need of diagnostics program. Features, limitations. Examples of commonly used diagnostic programs. • Probable defects in PC. Localizing faults through its observable visual or audio symptoms and possible methods for rectification/ servicing. Understanding serviceability of component. Economy in repair/

		connections, replacing cable, replacing keys (DIN, PS/2, USB). (3 hrs) 356. Trouble shooting defects related to Mouse and its related ports loose connections, replacing cable, replacing roller and sensing elements. (COM, PS/2, USB). (3 hrs) 357. Study of interface cable connector, replacing of subassemblies of Light pen, scanner, digitizer. (3 hrs) 358. Troubleshooting defects related to HDD, (practice of replacing motor, head, PCB among faulty drives) cable and connector. (4 hrs) 359. Troubleshooting defects related to CD ROM Drive, Attempting for replacement and adjustments) cable and connector. (4 hrs) 360. Troubleshooting defects related Ports to Jumper setting. (4 hrs) 361. Troubleshooting defects related to Processor. (4 hrs) 362. Troubleshooting defects related to RAM memory modules. (4 hrs) 363. Troubleshooting defects related BIOS. (4 hrs) 364. Troubleshooting defects related to CMOS setup. (4 hrs) 365. Troubleshooting defects related to Battery. (4 hrs)	replacement. • Block diagram of a KB, function of controller, LED driver Sample circuit. • Defects related to Keyboard and its related ports (DIN, PS/2, USB) Discontinuity in cable, and bad keys. Servicing procedure. • Defects related to Mouse and its related ports (COM, PS/2, USB) and servicing procedure. • Working principle, electro mechanical circuits of Light pen scanner and digitizer. • Defects and symptoms related to HDD and its cable, connector and servicing procedure. • Defects related to CD ROM Drive jamming of mechanical assembly mal function of control circuit, and its cable, connector and servicing procedure. • Defects related to Ports jumper setting on motherboard and servicing procedure. • Defects related to processor, its socket, cooling and servicing procedure. • Defects related to RAM memory module connector and servicing procedure. • Defects related to BIOS, upgrading and servicing procedure. • Defects related to CMOS, COMS setup and servicing procedure. • Defects related to battery and servicing procedure. (18hrs.)

Professional Skill 50 Hrs; Professional Knowledge 18 Hrs	Assemble, replace and troubleshoot various parts of Tablet/ Smart Devices.	**Tablet/ Smart Devices** 366. Assembling & disassembling of different types of tablets/ Smart Devices. (5 hrs) 367. Testing of various parts with multimeter. (4 hrs) 368. Replacing of faulty parts. (4 hrs) 369. Fault finding & troubleshooting. (4 hrs) 370. Practice Advanced troubleshooting techniques. (5 hrs) 371. Flashing of various brands of tablets/ smart devices. (4 hrs) 372. Upgrading operating systems. (4 hrs) 373. Formatting of virus affected devices. (4 hrs) 374. Unlocking of handsets through codes and software. (4 hrs) 375. Troubleshooting settings faults. (4 hrs) 376. Working with iOS, Android, Ice-cream sandwich, Jellybeans. (4 hrs) 377. Installation of Phone Gap framework. (4 hrs)	• Circuit Board/ Motherboard Introduction. • Study of parts of a tablet PC/ smart devices. • Testing of various parts with multimeter. • Steps of repairing various hardware problems. • Advanced troubleshooting techniques. • Introduction of various software faults. • Flashing of various brands of tablets / smart devices. • Upgrading operating systems. • Locking &Unlocking of handsets. • Concept of iOS, Android, Ice-cream sandwich, jellybeans. • Concept of Phone Gap. (18 hrs.)
Professional Skill 25Hrs; Professional Knowledge 09 Hrs	Browse internet and work with Cloud Computing.	**Internet and Web Browser** 378. Practice web browsing using popular web browsing software, Configuring web browser. (1 hr) 379. Search for content using popular search engines. (1 hr) 380. Use favourite folder for browsing quickly. (2 hrs) 381. Downloading & Printing	*Internet and Web Browser* • World wide web and website. • Web Browsing and popular web browsing software. • Introduction to Search Engines, Popular Search engines. • Concept of Favorites Folder. • What is an Electronic Mail? • Email Addressing, BCC and CC, Inbox, Outbox, Address book,

