COMPUTER HARDWARE & NETWORKING MAINTENANCE

NSQF LEVEL- 4.5

SECTOR - IT & ITeS

COMPETENCY BASED CURRICULUM

CRAFT INSTRUCTOR TRAINING SCHEME (CITS)

GOVERNMENT OF INDIA
Ministry of Skill Development & Entrepreneurship
Directorate General of Training
CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE
EN-81, Sector-V, Salt Lake City, Kolkata – 700091

COMPUTER HARDWARE & NETWORKING MAINTENANCE

Also Applicable for "Information and Communication Technology System Maintenance" Trade

(Non - Engineering Trade)

SECTOR – IT & ITeS

(Revised in 2023)

Version 2.0

CRAFT INSTRUCTOR TRAINING SCHEME (CITS)

NSQF LEVEL - 5

Developed By
Government of India
Ministry of Skill Development and Entrepreneurship

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CONTENTS

1. COURSE OVERVIEW

The Craft Instructor Training Scheme is operational since inception of the Craftsmen Training Scheme. The first Craft Instructor Training Institute was established in 1948. Subsequently, 6 more institutes namely, Central Training Institute for Instructors (now called as National Skill Training Institute (NSTI), NSTI at Ludhiana, Kanpur, Howrah, Mumbai, Chennai and Hyderabad were established in 1960 by DGT. Since then the CITS course is successfully running in all the NSTIs across India as well as in DGT affiliated institutes viz. Institutes for Training of Trainers (IToT). This is a competency based course for instructors of one year duration. "Computer Hardware & Networking Maintenance" CITS trade is applicable for Instructors of "Computer Hardware & Networking Maintenance" and "Information and Communication Technology System Maintenance" CTS Trades.

The main objective of Crafts Instructor training programme is to enable Instructors explore different aspects of the techniques in pedagogy and transferring of hands-on skills so as to develop a pool of skilled manpower for industries, also leading to their career growth & benefiting society at large. Thus promoting a holistic learning experience where trainee acquires specialized knowledge, skills & develops attitude towards learning & contributing in vocational training ecosystem.

This course also enables the instructors to develop instructional skills for mentoring the trainees, engaging all trainees in learning process and managing effective utilization of resources. It emphasizes on the importance of collaborative learning & innovative ways of doing things. All trainees will be able to understand and interpret the course content in right perspective, so that they are engaged in & empowered by their learning experiences and above all, ensure quality delivery.

2. TRAINING SYSTEM

2.1 GENERAL

CITS courses are delivered in National Skill Training Institutes (NSTIs) & DGT affiliated institutes viz., Institutes for Training of Trainers (ITOT). For detailed guidelines regarding admission on CITS, instructions issued by DGT from time to time are to be observed. Further complete admission details are made available on NIMI web portal http://www.nimionlineadmission.in. The course is of one-year duration. It consists of Trade Technology (Professional skills and Professional knowledge), Training Methodology and Engineering Technology/ Soft skills. After successful completion of the training programme, the trainees appear in All India Trade Test for Craft Instructor. The successful trainee is awarded NCIC certificate by DGT.

2.2 COURSE STRUCTURE

Table below depicts the distribution of training hours across various course elements during a period of one year:

S No.	Course Element	Notional Training Hours
1.	**Trade Technology**	
	Professional Skill (Trade Practical)	480
	Professional Knowledge (Trade Theory)	270
2.	**Training Methodology**	
	TM Practical	270
	TM Theory	180
	Total	**1200**

Every year 150 hours of mandatory OJT (On the Job Training) at nearby industry, wherever not available then group project is mandatory.

3	On the Job Training (OJT)/ Group Project	150
4	Optional Course	240

Trainees can also opt for optional courses of 240 hours duration.

2.3 PROGRESSION PATHWAYS

- Can join as an Instructor in a Vocation Training Institutes/ technical Institution.
- Can join as a supervisor in Industries.

2.4 ASSESSMENT & CERTIFICATION

The CITS trainee will be assessed for his/her Instructional skills, knowledge and attitude towards learning throughout the course span and also at the end of the training program.

a) The Continuous Assessment (Internal) during the period of training will be done by **Formative Assessment Method** to test competency of instructor with respect to assessment criteria set against each learning outcomes. The training institute has to maintain an individual trainee portfolio in line with assessment guidelines. The marks of internal assessment will be as per the formative assessment template provided on www.bharatskills.gov.in.

b) The **Final Assessment** will be in the form of **Summative Assessment Method**. The All India Trade Test for awarding National Craft Instructor Certificate will be conducted by DGT at the end of the year as per the guidelines of DGT. The learning outcome and assessment criteria will be the basis for setting question papers for final assessment**.** The external examiner during final examination will also check the individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS CRITERIA

Allotment of Marks among the subjects for Examination:

The minimum pass percent for Trade Practical, TM Practical, Soft Skill Practical Examinations and Formative assessment is 60% & for all other subjects is 40%. There will be no Grace marks.

2.4.2 ASSESSMENT GUIDELINE

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while undertaking the assessment. While assessing, the major factors to be considered are approaches to generate solutions to specific problems by involving standard/non-standard practices.

Due consideration should also be given while assessing for teamwork, avoidance/reduction of scrap/wastage and disposal of scrap/waste as per procedure, behavioral attitude, sensitivity to the environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency.

