INFORMATION TECHNOLOGY

NSQF LEVEL - 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

INFORMATION TECHNOLOGY

(Engineering Trade)

SECTOR – IT & ITeS

(Designed in 2023)

Version 2.0

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Developed By

Government of India
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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 Instructors' 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's 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 of one year duration. "Information Technology" CITS trade is applicable for Instructors of "Information Technology" trade.

The main objective of Craft 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 (Professionalskills 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

CITS Trainees of optional courses of up to 240 hours in each year short term courses.

2.3 PROGRESSION PATHWAYS

- Can join as an Instructor in a Vocational Training Institute / technical Institute.
- 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 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 yearly 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***	• 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

and engage students by demonstrating good attributes of a trainer.	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	**INFORMATION TECHNOLOGY- CITS**
Trade Code	DGT/4046
NCO – 2015	2356.0100, 2512.0205, 3514.0300, 3512.0101, 2513.0101, 2513.0302, 2523.0100
NOS Covered	SSC/N9482, SSC/N9483, SSC/N9484, SSC/N9485, SSC/N9486, SSC/N9487, SSC/N9488, SSC/N9489, SSC/N9496, SSC/N9501, SSC/N9502, SSC/N9503, PSS/N9412, PSS/N9411
NSQF Level	Level-5
Duration of Craft Instructor Training	One Year
Unit Strength (No. Of Student)	25
Entry Qualification	Degree in Engineering/ Technology in Computer Science/ IT/ Electronics & Communication from recognized Engineering College / University. OR 03 yrs. Diploma in Computer Science / Computer Application/ IT after class 10th from recognized Engineering College / University*. OR Ex-serviceman from Indian armed force with 15 years of service in related field as per equivalency through DGR OR 10th class with 02- year NTC / NAC passed in the trade of 'Information Technology' + 1 year of relevant experience. *Wherever diploma is of 2 yr. duration, 1 yr. experience will be required.
Minimum Age	18 years as on first day of academic session.
Space Norms	70 Sq. m
Power Norms	3.45 KW
Instructors Qualification for	
1. INFORMATION TECHNOLOGY -CITS Trade	B.Voc/Degree in Engineering/ Technology in Computer Science / IT from AICTE/UGC recognized University with two years experience in relevant field. OR 03 years Diploma in Engineering/ Technology in Computer Science / IT from AICTE/ 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 the Information Technology trade with seven years experience in relevant field. **<u>Essential Qualification:</u>** National Craft Instructor Certificate (NCIC) in Information Technology trade, in any of the variants under DGT.
2. Workshop Calculation & Science	B.Voc./Degree in any Engineering from AICTE/ UGC recognized Engineering College/ university with two years experience in relevant field. **OR** 03 years Diploma in any Engineering from AICTE /recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with five years experience in relevant field. **OR** NTC/ NAC in any Engineering trade with seven years experience in relevant field. **Essential Qualification:** National Craft Instructor Certificate (NCIC) in relevant trade. **OR** NCIC in RoDA or any of its variants under DGT.
3. Engineering Drawing	B.Voc./Degree in Engineering from AICTE/ UGC recognized Engineering College/ university with two years experience in relevant field. OR 03 years Diploma in Engineering from AICTE /recognized board of technical education or relevant Advanced Diploma (Vocational) from DGTwith five years experience in relevant field. OR NTC/ NAC in any one of the 'Electrical group (Gr-II)' trades categorized under Engg. Drawing'/ D'man Mechanical / D'man Civil' with seven years experience. **Essential Qualification:** National Craft Instructor Certificate (NCIC) in relevant trade. **OR** NCIC in RoDA / D'man (Mech /civil) or any of its variants under DGT.
4. 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.
5. 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 & equipments 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.

Junior Software Developer; is one of the many entry level roles in the software industry including support and help desk, testing, user interaction design, maintenance, enhancement, development and documentation. They are responsible for assisting in performing the key activities and tasks involved in the assigned role.

Programming Assistant/Junior Software Engineer; installs, maintains and updates computer programs by making minor changes and adjustments to them under the guidance of computing professionals. Maintains and updates documents of computer programs and installations. Applies knowledge of principles and practices in the area of programming and computing in order to identify and solve problems arising in the course of their work. They may receive guidance from managers or professionals. May supervise other workers also.

Domestic IT Helpdesk Attendant; is mainly responsible for the smooth running of computer systems and ensuring users get maximum benefits from them. Individual tasks vary depending on the size and structure of the organization, but may include installing and configuring computer hardware operating systems and applications; monitoring and maintaining computer systems and networks; talking staff/clients through a series of actions, either face to face or over the telephone to help set up systems or resolve issues; troubleshooting system and network problems and diagnosing and solving hardware/software faults etc.

Web Developer; is responsible for designing and maintaining web-based applications that include static and dynamic content. This includes the design, layout and coding of a website. They may work standalone or along with application/functional developers as part of the overall solution that includes a web based component.

Media Developer-Application Development; is responsible for designing and improving the look and feel, functionality and graphics appeal of the developed application. They may work standalone or along with application/functional developers to improve the aesthetics of the application being developed.

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.

Reference NCO 2015:

a) 2356.0100-Manual Training Teacher/ Craft Instructor
b) 2512.0205 - Junior Software Developer
c) 3514.0300 - Programming Assistant/Junior Software Engineer
d) 3512.0101 - Domestic IT Helpdesk Attendant
e) 2513.0101 - Web Developer
f) 2513.0302 - Media Developer-Application Development
g) 2523.0100 - Data Communication Analyst/Network Administrator

Reference NOS:

- SSC/N9482
- SSC/N9483
- SSC/N9484
- SSC/N9485
- SSC/N9486
- SSC/N9487
- SSC/N9488
- SSC/N9489
- SSC/N9496,
- SSC/N9501
- SSC/N9502
- SSC/N9503
- PSS/N9412
- PSS/N9411