		Webpages. (2 hrs) 382. Using e-mail – Opening & configuring email client, mailbox: inbox and outbox, Creating and sending e-mail, Replying to an e-mail message, Forwarding and e-mail message, Sorting and searching emails. (2 hrs) 383. Sending document/ softcopy by email, activating spell checking, using address book, Handling SPAM, Removal of Cookies. (2 hrs) **Cloud Computing** 384. Work with Cloud services. (15 hrs)	SPAM. *Cloud Computing* • Introduction to Cloud Computing, how to access Cloud service providers & to create an account. *IT Act & Law* • Introduction to Cyber Security. • Introduction to Cyber Laws & IT Act. • Importance of privacy and techniques to manage it. (09 hrs.)
Professional Skill 200Hrs; Professional Knowledge 72 Hrs	Set up and configure Networking System using various network devices.	**Components of the Computer Network** 385. Familiarization with various Network devices, Connectors and Cables. (10 hrs) 386. Understanding the Layout of network. (15 hrs)	• Introduction to Computer Networks – Advantages of Networking, Peer-to-Peer and Client/Server Network. • Network Topologies – Star, Ring, Bus, Tree, Mesh, Hybrid. • Type of Networks – Local Area Networks (LAN), Metropolitan Area Networks (MAN), Wide Area Networks (WAN). • Internet, Ethernet, Wi-Fi, Bluetooth, Mobile Networking, Wire and wireless Networking. • Difference between Intranet and Internet. (09 hrs.)
		Crimping & Punching 387. Crimping practice with straight and cross CAT 5 cables. (15 hrs) 388. Punching practice in IO Box and patch panel. (15 hrs) 389. Crimping and making cables. (20	• Communication Media & Connectors – Unshielded twisted-pair (UTP), shielded twisted-pair (STP), Fiber Optics and coaxial cable: RJ-45, RJ-11, BNC.

		hrs)	• Understanding color codes of CAT5 cable. 568A and 568B convention. (18 hrs.)
		Cabling 390. Create cabling in a lab with HUB/ Switch and IO Boxes and patch panel. (20 hrs) 391. Fitting Switch Rack. (5 hrs)	• Introduction to Data Communication – Analog and Digital Signals, Simplex, Half-Duplex and Full-Duplex transmission mode. (09 hrs.)
		Install & configure a Network 392. Installing & Configuring a Peer-to-Peer Network using Windows Software. (15 hrs) 393. Making cables by crimping. (5 hrs) 394. Connect computers using Bluetooth. (5 hrs)	• OSI Model - The functions of different layers in OSI model. (09 hrs.)
		Configuration of Data communication equipments 395. Connecting computers with Network with Drop cable and using Wi-Fi configuration. (08hrs) 396. Basic Programmable switch Configuration Spanning Tree Protocol (STP). (07hrs) 397. Command Line Interface. (05hrs) 398. IP Routing Process. (03hrs) 399. Verifying Configuration. (02hrs)	• Network Components – Modems, Firewall, Hubs, Bridges, Routers, Gateways, Repeaters, Transceivers, Switches, Access point, etc. – their types, functions, advantages and applications. • IP Routing in Network RIP IGRP (09 hrs.)
		IP Addressing & TCP/ IP 400. IP addressing technique (IP4/ IP6) and Subnetting and Supernetting the network. (6 hrs) 401. Installation and Configuration of TCP/ IP Protocol. (6 hrs) 402. Practice TCP/ IP Utilities: PING, IPCONFIG, HOSTNAME, ROUTE, TRACERT etc. (6 hrs)	• Protocols, TCP/IP, FTP, Telnet etc. • Theory on Setting IP Address(IP4/ IP6) & Subnet Mask, Classes of IP Addressing. • Overview of Virtual LAN. • VLAN Memberships. • Identifying VLAN. • Trunking - VLAN Trunk Protocol

		403. Setup and configure a Virtual LAN. (7 hrs)	(VTP). • Concept of Translator Gateways. (09 hrs.)
		Other Network Protocols 404. Working with SMTP, TELNET, FTP, HTTP, SNMP, LDAP etc. (15 hrs) 405. Practice on configuring DHCP. (10 hrs)	• Simple Mail Transfer Protocol (SMTP), Telnet, File Transfer Protocol (FTP), Hyper Text Transfer Protocol (HTTP), Simple Network Management Protocol (SNMP). • LDAP (Lightweight Directory Access Protocol). • Network Security. Concept of Dynamic Host Control Protocol. (09 hrs.)
Professional Skill 25Hrs; Professional Knowledge 09 Hrs	Share and control resource and Internet connection through network.	**Sharing Resource & Internet connection** 406. Sharing Resource and Advance Sharing Setting. (5 hrs) 407. Installing Proxy Server. (5 hrs) 408. Exposure and using Internet. Setting E-mail accounts. Conferencing. (5 hrs) 409. Installing and Configuring Internet. (5 hrs) 410. Connection on a PC using Broadband or Dongle. (5 hrs)	• Concept of Internet. • Architecture of Internet. • DNS Server. • Internet Access Techniques, ISPs and examples (Broadband/ Dialup/ WiFi). • Concept of Social Networking Sites, Video Calling & Conferencing. Concept of Virus and its Protection using Anti-Virus, UTM and Firewall. (09 hrs.)
Professional Skill 25Hrs; Professional Knowledge 09 Hrs	Implement Network Security to protect from various attacks on networking.	**Network Protection and troubleshooting** 411. Setting up basic protection using public keys and MAC address filters. (10 hrs) 412. Integrate wired with wireless network. (5 hrs) 413. Power over Ethernet (PoE). (5 hrs) 414. Troubleshooting wired and	• Collaborating using wired and wireless networks, Protecting a Network, Network performance study and enhancement. (09 hrs.)