Assessment will be evidence based comprising of the following:

- Demonstration of Instructional Skills (Lesson Plan, Demonstration Plan)

- Record book/daily diary
- Assessment Sheet
- Progress chart
- Video Recording
- Attendance and punctuality
- Viva-voce
- Practical work done/Models
- Assignments
- Project work

Evidences and records of internal (Formative) assessments are to be preserved until forthcoming examination for audit and verification by examining body. The following marking pattern to be adopted while assessing:

Performance Level	Evidence
(a) Weightage in the range of 60%-75% to be allotted during assessment	
For performance in this grade, the candidate should be well versed with instructional design, implement learning programme and assess learners which demonstrates attainment of an ***acceptable standard*** of crafts instructorship with ***occasional*** **guidance** and engage students by demonstrating good attributes of a trainer.	• Demonstration of ***fairly good*** skill to establish a rapport with audience, presentation in orderly manner and establish as an expert in the field. • Average engagement of students for learning and achievement of goals while undertaking the training on specific topic. • A fairly good level of competency in expressing each concept in terms the student can relate, draw analogy and summarize the entire lesson. • Occasional support in imparting effective training.
(b) Weightage in the range of 75%-90% to be allotted during assessment	
For performance in this grade, the candidate should be well versed with instructional design, implement learning programme and assess learners which demonstrates attainment of a ***reasonable standard*** of crafts instructorship with ***little*** **guidance** and engage students by demonstrating good attributes of a trainer.	• Demonstration of ***good*** skill to establish a rapport with audience, presentation in orderly manner and establish as an expert in the field. • Above average in engagement of students for learning and achievement of goals while undertaking the training on specific topic. • A good level of competency in

	expressing each concept in terms the student can relate, draw analogy and summarize the entire lesson. • Little support in imparting effective training.
(c) Weightage in the range of more than 90% to be allotted during assessment	
For performance in this grade, the candidate should be well versed with instructional design, implement learning programme and assess learners which demonstrates attainment of a ***high standard*** of crafts instructorship with ***minimal or no support*** and engage students by demonstrating good attributes of a trainer.	• Demonstration of ***high*** skill level to establish a rapport with audience, presentation in orderly manner and establish as an expert in the field. • Good engagement of students for learning and achievement of goals while undertaking the training on specific topic. • A high level of competency in expressing each concept in terms the student can relate, draw analogy and summarize the entire lesson. • Minimal or no support in imparting effective training.

3. GENERAL INFORMATION

Name of the Trade	**Computer Hardware & Networking Maintenance - CITS**
Trade code	DGT/4034
NCO – 2015	2356.0100, 2523.0200 ,2523.0100, 7422.2001
NOS Covered	SSC/N9441, SSC/N9442, SSC/N9443, SSC/N9450, SSC/N9469, SSC/N9479, SSC/N9480, SSC/N9481, MEP/N9446
NSQF Level	Level-5
Duration of Craft Instructor Training	One Year
Unit Strength (No. Of Student)	25
Entry Qualification	Degree in Computer Science / IT/Electronics Engineering or NIELIT "B" from recognized Board/ University. OR 03 years Diploma in Computer Science / IT/Electronics Engineering after class 10th from AICTE/ recognized board of technical education. OR 10th Class with 01-year NTC/NAC in CHNM or related trades + 02 year of relevant experience. OR Ex-serviceman from Indian armed force with 15 years of service in related field as per equivalency through DGR
Minimum Age	18 years as on first day of academic session.
Space Norms	84 Sq. m
Power Norms	3.45 KW
Instructors Qualification for	
1. Computer Hardware & Networking Maintenance - CITS Trade	B.Voc/ Degree in appropriate branches of Computer Science / IT/ Electronics Engineering from AICTE/ UGC recognized University, or NIELIT "B" with two years experience in relevant field. **OR** Diploma (Minimum 2 Years) in appropriate branches of Computer Science / IT/ Electronics Engineering recognized Board/ University or relevant Advanced Diploma (Vocational) from DGT with five years experience in relevant field. **OR** Ex-serviceman from Indian Armed forces with 15 years of service in related field as per equivalency through DGR. candidate should have undergone methods of instruction course or minimum 02 years of experience in technical training institute of Indian Armed forces.

	OR NTC/ NAC passed in CHNM trade with seven years experience in relevant field. **Essential Qualification:** National Craft Instructor Certificate (NCIC) in CHNM trade, in any of the variants under DGT.
2. Soft skills	MBA/ BBA / Any Graduate/ Diploma in any discipline from AICTE/ UGC recognized College/ university with Three years' experience and short term ToT Course in Soft Skills from DGT institutes. (Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above).
3. Training Methodology	B.Voc/ Degree in any discipline from AICTE/ UGC recognized College/ university with two years experience in training/ teaching field. **OR** Diploma in any discipline from recognized board / University with five years experience in training/teaching field. **OR** NTC/ NAC passed in any trade with seven years experience in training/ teaching field. **Essential Qualification:** National Craft Instructor Certificate (NCIC) in any of the variants under DGT / B.Ed /ToT from NITTTR or equivalent.
4. Minimum Age for Instructor	21 Years

4. JOB ROLE

Brief description of job roles:

Manual Training Teacher/Craft Instructor; instructs students in ITIs/Vocational Training Institutes in respective trades as per defined job role. Imparts theoretical instructions for the use of tools & equipment of related trades and related subjects. Demonstrate process and operations related to the trade in the workshop; supervises, assesses and evaluates students in their practical work. Ensures availability & proper functioning of equipment and tools in stores.

Computer System Hardware Analyst/Hardware Engineer; analyses data processing requirements to plan data processing systems that provide system capabilities required for projected workloads and plans layout and installation of new system or modification of existing system. Confers with Data Processing and Project Managers to obtain information on limitations and capabilities of existing system and capabilities required for data processing projects and projected work load. Evaluates factors such as number of departments serviced by data processing equipment, reporting formats required, volume of transactions, time requirements and cost constraints, and need for security and access restrictions to determine hardware configurations. Analyses information to determine, recommend, and plan layout for type of computers and peripheral equipment, or modifications to existing equipment and system, that will provide capability for proposed project or work load, efficient operation, and effective use of allotted space. May enter data into computer terminal to store, retrieve, and manipulate data for analysis of system capabilities and requirements. May specify power supply requirements and configuration. May recommend purchase of equipment to control dust, temperature, and humidity in area of system installation. May specialize in one area of system application or in one type or make of equipment. May train users to use new or modified equipment. May monitor functioning of equipment to ensure system operates in conformance with specifications.

Data Communication Analyst/Network Administrator; researches, tests, evaluates, and recommends data communications hardware and software: Identifies areas of operation which need upgraded equipment, such as modems, fibre optic cables and telephone wires. Conducts survey to determine user needs. Reads technical manuals and brochures to determine equipment which meets establishment requirements. Visits vendors to learn about available products or services. Tests and evaluates hardware and software to determine efficiency, reliability, and compatibility with existing system, using equipment such as computer terminal and modem. Analyses test data and recommends hardware or software for purchase. Develops and writes procedures for installation, use, and solving problems of communications hardware and software. Monitors system performance. Trains users in use of equipment. Assists users to identify and solve data communication problems. May write technical specifications to send to vendors for bid. May oversee or assist in the installation of communications hardware. May perform minor equipment repairs.