5. LEARNING OUTCOME

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

5.1 TRADE TECHNOLOGY

1. Demonstrate electronic components, micro-controllers, single board programming, sensors. (NOS: SSC/N9482)
2. Install, configure and troubleshoot Hardware related to computers, servers, network components and smart devices. (NOS: SSC/N9483)
3. Monitor Installation of different types of OS for Desktop, servers and Virtual Machines; Application /driver installation on premises /cloud. (NOS: SSC/N9484)
4. Demonstrate cyber security practices & laws, security threats & vulnerabilities and configure Networking systems &devices, (NOS: SSC/N9485)
5. Design and develop front end programming based on HTML 5, CSS, Javascript, Jquery, Angular and familiarisation with Git and various code editors like VScode, Atom, Braket, Notepad++. (NOS: SSC/N9486)
6. Design and develop Back end programming based on Python, PHP (Laravel) and database scripting with MySql, MongoDB. (NOS: SSC/N9487)
7. Demonstrate Hosting and deployment of web apps on cloud platforms like Azure, AWS, RedHat or equivalent. (NOS: SSC/N9488)
8. Create multimedia content with various tools like Adobe Photoshop, GIMP, Adobe Illustrator, Premier, Adobe XD, After effects, 3DMax. (NOS: SSC/N9489)
9. Simulate Robotic Process Automation. (NOS: SSC/N9496)
10. Design and analyse BIG data. (NOS: SSC/N9501)
11. Perform business analytics, business intelligence and analytical reporting. (NOS: SSC/N9502)
12. Create Artificial Intelligence and machine learning test data /annotations for text/image /video/speech. (NOS: SSC/N9403)
13. Read and apply engineering drawing for different application in the field of work. (NOS: PSS/N9411)
14. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: PSS/N9412)

6. COURSE CONTENT

SYLLABUS FOR INFORMATION TECHNOLOGY – CITS TRADE			
TRADE TECHNOLOGY			
Duration	**Reference Learning Outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
Practical 35 Hrs. Theory 14 Hrs.	Demonstrate electronic components, micro-controllers, single board programming, sensors.	1. Realization of sequential & combinational circuits using different electronic components i.e. Gates, flip flops, encoder, decoder, multiplexer, demultiplexer, adder, substractor & counter. 2. Checking, Removing & Re fixing various types of electronic components i.e. Resistor, capacitor, inductor, Crystal Oscillator, RTC (Real time Crystal), SMT Transformer & Mosfet on various existing circuit board. 3. Identify and use Various Basic Industrial Sensors. 4. Create Arduino - Hello World program and Arduino - Serial Plotter, projects on LED blink & fade.	1.Introduction to Digital Laboratory Equipments & IC‟s 1's compliment 2's compliment NOT, AND, OR, NAND and NOR gates. Flip-flops. Encoder and decoder. Multiplexer. Demultiplexer Subtractor Counter Introduction to Sensors Components, Application using - IR- Analog Sensor, IR Digital Sensor, Color IR _TSOP Sensor, Light Sensor, Sound Sensor, DTMF Module &Selection of Sensor and their Basic working Technique and Interface. Anatomy of Embedded Systems Introduction to Open Source platform. Introduction to Arduino. Understand Arduino - Code Structure with power supply & installation. Types of Arduino Boards Board Breakdown
Practical 35 Hrs. Theory 14 Hrs.	Install, configure and troubleshoot Hardware related to computers, servers, network components and smart devices.	5. Check Voltage marking of RAM slot & test signals on PCI, PCI exp., Slots& test BIOS. 6. Testing and troubleshooting the Faults and solution of power section including power logic sequence, CPU &RAM & Motherboard Testing Guide	Process of replacement of Gate IC, QFC IC etc. Concept of testing and troubleshooting of logic components of ICs, PCI, PCI exp, BIOS. Concept of testing of Power sections of CPU, RAM, Chipset.

		using Debug Cards. 7. Professional soldering process viz. Vertical drags solder technique. Replacement of4-Gate IC&BGA IC. 8. Troubleshooting of logic errors& power supply in audio, LAN, card reader, BIOS, WI-FI, laptop system board. 9. Testing Sequence to turn ON system board for dead system and testing CPU for 'No display' 10. Solution for failure of touchpad, HDD, ODD, keyboard, USB, HDMI, internal display, touch screen (digitizer) & BIOS programming using flasher tool. 11. Repair Mobile Faults &install Mobile Software.	Introduction to various Debug cards. Process of Laptop Assembling and de-assembling. Concept of PWM (Pulse-width modulation) CPU cooling. Various troubleshooting techniques for power supply components, display, system board. Layout of System board, components of CPU, HDD, ODD. USB drives, HDMI, BIOS. Types of Component in Mobile. Types of Parts and Peripherals. Types of testing in Mobile. Type of IC In mobile. Soldering and disordering. Use of jumper in Mobile. Project of Battery Booster
Practical 25 Hrs. Theory 10 Hrs.	Monitor Installation of different types of OS for Desktop, servers and Virtual Machines; Application /driver installation on premises /cloud.	**Operating system** 12. Create a Windows system image &Install Windows 8.1 or 10 or higher version. 13. Backup/ Restore your Windows partition with the bootable image disk &set up a multi-boot/ dual-boot using Ubuntu and Windows. 14. Applications software Program& device driver install in windows. 15. Install Windows Server 2012R2&InstallandConfigureActiveDirectory&ImplementADServices. 16. Install & configure DNS& DHCP Service. **Install Linux Server** 17. Create new user, group, public and data directory, anlm hosts file &Check host file in Linux.	Types of software-System software-OS, Compiler. Application software like MS office. High Level, low level language, Computer application. Concept of GUI & CUI. Applications accessories under windows/Linux. Pre-installation Prerequisites. Install procedure Rollback. Post-installation–Backup specifications procedure & Restore procedure, Periodical View check. Awareness of legal aspects of using computers such as copyright, patent etc. Un-install procedure, Tests. Advance Server concepts. Concept of Active Directory. Logical & Physical Elements of AD Concept of DNS. DHCP Overview. DHCP Clients and Leases. Configuration Plan Commands of Linux· Linux file system, The Shell, Users and file

		Virtual Machine 18. Install& Configuring Virtual Machine using Virtual Box or similar software. **Cloud printing** 19. Print on Cloud using cloud printer, Install Cloud printer driver.	permissions, VI editor, X window system, Filter Commands, Processes, Shell Scripting. • Public and data directory. • Host file. • SWAT • Password • Authentication • Telnet Concept of Virtual Machine. Introduction to device driver, Cloud driver.
Practical 45 Hrs. Theory 20 Hrs.	Demonstrate cyber security practices & laws, security threats & vulnerabilities and configure Networking systems &devices.	**Crimping & Punching** 20. Crimping practice with straight and cross CAT 5 cables, punching practice in IO Box and patch panel, Crimping and making cables. **Cabling** 21. Create cabling in lab with HUB/ Switch and IO Boxes and patch panel, Fitting Switch Rack. **Install & configure a Network** 22. Installing & Configuring a Peer-to-Peer Network using Windows Software, 23. Connect Bluetooth devices with computers. 24. IP Routing Process with Verifying Configuration. 25. Connecting computers with Network with Drop cable and using Wi-Fi configuration. 26. Programmable switch Configuration with Spanning Tree Protocol (STP). **IP Addressing & TCP/ IP** 27. Installation & Configuration of TCP/ IP Protocol. 28. Practice TCP IP Utilities: PINGIPCONFIG HOSTNAME ROUTE & Setup and configure	Introduction to Computer Networks – Advantages of Networking, Peer-to-Peer and Client/Server Networ. 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. Communication Media Connectors. Unshielded twisted-pair (UTP), shielded twisted-pair (STP), Fiber Optics: RJ-45, RJ-11. Understanding color codes of CAT6 cable convention. Introduction to Data Communication Analog and Digital Signals, Simplex, Half-Duplex and Full Duplex transmission mode. OSI Model - The functions of different layers in OSI model. Network Components- Modems, Firewall, Hubs, Bridges, Routers, Gateways, Repeaters, Transceivers, Switches, Access point, etc. their types, functions, advantages and applications.

		a Virtual LAN. 29. Network Protection and troubleshooting wired & wireless network & use advance protection using public keys and MAC address filters. 30. Integrate wire with wireless network &Install Power over Ethernet (PoE). **Control & monitoring of network devices** 31. Setting up collaboration tool like Net Meeting for activities like chat, application sharing, remote desktop access and control &VoIP. 32. Setup IP camera for surveillance scenario, logging and monitoring of devices/locations. **Network Security** 33. Practice LAN security considerations and implement end point and Layer 2 security features. 34. Practice on Cryptography & Steganography, Securely Make Digital Signature Configuration and practice Key Loggers.	IP addressing technique (IP4/IPv6,v4) & concept of subnetting, Superneting, IP Routing in Network RIP IGRP. Protocols, TCP/IP, FTP, Telnet etc. Theory on Setting IP Address (IPv4/IPv6) & Subnet Mask, Classes of IP Addressing. Overview of Virtual LAN. VLAN Memberships. Identifying VLAN. Trunking -VLAN Trunk Protocol Concept of Translator Gateways. Collaborating using wired and wireless networks, Protecting a Network, Network performance study and enhancement. Surveillance using network devices, collaboration on network for team optimization and support activities. Remote management of devices. Modern Network Security Threats and the advance level of securing a network. Secure Administrative Access, LAN security considerations. Network Security Devices. Wi-Fi security considerations. ***IT Act & Law*** Introduction to Cyber Security. Introduction to Cyber Laws & IT ACT Importance of privacy techniques to manage it.
Practical 60 Hrs. Theory 23 Hrs.	Design and develop front end programming based on HTML 5, CSS, Javascript, Jquery, Angular and familiarization with Git and various	35. Working with HTML5forms&submit button in HTML5. 36. Integrate CSS with HTML. 37. Integrate jquery with HTML and CSS. 38. Working with MVC architecture:	Designing web application HTML5 Working with html tags. Working with HTML5 forms. Integrate Submit button and HTML5 form Concept of CSS class. Integration of CSS with HTML. Working with Jquery functions. Integrate jquery and css with HTML. Setting up an

	code editors like VScode, Atom, Braket, Notepad++.	Controllers, Directives, Services, Factories, Filters 39. Compare SPA (Single Page Application) in Angular with traditional web technology, Building blocks of AngularJS 40. Two-way Data-binding XHR/Ajax/$http calls and binding JSON 41. Working with Eager Loading, Lazy Loading, and Pre-Loading in Angular 42. Classification of editors- VSCode, Atom, Bracket, Notepad++ .	AngularJS project. Working with ng directives. Working with controller and scope. Working with Events. Validation in AngularJS. Exception Handling. Filters in AngularJS. Routing in AngularJS. Dependency Injection in AngularJS. Integrate application with git. Concept of creating application with Atom. Concept of creating application using Bracket Concept of creating web application using Notepad.
Practical 60 Hrs. Theory 23 Hrs.	Design and develop Backend programming based on Python, PHP (Laravel) and database scripting with MySql, MongoDB.	**Python** 43. Setting up path working with Python 44. Basic Syntax Variable and Data Types Operator Conditional Statements, Looping, Control Statements, String Manipulation, Lists, Tuple, Dictionaries, Functions, Modules, Input-Output, Exception Handling, OOPs concept. **Laravel** 45. Introduction to PHP Framework & Laravel. 46. Larave Installation &Routing. 47. Practice MVC, Caching, Event subscribers in Laravel. 48. Package Development, Templates, Creating an Application, Testing in Laravel. 49. Database Configuration. 50. Helpers in Laravel. 51. Laravel Pagination, Validation & Laravel Security. 52. Authentication Facade. 53. Eloquent ORM. 54. Artisan Command Line	Python If If-else Nested if-else. For While Nested loops. Break Continue Pass. Accessing Strings Basic Operations String slices, Function and Methods. Introduction Accessing list Operations. Working with lists Function and Methods. Introduction Accessing tuples Operations, Working Functions and Methods. Accessing values in dictionaries Working with dictionaries Properties Functions. Defining a function Calling a

		Interface &Deploy Application using Laravel. **MySQL** 55. Setup Database and Tables. 56. Query with Select Statement, Distinct Clause, Where Clause, Logical (AND, OR) Operator, IN, NOT IN Operator, Between and NOT Between Operator, LIMIT and IS NULL Operator, LIKE Operator. 57. Query with ORDER BY Clause, JOINS - Cross, Inner, Left, Right and Self Join, GROUP BY and HAVING Clause 58. Practice SubQuery(Nested Query) with EXISTS and NOT EXISTS Clause, UNION, UNION ALL, INTERSECT and MINUS Set Operators, INSERT, UPDATE, DELETE Statement, 59. Managing Database in MySQL - Show, Create, Use and Drop Database. 60. Practice Create Table with Constraints (NOT NULL, Unique, etc..), PRIMARY and FOREIGN KEY in MySQL 61. Practice ALTER, DROP, TRUNCATE Table, Indexes in MySQL - CREATE, View and Delete Index. 62. Practice Create View, With Check Option, Manage Views. **Mongo DB** 63. Mapping Relational database to MongoDB, MongoDB installation and configuration in Windows. 64. MongoDB Create database, Drop Database, Create collection, Drop collection, Insert Document, 65. MongoDB Query Document, MongoDB Update Document, Delete document.	function Types of functions Function Arguments Anonymous functions Global and local variables. Importing module Math module Random module Packages Composition. Printing on screen Reading data from keyboard Opening and closing file Reading and writing files Functions. Exception Exception Handling Except clause Try. finally clause User Defined Exceptions. Class and object, Attributes, Inheritance, Overloading, Overriding, Data hiding. Laravel can be used to code any type of PHP web application. Packages Migrations Eloquent ORM Controllers Route declaration Authentication Mechanism Data Seeding Good Community. Introduction to MySQL Designing Databases Basic SQL Database Structures Doing Advanced Queries Advanced MySQL Concepts Managing Users and Privileges Backing Up and Restoring MySQL Databases MySQL Options File and Configuring and Tuning the MySQL Server, Setting Up MySQL Replication. Introduction to NoSQL Architecture with MongoDB