Field Technician (Computing and Peripherals); is also called 'Service Technician', the Field Technician provides after sale support services to customers, typically, at their premises. The individual at work is responsible for attending to customer complaints, installing newly purchased products, troubleshooting system problems and configuring peripherals such as printers, scanners and network devices.

Reference NCO-2015: -

a) 2356.0100 – Manual Training Teacher/ Craft Instructor
b) 2523.0200 – Computer System Hardware Analyst/Hardware Engineer
c) 2523.0100 – Data Communication Analyst/Network Administrator
d) 7422.2001 – Field Technician, Computing and Peripherals

Reference NOS :

I. SSC/N9441
II. SSC/N9442
III. SSC/N9443
IV. SSC/N9450
V. SSC/N9469
VI. SSC/N9479
VII. SSC/N9480
VIII. SSC/N9481
IX. MEP/N9446

5. LEARNING OUTCOMES

Learning outcomes are a reflection of total competencies of a trainee and assessment will be carried out as per the assessment criteria.

5.1 LEARNING OUTCOMES (TRADE TECHNOLOGY)

1. Demonstrate implementation of safe working practices, environment regulation, and housekeeping. (NOS: SSC/N9441)
2. Demonstrate testing and troubleshooting for power supplies in I/O devices and trace circuit of PC SMPS. (NOS: SSC/N9442)
3. Evaluate identification of faults, troubleshooting and maintenance of PC, laptop, Printers & Plotters, Scanner & MFD, Monitor, display card and driver. (NOS: SSC/N9443)
4. Assess upgrading of System software and Application Software in sequence with the external interface. (NOS: SSC/N9450)
5. Evaluate identification of faults, troubleshooting and maintenance of external devices, tablets / smart devices and UPS. (NOS: SSC/N9469)
6. Demonstrate networking Installation and Configuration of TCP/IP Protocol and set up of LAN. (NOS: SSC/N9479)
7. Assess set up of wired & wireless network protection system and their maintenance. (NOS: SSC/N9479)
8. Demonstrate the process of installation and configuration of DNS, routing and Remote access. (NOS: SSC/N9480)
9. Assess planning and implementation of AGDLP process and web server network security system. (NOS: SSC/N9480)
10. Demonstrate sequence of Linux server installation and configuration process. (NOS: (NOS: SSC/N9481)
11. Demonstrate implementation of firewall technologies for network security system and Wi-fi security considerations. (NOS: SSC/N9479)
12. Exhibit effective communication skills with logical reasoning ability and quantitative aptitude to maximize efficiency in work. (NOS: MEP/N9446)

6. COURSE CONTENT

SYLLABUS FOR COMPUTER HARDWARE & NETWORKING MAINTENANCE – CITS TRADE			
TRADE TECHNOLOGY			
Duration	**Reference Learning Outcome**	**Professional Skill (Trade Practical)**	**Professional Knowledge (Trade Theory)**
Practical 12 Hrs Theory 06 Hrs	Demonstrate implementation of safe working practices, environment regulation, and housekeeping.	SAFETY: 1. Ensure safety while lifting and shifting fragile and heavy equipment. 2. Check earthing and identify the type of earthing. 3. Ensure electrical safety while connecting, switching-on and switching-off of heavy electrical outlet points. 4. Provide first aid in case of physical injury. 5. Provide first aid in case of electrical hazard. 6. Handling e-wastage.	SAFETY: Practice of safety while lifting and shifting fragile and heavy equipment. Check earthing and identify the type of earthing. Practice electrical safety while connecting, switching-on and switching-off of heavy electrical outlet points. Practice first aid in case of physical injury. Practice first aid in case of electrical hazard. Handling e-wastage.
Practical 25 Hrs Theory 10 Hrs	Demonstrate testing and troubleshooting for power supplies in I/O devices and trace circuit of PC SMPS.	***SMPS*** 7. Construct and test a Thyristor based power supply. 8. Testing op-amp, testing and analyzing results of an OP-Amp. Wire and test a Multistage IC amplifier. 9. Construct and test a 3-pin Voltage regulator. Construct and test an IC variable output Voltage regulator. 10. Trace circuit of PC SMPS. Fault finding of SMPS used in PC. Troubleshoot SMPS used in PC's/Laptops.	DIAC, SCR, TRIAC- working principle, specifications, applications. Circuits and application. Differential amplifiers, OP-Amps, principle, characteristics, advantages, applications. List a few commonly used op-amps, Amplifiers in integrated circuit forms. IC oscillators -IC 555 Other types of linear IC's and applications. Voltage regulator -zener diode, principle, application, limitations. Shunt and series regulators, applications, limitation. IC voltage

		11. Trace circuit, Fault finding and troubleshoot Power supplies used in PC I/O devices.	regulators-fixed/variable, specifications, testing. Multiple output regulators, package details of some common IC regulator Comparison of linear and Switch mode power supplies. Working of SMPS. Types, specifications and applications. Trace SMPS circuits. Approach to faultfinding and Troubleshooting of SMPS with emphasis on the knowledge of power supplies in PC's and its I/O devices.
Practical 120 Hrs Theory 40 Hrs	Evaluate identification of faults, troubleshooting and maintenance of PC, laptop, Printers & Plotters, Scanner & MFD, Monitor, display card and driver.	***PC*** 12. Running diagnostics program to identify the health and defects of a PC. 13. Check system performance using third party utilities. 14. Use benchmarking utilities to benchmark systems. 15. Identify the defect in PC from the audible and observable symptoms such as beep sounds, post messages, Hanged keyboard, erratic display, cables, connectors and slots etc., and corresponding corrective actions. 16. Tracing the circuit of a KB. 17. Trouble shooting defects related to Keyboard and its related ports, ports loose connections, replacing cable, replacing keys (DIN, PS/2, USB). 18. Trouble shooting defects	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/replacement. Block diagram of a KB, function of controller, LED driver Sample circuit

		related to Mouse and its related ports loose connections, replacing cable, replacing roller and sensing elements. (COM,PS/2,USB). 19. Study of interface cable connector, replacing of subassemblies of Light pen, scanner, digitizer. 20. Trouble shooting defects related to HDD,(practice of replacing motor, head, PCB among faulty drives) cable and connector. 21. Trouble shooting defects related to CD/DVD ROM Drive, Attempting for replacement and adjustments) cable and connector. 22. Trouble shooting defects related to Ports to Jumper setting. 23. Trouble shooting defects related to Processor. 24. Trouble shooting defects related to RAM memory modules. 25. Trouble shooting defects related BIOS. 26. Trouble shooting defects related to CMOS setup. 27. Trouble shooting defects related to Battery.	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 mother board 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.
		Laptop 28. Identification of laptop sections and connectors.	Introduction of laptop and comparison of various Laptops. Block diagram of laptop &