		66. MongoDB Projection 67. limit() and skip() method in MongoDB. 68. Sorting of Documents in MongoDB& Indexing.	Overview, Advantages, Environment, Data Modeling Create Database, Drop Database, Create Collection Drop Collection, Data Types Insert Document, Query Document, Update Document, Delete Document, Projection Limiting Records, Sorting Records, Indexing, Aggregation Replication, Sharding, Create Backup, Deployment.
Practical 25 Hrs Theory 10 Hrs	Demonstrate Hosting and deployment of web apps on cloud platforms like Azure, AWS, RedHat or equivalent	69. Summarize the Basics of Cloud Computing & Service models: IAAS, PAAS, SAAS. 70. Comparing cloud computing along with providers (Google/AWS/MSAzure/ RedHat): Public, Private, Hybrid. 71. Benefits of using Cloud platforms & Working with DevOps methodology.	Create Virtual Machine in MS Azure, Working with Resource groups, Working with Continuous Integration (CI) and continuous delivery(CD): Configuring pipelines: Deploying web application using Repos like git/VSTS/Jenkins: Create pull request: Configure Release pipeline
Practical 95 Hrs. Theory 36 Hrs.	Create multimedia content with various tools like Adobe Photoshop, GIMP, Adobe Illustrator, Premier, AdobeXD, Aftereffects, 3DMax.	**Adobe Photoshop** 72. The New CS4 Applications Bar & the Options Bar, Exploring Panels & Menus **Working with Images** 73. Adjusting Color, New Masks Panel &Vibrance Color Correction Command. 74. The New 3D Commands RESIZING & CROPPING IMAGES. 75. Interpolation Options, Resizing for Print & Web, Cropping & Straightening an Image, Adjusting Canvas Size & Canvas Rotation. **PHOTO RETOUCHING** 76. The Red Eye Tool, Clone Stamp Tool, Patch Tool & the Healing Brush Tool, Spot Healing Brush Tool, Color Replacement Tool, Toning &	**Photoshop** User Interface-Get familiar with the work area, Pixel vs vector graphic, Image size and resolution Colour modes and colour management, Bit depth and Transparency, File types, Compression and noise, Histogram and tonal range, Layer concept Photo retouching concepts Knowledge of using Presets in photoshop, Keyboard shortcuts for better use. Selection Tools, Path Tool, Transform Tools, Paint Tools, Text Tool, Miscellaneous Tools. Setting up the program interface for photo retouching. Opening RAW images into GIMP. Editing your photos to improve their color and quality. Color balancing, levels

		Focus Tools, Painting with History. **INTRODUCTION TO COLOR CORRECTION** 77. Color Spaces & Color Modes, the Variations Command and Adjusting Levels, Adjust Curves, Non-Destructively, with Adjustment Layers. **USING QUICK MASK MODE** 78. Quick Mask Options, Painting a Selection, Saving & Removing a Selection from the Background. **WORKING WITH THE PEN TOOL** 79. Understanding Paths & the Pen Tool, Creating Straight & Curved Paths, Combo Paths, Clipping Path. **CREATING SPECIAL EFFECTS** 80. Getting Started with Photoshop Filters, Smart Filters., Creating Text Effects & applying Gradients to Text. **Adobe Illustrator** 81. Using the shape tools for Repositioning and resizing. 82. **Adding color** Exploring the Appearance panel Changing colors and different effects. 83. **Using the drawing tools** Use the Pen, line, pencil, eraser tools for Creating a tracing template Working with Image Trace. 84. **Adding and formatting text.** Format text using Paragraph formatting. 85. **Using layers** Practice different layer options. **GIMP** 86. Use GIMP Layers to Create Amazing Photos, Work WithPaths, filters, lighting.	adjustment, Brightness & Contrast, Hue/Saturation, Hue/Chroma. Sharpening an image, Touching up an image , Eye enhancement. All 38 layer modes found in GIMP for blending images Includes explanations of each Layer Mode Type. Scaling and cropping your images, including cropping images into a circle shape. Enhancing your photos with lighting effects and filters. Editing Black and White Photos. Exporting your images out of GIMP for use in print or web projects. **Adobe Illustrator** • Advanced Drawing and Path Editing • Working with Color • Object Transformation and Positioning • Use of Brushes • Use of Masks • Use of Symbols • Application of Filters and Live Effects • Advanced Text Editing • Designing for the Web • Creation of Blends • Working with Images

		87. Practice Photo Retouching, Creating a Custom Brushes, Practice Animation. 88. Use the Cage Transform Tool in GIMP, Practice to GIMP Scripting, PracticeGIMP Text Effects. 89. Designing a Photo Collage Using Multiple Images and Layer Masks. 90. Creating social media banners for Facebook, Twitter, and LinkedIn. **Adobe XD** 91. Creating New Files & Designing on a Grid, Creating a new file, Setting up artboards, Importing text, Creating colored backgrounds for text. 92. Adjusting the Layout for Tablets & Mobile Phones Designing with Bootstrap's grid. 93. Importing Vector Graphics, Color Swatches, Shadows, & More. **Character Styles**. 94. Creating & Editing Character Styles. **Repeat Grids** 95. Working on Repeat Grid. **Symbols (Reusable Elements)** 96. Creating & editing symbols. **Turning a Design into a Clickable Prototype** 97. Linking between art boards. Creating an overlay. Previewing the prototype. Background blur. 98. **Exporting Assets for Web: SVG, JPEG, & PNG** Exporting individual assets. Exporting artboards. 99. **Sharing XD Files (For Review, Developers, etc.)** Sharing an XD file.	**GIMP** Basics settings and Getting around GIMP environment. GIMP Toolbox, Mixing Colors in GIMP, Cutting Out An Image Using GIMP, Using the Quick Mask In GIMP, Layer Masks in GIMP. **ADOBE XD** Navigate around the interface, Set up art boards to rapidly assemble wireframes, Create a splash screen, Resizing and positioning, Make your art boards responsive using auto-resize, Design icons using the pen tool and boolean effects, Convert icons and buttons into symbols to reuse across entire project, Apply text and color style presets and change on the fly, how to use the repeat grid to create fast, repeating columns and/or rows how to prototype and test your prototype within seconds, How to share projects, prototypes, and design assets. **Introduction to Adobe Premier Project** Creating a Sequence, Editing in the Timeline, Refining the sequence, Transitions, Audio, Tiles, Effects, Output. **Introduction to Adobe After Effects** Special effect Techniques. Introduction to User interface. Concepts of compositions, Key framing, Looping animation, motion path. Introduction to Bound Effects, Authoring Tool & Special effects