		29. Assembling and disassembling a Laptop. 30. Checking of various parts of a laptop. 31. Checking of batteries and adaptors. 32. Replacing different parts of laptops. 33. Upgrading RAM, HDD and other parts. Testing, fault finding and troubleshooting techniques. 34. POST codes and their meaning, fixing of problems based on codes. 35. Enabling support for ATA/SATA technology. 36. Installation of OS using SATA technology drivers. 37. Laptop troubleshooting Latest Tools & Gadgets For Desktop/Laptop Repairs.	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, Configuring wireless internet in a laptop, Latest Tools & Gadgets For Desktop/Laptop Repairs
		Printers & Plotters 38. Testing front panel controls. 39. Interface pins, cables, measurement of voltages and waveforms. 40. Installation of proper printer (Laser, Inkjet, Deskjet) drivers and proper operating system support and carrying self- test. 41. Replacing ribbon in a DMP. 42. Refilling ribbon tape of DMP. 43. Testing and Rectifying defective cable. 44. Removing and cleaning printer head. 45. Replacing a new printer	Types of printers, Dot Matrix printers 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

		head.	head assembly.
		46. Testing and servicing Printer power supply.	Pinter power supply, circuit analysis, defects, servicing.
		47. Changing rollers and other mechanical parts.	Carriage motor assembly, paper feed assembly, sensors.
		48. Tracing the control board and identifying defective components. Servicing of control board.	Procedure for dismantling and replacing mechanical parts. Printer control board, circuit, function, probable defects, servicing. k) Working principle of LASER printer. l) Toner
		49. Replacement of toner cartridge of laser printers.	cartridge, types, replacing toner
		50. Refilling toner cartridge of laser printers.	Cartridges Refilling toner cartridges, equipment available for refilling and procedure.
		51. Drum cleaning and replacement in of laser printers.	Printer drum, function, cleaning and replacing procedure.
		52. Testing and servicing Printer power supply of laser printers.	Power supply in laser printers, circuit, defects, servicing.
		53. Changing mechanical parts of laser printers.	Mechanical parts and sensors on laser printer, function, replacement procedure.
		54. Tracing the control board circuit and identifying defective components. Servicing of control board of laser printers.	Control board (s) in laser printer, circuit diagram, defects and servicing procedure.
		55. Troubleshooting on Laser printer, Chip and blade replacement.	Working principle of INK JET/ DeskJet printers. Type of ink used and replacement of ink cartridge.
		56. Replacement of ink cartridge of DeskJet/inkjet printers.	Refilling of ink, equipment available, quality of refilled cartridges. Printer drum, function, cleaning and replacing procedure.
		57. Refilling ink cartridge of DeskJet /inkjet printers.	Power supply in inkjet printers, circuit, defects, servicing.
		58. Drum cleaning and replacement in DeskJet /inkjet printers.	Mechanical parts and sensors on inkjet printer, function.
		59. Testing and servicing Printer power supply of DeskJet /inkjet printers.	

		60. Changing mechanical parts of DeskJet /inkjet printers. 61. Tracing the control board and identifying defective components. Servicing of control board of DeskJet/inkjet printers. 62. Connecting and using high speed line printers. 63. Replacing spares of line printers. 64. Self test procedures in printers. 65. Use of diagnostics software for serving printers.	Working principle of Plotter and its common faults.
		Scanner & MFD 66. Scanner – Installation of flat bed scanner, configuration, using Automatic Document Feeder (ADF), OCR. 67. Barcode Scanner - Installation and configuration. 68. Network Scanner - Installation and configuration. 69. Troubleshooting of Scanner. 70. Multifunction Printer - Installation, Replacing supplies and spares, troubleshooting, Passbook Printer Installation, calibration, configuration & troubleshooting. 71. Replacement of Supplies and maintenance. 72. Network Printer – Installation, configuration and troubleshooting. How	Working principles of Scanner, Barcode Scanner, and Network Scanner. Working principles of Multifunction Printer, Passbook printer, High Speed Printer, Line Printer, Network Printer. Print Server.

		to update the flash of Motherboard, printer, scanner and modem etc.	
		Monitor, display card and driver 73. Identify the type of monitor connected to PC. Specifications, front panel controls and settings. 74. Identify the specifications of the display driver card installed in the PC. 75. Remove the display driver card and identify the main components and connectors on the display driver card. 76. Replace the display driver card and re-install (before practicing this skill set, the already installed driver should be removed from device manager). 77. Change the exiting display card with a different card given and install. 78. 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. 79. Install, configure and operate LCD Projector. 80. Install and Configure Touch Pad.	Types of monitor, Monochrome and colour, CGA, EGA, VGA, SVGA, Digital Analogue interlaced non interlaced. Specifications and comparison of Monitors. Front panel controls brightness, contrast, horizontal and vertical height settings. Display cards, bus standards, types CGA, EGA VGA, SVGA, AGP, memory and drivers. Main components and connectors on display cards, display controller IC, RAM chips and dual port feature principle of working and use of display memory. Installing display drivers, setting features. Information required before changing the display driver card and precautions to be taken while installing a display driver card. LCD and TFT Monitors. Understanding the difference between flat screens and CRT display systems. Understanding the displays memory and its effect on quality and performance. Working principle of LCD Projector, its specification, configuration and common faults. Working Principle of Touch Pad.