		Commenting on shared files. Pinning a comment. Updating an existing shared file. Sharing for Development. **Adobe Premier** 100. Practice to change Project settings, Preference settings, Asset Management, Sequences & Clips, Offline On-line Clips. 101. Managing Clips: The Project panel, Views, The preview area, Organizing and working on clips and bins. 102. Wave form and Vector scope Options, The Reference Monitor, Ganging source and Program Monitor. 103. Creating a Sequence Editing Methods. 104. Editing in the Timeline. 105. Refining the sequence with Snapping, Trimming Methods. 106. Practice with Transitions: The Effects Panel, Understanding Transitions, Applying A Transitions, Editing A Transitions. 107. Working with Audio and different options. 108. Practice with Titles. 109. Working with different Effects. 110. Making Output: Creating DVDs, Blu-Ray, SWF, MP4 and FLV Files, Media Encoder for DVD Makers using Clip Notes. **Adobe After Effects** 111. Practice on Animate 3D transformations, Include a common loop sound. 112. Practice on simple scripting	Tool, filter effects and mask to components. 3D Animation transformations, use of common loop sound, simple scripting in special effect Tool. Rotoscoping, Chroma, 2D & 3D tracing, Green/Blue screen technique/shooting. Colour Correction. **Introduction to 3Ds Max** • Fundamentals & concepts of Animation • 3D Animation Techniques • User Interface • Modelling • Lighting /Rending • Character Setup & Animation Dynamics

		in special effect Tool, Rotoscoping, Chroma, 2D & 3D tracing, Green/Blue screen technique/shooting. Colour Correction. **3Ds MAX** 113. Practice on Transform tool basics, Pivot points, Grouping and parenting, modelling with primitives. 114. Practice on different User. 115. Working with the camera, over view of MEL, Outliner/ Hyper graph, Grouping /parenting Shelf Marking Menus. 116. Practice on different types of Modellingi.e. Curve Tools /snapping, Revolving etc. 117. Working with polygons, Sub-divisional surfaces, Split polygon Tool, Lofting, Extruding. 118. Practice on MODELLING, POLYGON TOOLS, with PROXY, NORMALS, Lighting /Rendering. 119. Practice on Hyper shade, Materials, Apply Materials, Making Shader Networks, Combining Ramps, Layered Textures, Intro to lights, Making Bump Maps. 120. Working with Shadows, UV Mapping, Specular Maps, Paints FX, Render View, Camera Settings, Render Globals, TOON SHADER.	
Practical 25 Hrs. Theory 10 Hrs.	Simulate Robotic Process Automation.	**Introduction to Robotic Process Automation** 121. Explore and evaluate business processes from different industries like banking, retail, e-commerce, healthcare, telecom, agriculture, pharmaceutical,	**Robotic Process Automation** RPA – what, why & how? Benefits of RPA. Current trends and the impact it will have on different industries. RPA Lifecycle, stages, object model flowchart.

		education, energy, manufacturing etc. which can potential candidates for RPA. 122. Register and install UI path community edition and explore UI path studio. 123. Implement a web-scrapping RPA project to extract a specific information from the web and store it in a local file. 124. Implement a Customer order processing RPA project to consolidate customer orders, update inventory and finally prepare for the dispatch. 125. Implement a RPA project for automated payroll processing. 126. Implement an email query processing RPA project to scan incoming mails for specific request and trigger an action accordingly. 127. Implement an invoice processing RPA project to extract data from invoices and send a consolidated report to a specific email with that information. 128. Implement an Account reconciliation RPA project to eliminate duplicate payments. 129. Implement an automatic patient registration RPA project for a hospital. 130. Implement a Compliance reporting automation project to check all the software installed on the computers of an organization.	Evaluating complexity, viability, system requirements for RPA implementation. Key players in RPA and comparison among them - UI Path, Blueprism, Automation Anywhere, Pega Systems. UI Path components, architecture, variables, data types and activities. Error Handling & Debugging in UI Path. Orchestrator in UI Path. UI Path Robotic Enterprise Framework. Overview of Automation Anywhere. Automation Anywhere control room and bots. Industry trends and latest emerging scope for RPA.
Practical 25 Hrs.	Design and analyse BIG data	131. Case study for BIG data. 132. Cloudera Quick starts VM installation and	Introduction to Big Data – what is big data? Concept of 5 v's - volume, velocity, variety, value,

Theory 10 Hrs.		configuration. 133. Explore Hadoop Distributed File System, MapReduce, YARN and YARN components. 134. Case study and walkthrough of different Cloudera Hadoop ecosystem components – sqoop, flume, hive, hcatalog, pig, apache hbase, apache kafka, oozie, zookeeper, pig scripting, apache drill, mahout, kafka, apache storm. 135. Apache Spark installation and configuration on Windows and work with Spark shell.	veracity. The other v's – volatility, validity, viscosity, virality. Introduction to Hadoop. Distribution of Apache Hadoop & different available cluster management solutions. HDFS, MapReduce & YARN Apache Spark, Components of Apache Spark & Hadoop vs Spark
Practical 25 Hrs. Theory 10 Hrs.	Perform business analytics, business intelligence and analytical reporting	136. Explore different type, nature & magnitude of data generated by different business, processes, industry and systems. 137. Understand and apply basic day-to-day analytics using Excel. 138. Work with Excel functions viz. math & trigonometry, financial, text, lookup and reference, logical, statistical, engineering, compatibility, add-in and automation, information. 139. Summarization of data - Pivot function. 140. Different visualization options – graphs and charts. 141. Implement analytical model in excel with various visualizations & Power pivot. 142. Case study of how focused and targeted analytics could dramatically transform business and industries. 143. Install Microsoft Power BI desktop and explore the	Analyze the lifecycle of data – creation, transfer, processing, analysis, preservation and purging along with focus on data security and privacy. Basic concepts of ETL, encryption-decryption, data cleansing & data quality. Introduction to OLTP & OLAP Understand Data warehouse, Data mart, Cubes & Data lake Introduction to business analytics – from raw data to insights. Trends in business analytics. Visualization of information Introduction to different Business Analytics and Business Intelligence tools Overview of Microsoft Power BI Direct query & import data, Standard & Custom visualizations Filters Calculated columns & measures M-query &Dax query