Practical 25 Hrs Theory 10 Hrs	Assess upgrading of System software and Application Software in sequence with the external interface.	***Upgrading* of *System*** 81. Mother board, Memory, CPU, Graphic Card, BIOS upgradation, Additional features, Updating of System Software & Application Software (Requirement & How to update). ***Practice on Backup Drives*** 82. Pen Drive U3 format, Zip Drive, Tape Drive, USB External Drive (HDD, CD/D VD writer), BlueRay drive, Types, capacity, interface connector, write protection, Trouble Shooting, Interface, Installation, casing for external drive.	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 CDROM drives. Technology, working principle, capacity, 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. k) Technology, working principle, capacity, media of Magneto- Optical Disk (MOD) drives. Applications. l) Important parts and functions of MOD drive. m) Minor repair works on MOD. n) Latest trends in backup devices /media.
Practical 45 Hrs Theory 20 Hrs	Evaluate identification of faults, troubleshooting and maintenance of external devices, tablets / smart	***Tablet / Smart Devices*** 83. Assembling & disassembling of different types of tablets / Smart Devices. 84. Testing of various parts with multimeter.	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

	devices and UPS.	85. Replacing of faulty parts. 86. Fault finding & troubleshooting. 87. Practice Advanced troubleshooting techniques. 88. Flashing of various brands of tablets / smart devices. 89. Upgrading operating systems. 90. Formatting of virus affected devices. 91. Unlocking of handsets through codes and software. 92. Troubleshooting settings faults. 93. Working with iOS, Android, Ice-cream sandwich, Jellybeans. 94. Installation of Phone Gap framework.	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.
		UPS 95. Block diagram of UPS, Principle of working of offline and online UPS. 96. Role of battery, specification of battery inverter and charging circuit. Procedure for switching on-off inverter/UPS. 97. Study of typical working UPS circuit, explanation of each stage involved. Voltage, current, frequency and KVA specifications. 98. Controls of different type of UPS: On-line, Off-line, Line interactive etc., Typical	Identify the specifications of UPS. Switch-on and Switch-off procedure of UPS. Measurement of Input/output voltage /current levels, battery charge level. Identifying status of UPS from front panel indicators. Carryout routine maintenance of battery, battery terminals, loose contacts etc., Test UPS as per specification. Verification of back-up time. Circuit tracing and fault finding practice. Servicing of UPS by simulating more likely faults and systematic approach to identify and

		circuit blocks. 99. Routine maintenance of battery and UPS. 100. Back-up time, its dependence on battery, load and its calculations. 101. Possible problems in UPS, fault finding procedures. 102. Simulated faults and serving of UPS.	rectify them.
Practical 44 Hrs Theory 20 Hrs	Demonstrate networking Installation and Configuration of TCP/IP Protocol and set up of LAN.	***IP Addressing & TCP/IP*** 103. IP addressing technique (IP4/IP6) and Subnetting and Supernetting the network. 104. Installation and Configuration of TCP/IP Protocol. 105. Practice TCP/IP Utilities: PING, IPCONFIG, HOSTNAME, ROUTE, TRACERT etc. 106. Setup and configure a Virtual LAN.	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 (VTP) Concept of Translator Gateways
		Configuration of Data communication equipment 107. Connecting computers on a network with Drop cable and using Wi-Fi configuration. 108. Basic Programmable switch Configuration (L2/L3) Spanning Tree Protocol (STP) Command Line Interface IP Routing Process Verifying Configuration. Routers simulation software, installation and configuration (CISCO	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

		packet tracer).	
Practical 44 Hrs Theory 18 Hrs	Assess set up of wired & wireless network protection system and their maintenance.	***Network Protection and troubleshooting*** 109. Setting up basic protection using public keys and MAC address filters. 110. Integrate wired with wireless network. 111. Power over Ethernet (PoE). Troubleshooting wired and wireless network.	Collaborating using wired and wireless networks, Protecting a Network, Network performance study and enhancement.
		Server Installation & Basic Configuration 112. Identify Server Hardware 113. Install and configure Windows Server (latest version). 114. Install and Configure Active Directory services, Implementing AD Services, DC promo command. 115. Configuration of broadband modem and sharing internet connection (Broadband/ Leased lines).	Server concepts, Server Hardware, Installation steps, configuration of server. Concept of Active Directory. ADS Overview, ADS Database, Active Directory Namespace, Logical & Physical Elements of AD.
Practical 45 Hrs Theory 18 Hrs	Demonstrate the process of installation and configuration of DNS, routing and Remote access.	***Install & configure DNS*** 116. Installing and Configuring DNS Services, Setup Name resolution, Host names, NetBIOS names. 117. Installing DNS Server, Configuring DNS Zones, DNS Clients, Delegating Zones, Testing DNS with nslookup, dnscmd and dnslint, Installing and Configuring DHCP	Concept of DNS. Name resolution - Host names, NetBIOS names. DNS Overview. DHCP Overview DHCP Clients and Leases

		Services, DHCP Server Configuration, Setting up of DHCP, Routing and remote access.	
		Routing and Remote Access 118. Configuring RRAS, VPN implementation. 119. Configuring Remote Access Authentication Protocol. 120. Configuring RRAS Policies. 121. Configuring IAS. 122. Managing TCP/IP Routing, Video conferencing implementation, Net meeting.	Remote Access Overview VPN Concepts. Remote Access Authentication Protocol RRAS Policies IAS TCP/IP Routing Overview of Video conferencing and Net meeting.
Practical 70 Hrs Theory 28 Hrs	Assess planning and implementation of AGDLP process and web server network security system.	***Planning and Implementing User and Group Strategies*** 123. Adding Account. 124. Implement AGDLP Process. 125. Implement User Authentication Strategy. 126. Planning and Implementing OU Structure. 127. Planning and Maintaining Group Policies. 128. Configuring User Environment. 129. Configuring Computer Security.	**Concept of User and Group** Planning Security Group Strategy AGDLP Process Planning User Authentication Strategy Planning OU Structure Planning a Group Policy Strategy Deploying Software Through GPO
		Server Configuration & Backup 130. Configure a server as web server, Configuring Mailbox Servers Implementing Backup and Recovery.	Introduction to Messaging Services Concept of Backup and Recovery of Server.
		Managing Server Network Security	Security Baseline and Templates Audit Policy

		131. Security Baseline Settings and Templates. 132. Configuring Audit Policy. 133. Monitoring and Troubleshoot Network protocol. 134. Configuring Protocol Security. 135. Planning security for Wireless Network (UTM installation/ firewall security system).	Understanding IPSec Protocol Security ,Planning security for Wireless Network
		Maintaining Network Infrastructure 136. Monitor Network Traffic 137. Troubleshoot Internet Connectivity. 138. Troubleshoot Server Services 139. Use Linux Network Tools to check / maintain / Manage Network.	Managing Network Traffic Types of Problems of Internet Connectivity Types and working of Server Services.
Practical 25 Hrs Theory 10 Hrs	Demonstrate sequence of Linux server installation and configuration process.	**Linux Server installation and configuration** 140. Install Linux Server (Redhat/ Suse). 141. Create new user and group. 142. Create public and data directory. 143. Create lmhosts file. 144. Check host file. 145. Secure and run SWAT. Filter ports. 146. Telnet installation and configuration.	Linux Server installation and configuration. Configuration Plan Public and data directory Host file SWAT Password Authentication Telnet.
Practical 25 Hrs Theory 10 Hrs	Demonstrate implementation of firewall technologies for network security	***Network Security*** 147. Practice on firewall/ UTM (Cyber room/ sonic wall) technologies to secure the network perimeter.	Modern Network Security Threats and the basics of securing a network. Secure Administrative Access, LAN security considerations.

	system and Wi-fi security considerations.	148. Practice LAN security considerations and implement endpoint and Layer 2 security features. 149. Wi-fi configuration to implement security considerations.	Network Security Devices. Cryptography. Wi-fi security considerations.
SOFT SKILLS: 80 Hrs.			
Professional Knowledge Soft Skills- 80 Hrs.	Exhibit effective communication skills with logical reasoning ability and quantitative aptitude to maximize efficiency in work.	**COMMUNICATION SKILLS:** Oral communication Skills, Voice, accent, Voice modulation, pace, Intonation, etc. Study of different pictorial expressions of non-verbal communication and its analysis. Demo on Strengths and Weaknesses Demo on Motivation, Positive attitude. Practice on personal appearance, Dressing Manners & Etiquettes. Practice on attending of mock interview of different types. Listening & doubt clarifying etc. Case studies on Interview sessions. **Communication & Listening Skills** Components of effective communication, Types of communication- Oral, Written, Reading & body language, Handling of communication, Barriers of communication, Listening Tools & Speaking Tools, Non-verbal communication and its importance. **Self-Management & Personality Development** Self-Management, SWOT analysis, self-learning and management. Motivation and Image building Techniques **Personal Grooming & Hygiene** Presentation of Self, Formal & Informal Dressing, Dressing for Occasions. **Techniques of Attending Interviews** Interview & its types. Preparation for the interview, stages of interview. Do's & Don'ts in an interview. **BASIC MATHEMATICAL CALCULATION:** Conversions of different units viz. length, area, mass etc. Simple Problems on Perimeter and area of a triangle, a circle, a square, rectangle, semicircle etc. Simple Problems on Comparing quantities, weight, speed, height, age, ratio, percentage, and price, etc. Simple calculation on profit and loss statement, discount calculations of products. Demonstration of utilization of mobile apps for financial transactions. Exercises on	

		aptitude/puzzles Practice on Types of Charts and Graphs Introduction to units and dimensions of different objects. Perimeter, Area of regular shapes, viz. Triangle, Square, and Circle, rectangle, semicircle etc. **Quantitative Aptitude** Introduction, Comparing quantities viz. Speed, age, height, ratio, percentage, weight, and price, etc. Introduction to cost price, sale price, profit, loss and discounts of products. Introduction to online internet banking mechanisms, various modes of payments, cash transactions and associated mobile apps. Concept of insurance and taxes and types. Personal saving and investment mechanism. **Logical reasoning** Introduction to logical reasoning. Types of logical reasoning. Principles of logical reasoning with examples on numbers and sequences, arrangement and relations, **Data Interpretation** Data analysis and interpretation. Types of variables for different applications. Basic graph types (Bar, Line, PIE Charts). **ENERGY & ENVIRONMENT:** Video demo on different types of energy resources. Conventional & Non-Conventional Energy Resources. Fossil Fuel, Biomass, Bio-Gas, Solar, etc. Public awareness on Energy conservation and use of clean energy. **ENGLISH LITERACY:** Pronunciation of simple words, Diction (use of word and speech) Transformation of sentences, Spellings. Reading and understanding simple sentences about self, work and environment. Construction of simple sentences Writing simple English, Speaking with preparation on self, on family, on friends/ classmates, on work. Role-playing and discussions on current affairs. Job description. Practice of Taking messages, passing on instructions. Practice making Resumes or curriculum vita. Letters of application &referencing to previous communication.

SYLLABUS FOR CORE SKILLS
1. Training Methodology(TM) (Common for all CITS trades) (270 Hrs + 180 Hrs.)

Learning outcomes, assessment criteria, syllabus and Tool List of Core Skills subjects which is common for all the CITS trades, provided separately in www.bharatskills.gov.in / dgt.gov.in