		studio and query editor features and options. 144. Create basic data models by importing data in Power BI and represent key insights in different standard visualizations like – pie charts, histogram, tree map. 145. Change visual attributes and properties. 146. Apply visual level, page level and report level filters in Power BI &Create calculated column and measures in Power BI. 147. Work with M-query and Dax query.	
Practical 25Hrs. Theory 10Hrs.	Create Artificial Intelligence and machine learning test data /annotations for text/image /video/speech	148. Get familiar with applications that are based on Artificial Intelligence a. Google voice assistant detects speech b. Google lens can detect texts on image, it can also identify objects & persons in an image c. Doodle recognition using quick draw by google https://quickdraw.withgoogle.com/ d. Google photos - search using texts (e.g. red flower, running, scene, child) 149. Image data labelling using LabelMe tool by MIT - http://labelme2.csail.mit.edu/ a. creating account b. uploading various kinds of images c. labelling them 150. Video data labelling using Computer Vision Annotation Tool (4 Hrs) (CVAT: https://github.com/opencv/cvat) (*CVAT has to be set up*	Basics of AI & ML a. Why these two terms are relevant these days b. A brief history c. How AI can reshape our economy by adding more efficiency in the existing processes and how it has potential to create more job opportunities d. Types of machine learning i. supervised ii. unsupervised iii. semi-supervised iv. reinforced e. Applications of AI for various purposes i. Object detection ii. Face recognition iii. Speech-to-text iv. Text-to-speech v. Language translation vi. Text classifications and categorization vii. Human gesture recognition viii. Product Recommendations 2. Examples of innovative AI

		in cloud and has to be maintained. There are companies who provide managed hosting for CVAT with a yearly cost) 151. Hands-on train AI image recognition online using Teachable Machine https://teachablemachine.withgoogle.com/ a. Collect (10+2) good quality images for each of 5 different birds. b. Separate these into two sets of 10 images and 2 images; name these as train set and test set. c. Upload the train set images according to 5 class labels. d. Train the system. e. Now test the training quality by uploading test set one by one and note down if the machine can identify the bird correctly. f. Derive accuracy of the system by calculating (total correct identification / total images in **test set**). g. Export the model and save it on the local computer. 152. Speech data annotation using Wavesurfertool:https://wavesurfer-js.org/ a. Record sound clips b. Adding annotations c. Saving files locally 153. Text data labelling using **doccano**https://github.com/doccano/doccano **(*The tool*** *has to be set up in cloud and has to be maintained. There are companies who provide managed hosting for doccano with a yearly cost* **)** (	based applications and how they have changed the existing way of how we do things a. Search engine ranking- Google b. Self-driving car - Tesla c. Personal assistant - Google assistant, Siri, Alexa d. Amazon's new product recommendation engine e. Industry applications - Early detection of faults & anomalies. f. How ML training is How computer learns from a. samples of various data: text, speech, image, video etc. b. Various algorithms for machine learning c. Various libraries used for machine learning 2. Data labelling & annotations in AI a. Why ML training needs high quality training data, annotated with proper labels. How lack of data can impact the quality of learning. b. Understanding of text, image, video , speech annotation and labelling 3. Basics of chat bots & and its usefulness / applications in various industries (2 hr) a. E-commerce b. Banking c. Customer support d. Digital marketing

		***Prerequisites**: Students should be provided with 100 reviews from amazon, news headlines and other texts from various internet sources*) a. Label texts to various classes b. Classification tasks with sentiment labelling such as: positive, negative, neutral c. Entity extraction tasks - annotate words with entity names such as: people, country, event 154. Hands-on text-classification using fastText&Python:https://fasttext.cc/docs/en/supervised-tutorial.html a. Installing FastText in python environment b. Use data created in step 7 for training c. Testing output and retraining 155. Facebook chatbot development using Chatfuel - https://dashboard.chatfuel.com/login a. Login with facebook b. Create a facebook page c. Learn how to automate interactions d. Set up AI to respond contextually	
Engineering Drawing: 40 Hrs.			
Professional Knowledge ED- 40 Hrs.	Read and apply engineering drawing for different application in the field of work.	**ENGINEERING DRAWING:** Reading of Electrical Sign and Symbols. Sketches of Electrical components. Reading of Electrical wiring diagram and Layout diagram. Reading of Electrical earthing diagram. Drawing the schematic diagram of plate and pipe earthing. Drawing of Electrical circuit diagram. Drawing of Block diagram of Instruments & equipment of trades.	
WORKSHOP CALCULATION & SCIENCE: 40 Hrs.			
Professional	Demonstrate	**WORKSHOP CALCULATION & SCIENCE:**	

Knowledge WCS- 40 Hrs.	basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study.	**Friction** Friction - Lubrication **Algebra** Algebra - Addition , subtraction, multiplication & division Algebra - Theory of indices, algebraic formula, related problems **Elasticity** Elasticity - Elastic, plastic materials, stress, strain and their units and young's modulus **Profit and Loss** Profit and loss - Simple problems on profit & loss Profit and loss - Simple and compound interest **Estimation and Costing** Estimation and costing - Simple estimation of the requirement of material etc., as applicable to the trade. Estimation and costing - Problems on estimation and costing

SYLLABUS FOR CORE SKILLS (Syllabus available separately)
1. Training Methodology (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 OUTCOMES	ASSESSMENT CRITERIA
TRADE TECHNOLOGY	
1. Demonstrate electronic components, micro-controllers, single board programming, sensors. (NOS: SSC/N9482)	Construct a 2's complement circuit
	Verify truth table of NAND Gate
	Construct AND gates from UNIVERSAL Gate
	Create Hello World program using Arduino code structure
	Identify various sensors
	Removing and refixing SMT registors
	Desing adder/subtractor circuit
	Design basic flip-flops
	Desing Multiplexer/Demultiplexer
	Construct Asynchronous/synchronous counter
2. Install, configure and troubleshoot Hardware related to computers, servers, network components and smart devices. (NOS: SSC/N9483)	Test RAM power supply
	Use debug card to test Motherboard
	Troubleshoot LAN Card errors
	Troubleshoot WiFi errors
	Troubleshoot failure of touchpad/USB/HDMI
	Configure BIOS
3. Monitor Installation of different types of OS for Desktop, servers and Virtual Machines; Application /driver installation on premises /cloud. (NOS: SSC/N9484)	Create a windows system image
	Install Windows OS
	Install Linux OS
	Install and configure Virtual Machine
	Install Telnet and configure
	Install driver for printer/scanner/cloud printer
4. Demonstrate cyber security practices & laws, security threats & vulnerabilities and configure Networking systems & devices. (NOS: SSC/N9485)	Familiarization with various Network devices, Connectors and Cables.
	Crimping practice with straight and cross CAT 6 cables.
	Punching practice in IO Box and patch panel.
	Create cabling in a lab with Router/ Switch and IO Boxes and patch panel.
	Installing & Configuring a Peer-to-Peer Network using Windows Software.
	Connecting computers with Network with Drop cable and using Wi-Fi configuration.
	Programmable switch Configuration (STP).
	Installation and Configuration of TCP/ IP Protocol.
	Setup and configure a VLAN.
	Practice on Tracking Email.

	Practice on Cryptography & Steganography.
	Securely Make Digital Signature 1 & 2.
	Configuration and practice Key Loggers.
	Set up & Configure protection using MAC address filtering & public keys.
	Troubleshoot different problems of wired & wireless network.
	Implement LAN/WLAN security using hardware & software firewall to secure the network.
5. Design and develop front end programming based on HTML 5, CSS, Javascript, Jquery, Angular and familiarisation with Git and various code editors like VS code, Atom, Braket, Notepad++. (NOS: SSC/N9486)	Design HTML5 webpage using audio video control
	Use CSS 3 to create rounded corners, 2D animations and multiple backgrounds
	Create webpage with embedded JavaScript for adding two nos.
	Create webpage with embedded JavaScript using conditional statements/loops/arrays/string/events
6. Design and develop Backend programming based on Python, PHP (Laravel) and database scripting with MySql, MongoDB. (NOS: SSC/N9487)	Printing different messages by using different variations of print() method.
	Python program to print given text using a user-defined method
	Design a simple calculator using if elif (just like switch case)
	Print all numbers between 1 to 1000 which are divisible by 7 and must not be divisible
	Program to print Odd and Even numbers from the list of integers.
	Python program to check the given Date is valid or not
	Python program to find sum of all digits of a number
	Python program to find the sum of all elements of an array
	Python program to find number of bits necessary to represent an integer in binary
	Make a basic Basic Task List using Laravel
	Creating a Basic Laravel MVC Application
	Develop a User Registration & Login and User Management System With admin panel using PHP and MySql.
7. Demonstrate Hosting and deployment of web apps on cloud platforms like Azure, AWS, RedHat or equivalent. (NOS: SSC/N9488)	Create Virtual Machine in MS Azure
	Create Resource groups
	Create build pipeline and release pipeline
	Create Pull Request
	Deploy using Release pipeline
8. Create multimedia content with various tools like Adobe	What is a Gradient in Adobe Photoshop.
	What are the Photoshop's work areas.
	Opening and Importing images, Creating Documents with different

Photoshop, GIMP, Adobe Illustrator, Premier, AdobeXD, Aftereffects, 3DMax. (NOS: SSC/N9489)	sizes.
	Rectangular Marquee Tool & Elliptical marquee tool & single row marquee tool, single column marquee tool.
	Move tool, magic wand tool, quick selection tool, lasso tool, polygonal lasso tool, magnetic lasso tool
	Crop tool, slice tool, slice select tool, eyedropper tool, color sampler tool, ruler tool, note tool, count tool
	Spot healing brush tool, healing brush tool, patch tool, red eye tool, brush tool, pencil tool, color replacement tool, mixer brush tool
	Drawing with the Pen tool in Adobe Illustrator
	Create and edit shapes Adobe Illustrator
	Create with drawing tools Adobe Illustrator
	How to use the Color Picker Adobe Illustrator
	Add text to your designs Adobe Illustrator
9. Simulate Robotic Process Automation. (NOS: SSC/N9496)	Register and Install UI path community
	Implement a web scraping RPA project
	Implement a Customer order processing RPA project
	Implement an automatic patient registration RPA project for a hospital.
10. Design and analyse BIG data. (NOS: SSC/N9501)	Create the ER diagram of a stock inventory database
	Create a SQL view by joining multiple tables
	Create a database stored procedure
	Install and configure Apache spark
11. Perform business analytics, business intelligence and analytical reporting. (NOS: SSC/N9502)	Summarise data using Pivot table in Excel
	Design a graphical report in excel based on world population data with trend lines, stacked bar charts, pie chart &treemap
	Implement a project in Microsoft Power BI using world gdp data with different custom visuals
	Apply slicers in a power bi report
	Create a calculated column in a power bi report
	Create a calculated measure in a power bi report
12. Create Artificial Intelligence and machine learning test data /annotations for text/image/video/ speech. (NOS: SSC/N9503)	Annotate objects using LabelMe tool in given 5 random images
	Train an AI to distinguish between cats and dogs in Teachable Machine online tool. Calculate the accuracy of your system.
	Label objects using CVAT tool for a given 5 sec video.
	Annotate speech in Wavesurfer tool for a given audio.
	Train an AI using fastText in python for given 100 news paragraphs.
13. Read and apply engineering drawing for	Read & interpret the information on drawings and apply in executing practical work.

different application in the field of work. (NOS: PSS/N9411)	Read & analyze the specification to ascertain the material requirement, tools and assembly/maintenance parameters
	Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.
14. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: PSS/N9412)	Solve different mathematical problems
	Explain concept of basic science related to the field of study

8. INFRASTRUCTURE

LIST OF TOOLS AND EQUIPMENT FOR INFORMATION TECHNOLOGY - CITS TRADE			
(for batch of 25 candidates)			
S no.	**Name of the Tool &Equipment**	**Specification**	**Quantity**

A. TRAINEES TOOL KIT			
1.	Insulated Screw Driver (different types)		26 (25+1) Nos.
2.	Knife double bladed electrician		26 (25+1) Nos.
3.	Insulated handle thin connector screw driver		26 (25+1) Nos.
4.	Line tester		26 (25+1) Nos.
5.	Heavy duty screw driver		26 (25+1) Nos.
6.	Combination plier		26 (25+1) Nos.
7.	Long nose plier		26 (25+1) Nos.
8.	Tweezer		26 (25+1) Nos.
9.	Phillips type screw driver set		26 (25+1) Nos.
10.	Wire stripper		26 (25+1) Nos.
11.	Desoldering pump		26 (25+1) Nos.
12.	Bread board for connecting various components i.e. ICs		26 (25+1) Nos.
13.	IC Puller		26 (26+1) Nos.
B. WORKSHOP FURNITURE			
14.	Instructor table & chair		01 each
15.	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
16.	Stool cum chair		25 Nos.
17.	Computer Table, Printer Table, Stools		As required
18.	Green Glass Board		01 No.
19.	Metal Rack		As required
20.	Locker with 10 drawers (standard size) for 25 trainees		03 Nos.
21.	Storage Almirah		01 No.
22.	Book shelf (Glass panel)		01 No.
23.	Fire fighting equipment, first aid box etc.		As required
24.	Computer Maintenance Tables of Suitable sizes		As required
C. HARDWARE			
25.	Desktop Computer	CPU: 64 Bit i3/i5/i7 or latest processor, Speed: 3 GHz or Higher.	25 (13 nos. connected in LAN,