7. ASSESSMENT CRITERIA

LEARNING OUTCOME	ASSESSMENT CRITERIA
TRADE TECHNOLOGY	
1. Demonstrate implementation of safe working practices, environment regulation, and housekeeping. (NOS: SSC/N9441)	Explain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements and according to site policy.
	Check and report all unsafe situations according to site policy.
	Demonstrate necessary precautions on fire and safety hazards and report according to site policy and procedures.
	Evaluate and observe site policies and procedures in regard to illness or accident.
	Demonstrate basic first aid and use them under different circumstances.
	Explain different fire extinguisher and use the same as per requirement.
2. Demonstrate testing and troubleshooting for power supplies in I/O devices and trace circuit of PC SMPS. (NOS: SSC/N9442)	Explain working principle of DIAC, SCR, TRIAC.
	Demonstrate the characteristics and application of amplifiers.
	Explain commonly used op-amps, Amplifiers in integrated circuit forms.
	Explain application and limitation of shunt and series regulators.
	Check comparisons of linear and Switch mode power supplies.
	Check, trouble shoot SMPS with emphasis on power supplies used in PC's and its I/O devices.
	Observe safety norms while handling the components.
3. Evaluate identification of faults, troubleshooting and maintenance of PC, laptop, Printers & Plotters, Scanner & MFD, Monitor, display card and driver. (NOS: SSC/N9443)	Explain the running diagnostic program to check the status and defect of PC.
	Discuss features and limitations of commonly used diagnostic problem.
	Check the circuit of KB, controller function and LED driver circuit.
	Evaluate overall defects in input and out devices of a PC relating to software and hardware.
	Demonstrate role of different parts of a laptop viz. Touchpad, Trackball, Track point, etc.
	Demonstrate process for laptop repairing by selecting proper upgraded tools.
	Explain the function of each unit head assembly, carriage, and paper feed mechanism in printers.
	Demonstrate Refilling toner cartridges, equipment available for refilling and procedure.
	Evaluate installation of printer drive and self test, repair and

	maintenance of printers.
	Evaluate working condition of scanner, barcode scanner and network scanner.
	Check main components and connectors on display cards, display controller IC, RAM Chips.
	Explain difference between LCD and TFT monitors, flat screen and CRT display.
	Assess Working condition of LLCD projector, its specification, configuration and troubleshooting of common faults.
4. Assess upgrading of System software and Application Software in sequence with the external interface. (NOS: SSC/N9450)	Check limitation and scope for upgrading of PC system.
	Demonstrate upgrading of system software in sequence with Mother board, Memory, CPU, Graphic Card and BIOS upgradation.
	Evaluate upgrading of application software and proper functioning of system.
	Evaluate role of removable storage devices, bulk data storage devices etc.
	Inspect repair and maintenance of CD, DVD drives, ZIP drives, DAT drives etc.
5. Evaluate identification of faults, troubleshooting and maintenance of external devices, tablets / smart devices and UPS. (NOS: SSC/N9469)	Demonstrate dissembling, repair and assembling of tablets/smart phones.
	Test function of parts and circuits with the help of multimeter.
	Explain sequential steps of repairing hardware problem of a Tab.
	Assess upgradation process of operating system.
	Measure input/output voltage, current level, battery charge level.
	Assess maintenance of battery, battery terminals and loose contacts.
	Test UPS as per specification.
	Demonstrate systematic approach of maintenance of UPS by simulating faults and rectify them.
	Observe safety norms for upgrading, repair and maintenance of devices.
6. Demonstrate networking Installation and Configuration of TCP/IP Protocol and set up of LAN. (NOS: SSC/N9479)	Explain Configuration of different TCP/IP protocols, Virtual LAN Trunk protocol etc.
	Demonstrate functions of Modems, Firewall, Hubs, Bridges, Routers, Gateways, etc.
	Demonstrate connecting of computers with network cables and wi-fi configuration.
	Evaluate basic programmable switch configuration with the required standard of networking.
	Check the working condition of data communication equipment.

7. Assess set up of wired & wireless network protection system and their maintenance. (NOS: SSC/N9479)	Demonstrate setting up basic protection using public keys and MAC address fitters.
	Demonstrate troubleshooting wired and wireless network.
	Assess installation and configuration of windows server.
	Evaluate installation and configuration of Active directory and implementation of AD services.
	Explain configuration of broad band modem and sharing internet connection.
8. Demonstrate the process of installation and configuration of DNS, routing and Remote access. (NOS: SSC/N9480)	Demonstrate installation and Configuring DNS Services, Setup Name resolution Host names, NetBIOS names.
	Appraise installation of DNS server.
	Test installation of RRAS, VPN, and configuration of remote access.
	Analyse configuration IAS, TCP/IP routing.
9. Assess planning and implementation of AGDLP process and web server network security system. (NOS: SSC/N9480)	Choose process for implementation of AGDLP, user Authentication Strategy, OU structure
	Plan for maintaining group policies and configuration of user environment computer security
	Demonstrate server configuration process in detail.
	Explain security Baseline setting and templates.
	Test for configuration of Audit Policy.
	Monitor troubleshooting of Network Protocol.
	Monitor troubleshooting of inter connectivity and network traffic.
	Assess troubleshooting server services via Linux network tools.
10. Demonstrate sequence of Linux server installation and configuration process. (NOS: SSC/N9481)	Demonstrate installation process of Linux Server by creating new user group, public and data directory.
	Check host file and SWAT running process for security.
11. Demonstrate implementation of firewall technologies for network security system and Wi-fi security considerations. (NOS: SSC/N9479)	Demonstrate network security and monitoring.
	Explain setting of password policy.
	Evaluate configuration of firewall technologies based on hardware and software.
	Evaluate configuration of network devices.
	Demonstrate installation and configuration of server-client network and all related protocol services.
	Demonstrate Wi-fi installation and configuration based on security consideration.
12. Exhibit effective	Demonstrate reasonable quantitative aptitude and interpret

communication skills with logical reasoning ability and quantitative aptitude to maximize efficiency in work. (NOS: MEP/N9446)	data in the field of work
	Demonstrate effective communication skills with logical reasoning ability.
	Describe method of energy conservation and day-to- day contribution to work for optimum utilization of resources.
	Demonstrate English language fluency while carrying out official work.