		RAM:-4 GB DDR-III or Higher, 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.	12 for Assembly &Maintenance Practice)
26.	Desktop Computer (Server)	CPU: 64 Bit i3/i5/i7 or latest processor, Speed: 3 GHz or Higher. Cache Memory: - Minimum 3 MB or better. RAM:-8 GB DDR-III or Higher. Hard Disk Drive: 500GB or Higher, 7200 rpm (minimum) or Higher, Network Card: Integrated Gigabit Ethernet (10/100/1000) - Wi-Fi, USB Mouse, USB Keyboard and Monitor (Min. 17 Inch), Standard Ports and connectors. DVD Writer, Licensed Windows Operating System / OEM Pack (Preloaded), Antivirus / Total Security	01 No.
27.	Laptop or Notebook		01 No.
28.	Tablet		04 Nos.
29.	Broad Band Internet Connection/Leased Line	20 Mbps or above bandwidth with 100GB or more data/per month preferably with Fiber optic media	01 No.
30.	Logic Probes/Logic Pulser		04 Nos.
31.	Digital IC tester		04 Nos.
32.	Digital ICs		As required
33.	DC regulated power supply	5 volts and 12 volts	13 Nos.
34.	Digital Multimeter		13 Nos.
35.	Analog Multimeter		10 Nos.
36.	Basic Digital Electronics Trainer Kit		05 Nos
37.	SMPS Trainer Kit		05 Nos
38.	Temperature controlled soldering/ desoldering station with changeable bit.		05 Nos.
39.	SMD soldering/desoldering station		05 Nos.
40.	SMPS of PC		13 Nos.
41.	SMD REWORK STATION	0-12 V, 6-0-6 V, 1 Amp	05 Nos.
42.	BGA REWORK STATION		13 Nos.
43.	Arduino Training Kit		05 Nos.

44.	PCB, solder flux etc& electronic components		As required
45.	Resistors, Capacitors, Inductors, Diodes, Transistors, Thyristors, ICs etc.		As required
46.	Various types of Button Cells		As required
47.	Crimping tool (pliers)		05 Nos.
48.	Punching Tool		05 Nos.
49.	Different types and makes of Motherboards		10 Nos.
50.	CD Writers		05 Nos.
51.	DVD writer		05 Nos.
52.	External HDD		13 Nos.
53.	CD/DVD ROM Drive		13 Nos.
54.	Display card		13 Nos.
55.	Ethernet card		13 Nos.
56.	Computer monitor of different types	15"/17"	05 Nos.
57.	Keyboard and mouse		13 each
58.	USB Flash drive	latest specification	13 Nos.
59.	Internal PCI modems of at least four different makes and types		01 each
60.	External modems of at least two different makes and types		01 each
61.	Dot matrix printer		02 Nos.
62.	Inkjet printer		02 Nos.
63.	Laser printer Network	B & W	02 Nos.
64.	Scanner		01 No.
65.	UPS		Asrequired
66.	RAM	2 GB or Higher(For demonstration)	As required
67.	CPU different types	(For demonstration)	As required
68.	HUB/Switch	8/16 port	4 Nos.
69.	Switch	16 port or higher	1 No.
70.	Router	16 port or higher	1 No.
71.	UTP cable		As required
72.	RJ 45 connectors		As required
73.	LAN Cards, Wi-fi LAN Cards		06 Nos. each.
74.	LCD/DLP Projector		01 No.
75.	Motherboards (of different make)		4 Nos.
76.	LCD/LED/TFT Monitors		2 Nos.
77.	Anti static pads		4 Nos.
78.	Card Reader		2 Nos.

79.	Web Cam		2 Nos.
80.	Surround sound speakers		2 Nos.
81.	Different types of memory cards		2 Nos. each
82.	Laptop kits		01 No.
83.	Laptop spares: Cabinet with display, memory, hard disk, battery pack, keyboard membrane, chargers		As required
84.	UPS Trainer kit		As required
85.	LAN cable tester		2 Nos.
86.	Media Convertor		4 each
87.	Fibre Optics cable with LC connector		As required
88.	LC connector module		As required.
89.	IP Camera		4 Nos
90.	POE Switch		4 Nos
91.	Different types of SMT registers, SMST registers, SMT capacitors, SMT Inductors, Crystal Oscillotors, RTC, SMT TRANSFORMER, SMT DIODE, SMT TRANSISTERS(PNP/NPN), MOSFET		As required.
92.	VARIOUS TYPES OF INDUSTRIAL SENSORS		As required.
93.	BASIC ADRINO HARDWARE & SOFTWARE		13 Nos.
D. SOFTWARE (Licensed Version)			
94.	Microsoft Window	latest version/Preinstalled	26 licenses
95.	Microsoft Windows Server	latest version	01 license
96.	MS Office	latest version	27 licenses
97.	Anti virus	latest version	27 Nos.
98.	Network troubleshooting utilities	latest version	4 Nos.
99.	Linux Server	latest version/Freeware	1 No.
100.	Linux OS	latest version/Freeware	26 licenses
101.	VM Ware	latest version/Freeware	26 licenses
102.	Digital Signature1&2 maker		05 Nos.
103.	Cryptography & Steganography tools/freeware		05 Nos.
104.	Key Logger softwares		05 Nos.
105.	VSCode	Visual Studio 2019/latest version	26 licenses
106.	Atom	Freeware	26 licenses
107.	Braket	Freeware	26 licenses
108.	Notepad++	Freeware	26 licenses

109.	Angular JS	Latest version	26 licenses
110.	JSON Viewer	Latest version	26 licenses
111.	Git	Latest version	26 licenses
112.	Python	Freeware	26 licenses
113.	PHP	Freeware	26 licenses
114.	Laravel	Freeware	26 licenses
115.	My SQL	Freeware	26 licenses
116.	MongoDB Atlas	Freeware	26 licenses
117.	Azure/AWS/RedHatcloud platforms	Microsoft Azure	04 Accounts
118.	DevOps	Freeware	26 licenses
119.	Adobe Photoshop	latest version	26 licenses
120.	Adobe Illustrator	latest version	26 licenses
121.	GIMP	Freeware	26 licenses
122.	Adobe XD	latest version	26 licenses
123.	Adobe Premier	latest version	26 licenses
124.	Adobe After Effects	latest version	26 licenses
125.	Microsoft Power BI	latest version	26 licenses
126.	Google voice assistant	Freeware	26 licenses
127.	Google lens	Freeware	26 licenses
128.	Quickdraw by google	Freeware	26 licenses
129.	LabelMe tool	Freeware	26 licenses
130.	Computer Vision Annotation Tool	Freeware (managed hosting can be purchased)	26 licenses
131.	Teachable Machine	Freeware	26 licenses
132.	Wavesurfer tool	Freeware	26 licenses
133.	doccano	Freeware(managed hosting can be purchased)	26 licenses
134.	fastText	Freeware	26 licenses
135.	Chatfuel	Freeware	26 licenses
136.	Facebook chatbot	Freeware	26 licenses
Note: - *All the tools and equipment are to be procured as per BIS specification.*			


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