8. INFRASTRUCTURE

LIST OF TOOLS AND EQUIPMENT for CHNM (CITS) trade			
For batch of 25 candidates			
S No.	**Name of the Tool & Equipment**	**Specification**	**Quantity**
A. Trainees tool kit			
1.	Basic Analogue Electronics Trainer		5 Nos.
2.	SMPS Trainer Kit		5 Nos.
3.	Insulated Screw Driver (different types)		26 Nos.
4.	Knife double bladed electrician		26 Nos.
5.	Insulated handle thin connector screw driver		26 Nos.
6.	Line tester		26 Nos.
7.	Heavy duty screw driver		26 Nos.
8.	Insulated combination pliers	150 mm	08 Nos.
9.	Insulated side cutting pliers	150 mm	08 Nos.
10.	Neon tester	500 V.	08 Nos.
11.	Long nose plier	150 mm	26 Nos.
12.	Tweezer	100mm	26 Nos.
13.	Phillips type screw driver set		26 Nos.
14.	Wire stripper		26 Nos.
15.	Soldering iron,	20/25watts	13 Nos.
16.	Soldering Iron Changeable bits	15 W	26 Nos.
17.	De-soldering pump		26 Nos.
18.	Digital Multimeter-hand held		26 Nos.
19.	Temperature controlled soldering/ de-soldering station		05 Nos.
20.	Wire gauge set		04 Nos.
21.	Permanent magnet bar		08 Nos.
22.	Analog Multimeter		04 Nos.
23.	Magneto spanner set		2 Nos.
24.	Scriber straight	150mm	2 Nos.
25.	Allen key set	set of 9	2 Nos.
26.	Tubular box spanner	set of 6	2 No
27.	Regulated DC Power Supply	0-30 V, 2 Amp	05 Nos.
28.	PC Pentium IV or latest configuration (for testing with SMPS)		05 Nos.
29.	Rubber gloves		08 Nos.

30.	Spare Transformers and power devices required for servicing SMPS		As required
B. Hardware			
31.	Desktop computer	CPU: 32/64 Bit i3/i5/i7 or latest processor, Speed: 3 GHz or Higher. RAM:-4 GB DDR-III or Higher, Wi-Fi Enabled. Network Card: Integrated Gigabit Ethernet, with USB Mouse, USB Keyboard and Monitor (Min. 17 Inch. Licensed Operating System and Antivirus compatible with trade related software.	25
32.	ISDN/Broad Band Internet Connection		01 No.
33.	Dual Trace Oscilloscope	20 MHz	02 Nos.
34.	Digital trainer kit		08 Nos.
35.	Logic Probes/Logic Pulser		08 Nos.
36.	Digital IC tester		04 Nos.
37.	Function Generator		04 Nos.
38.	Pulse Generator		04 Nos.
39.	Digital ICs		As required
40.	Different types and makes of Motherboards		06 Nos.
41.	CD Writers		04 Nos.
42.	DVD writer		04 Nos.
43.	External HDD		05 Nos.
44.	Floppy Disk Drive		05 Nos.
45.	CD ROM Drive		05 Nos.
46.	Display card		05 Nos.
47.	Computer monitor	15"/17" of different types	04 Nos.
48.	Cabinet with SMPS		05 Nos.
49.	Dot matrix printer		02 Nos.
50.	Scanner		01 No.
51.	UPS		As required
52.	Vacuum Cleaner		01 No.
53.	Hand blower		01 No.
54.	RAM	512 MB or higher	As required
55.	CPU different types		Do
56.	Tablet, Smart Device		02 Nos. each
57.	Printers: Laserjet, deskjet, passbook,		01 each

	mfd		
58.	Network Printer		01 no
59.	LCD/DLP Projector with Screen		01 no
60.	Computer Toolkits		06 Nos.
61.	Computer Spares:		As required
62.	Hard Disk	(500 GB or better) different types	4 nos.
63.	External DVD Writer		2 nos.
64.	Blu-Ray drive and player		2 nos.
65.	Digital Camera		2 nos.
66.	HD Display		2 nos.
67.	Card Reader		2 nos.
68.	Game video card		2 nos.
69.	Different types of memory cards		2 nos. each
70.	Laptop kits		13 nos.
71.	Laptop spares: Cabinet with display, memory, hard disk, battery pack, keyboard membrane, chargers		As required
72.	UPS Trainer kit		2 nos.
73.	Power electronics Trainer kit		2 nos.
74.	Post error debugging card		4 Nos
75.	SMPS Tester		4 Nos.
76.	PCI slot Testing tool		4 Nos.
C. Software			
77.	Data recovery software		2 nos.
78.	Open source Pc Utility / Tweak Software		As available
79.	Microsoft Window 2000/ XP or latest		As required
80.	MS Office latest version		As required
81.	Anti virus latest version		As required
D. Raw materials			
82.	White Board Marker		1 Dozens
83.	Duster Cloth	2' by 2'	25 Pcs
84.	Cleaning Liquid	500 ml	2 Bottles
85.	Xerox Paper (A4)		As required
86.	Full Scape Paper (White)		1 reams
87.	PCB, solder flux etc& electronic components		As required
88.	Wires, cables Plug sockets switches of various types and		As required

89.	other consumables		
90.	Resistors, Capacitors, Inductors, Diodes, LED, Transistors,		As required
91.	Thyristors, ICs etc.		
92.	Spare Transformers and power devices required for		As required
93.	servicing SMPS		
94.	Various types of Button Cells		As required
95.	Dry Cell		As required
96.	Hand Brush		As required
97.	Silicon grease		As required
98.	IC Puller		As required
99.	Heat sink agent		As required
100.	Cartridges for printer		As required
101.	Optical Mouse P/S2 or USB		As required
102.	P/S2 OR USB Key Board		As required
103.	CMOS Battery		As required
104.	3 Pin Power Chord		As required
105.	Cat 5/5e/6 cable		300 meters
106.	Stapler Small		2 pcs
107.	Stapler Big		1 pcs
108.	AAA battery for remote		As required
109.	AA battery for clock		As required
110.	Pen drives	8 GB	4 Nos
111.	CDs		20 Nos
112.	DVDs		10 Nos.
113.	Wall Clock		1 pcs
114.	Anti static pads		As required
115.	Anti static wrist wraps		As required
116.	Soldering wire and paste		As required
E. Furniture, Accessories and Audio Visual Aids for Trade Technology			
117.	Instructor table & chair		01 each
118.	Suitable Table Teak Wood fitted with Back Panel complete with different types of meters/switches, AC/DC supplies etc. required for testing of electronic circuits. Insulation mats to cover below the table.		As required
119.	Revolving Stool cum chair		25
120.	Computer Table, Printer Table, Stools		As required

121.	Green Glass Board / White Board		01
122.	Metal Rack		As required
123.	Locker with 8 drawers (standard size) for 16 trainees		02
124.	Storage Almirah		As required
125.	Book shelf (Glass panel)		01
126.	Fire fighting equipment, first aid box etc.		As required
127.	Computer Maintenance Tables of Suitable sizes		As required
128.	Shoe Rack		As required
129.	Air conditioners (optional)		As required


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