GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

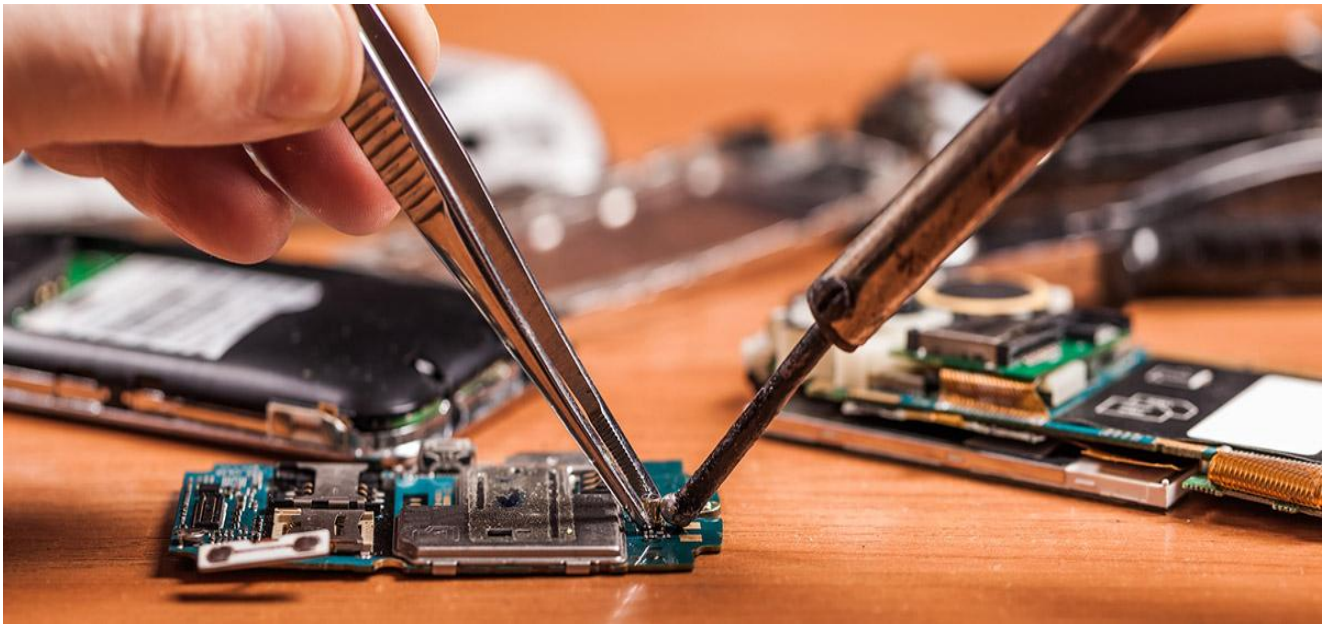
COMPETENCY BASED CURRICULUM

SMARTPHONE TECHNICIAN CUM APP TESTER

(Duration: Six Months)

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 3



SECTOR –ELECTRONICS & HARDWARE

Directorate General of Training

SMARTPHONE TECHNICIAN CUM APP TESTER

(Non-Engineering Trade)

(Revised in 2019)

Version: 1.2

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL - 3

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

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CONTENTS

1. COURSE INFORMATION

During the six months duration of Smartphone Technician cum App Tester trade a candidate is trained on professional skills and professional knowledge related to job role. In addition to this a candidate is entrusted to undertake project work and Extra-Curricular Activities to build up confidence. The broad components covered related to the trade are categorized in six months duration as below:-

The trainee begins with learning first aid, fire fighting and various safety practices for working in industry environment. Identifies and checks different electronic components used in mobiles phone and understand their working. He does practicals on soldering/ de-soldering, understands different sections and circuits of mobile phones starting with basic GSM and CDMA sets. Understands various concepts and technologies used in basic mobiles, smartphone and tablets. The Trainee learns to disassemble/ assemble smartphones, identify defects and practices on replacement of different components viz., mic, speaker, connectors, ICs, camera, display, etc. He does practicals on OS installation, reboot procedure, password cracking, Removes virus, perform installation of firmware, encryption/ decryption, use of third party software, flash different android dead phones, etc. The trainee learns to troubleshoot Software problems using internet, backup data, update and provide hard drive solutions. He also learns mobile app testing to verify functionality of mobile applications on Android/ iOS platforms, performs mobile app Security to find and fix mobile app security flaws, ensures prevention of malware and data theft and Troubleshoot Mobile Applications Performance.

Also the trainee will learn to Communicate with required clarity, understand technical English, environment regulation, productivity and enhance self-learning.

2. TRAINING SYSTEM

2.1 GENERAL

The Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers a range of vocational training courses catering to the need of different sectors of the economy/ labour market. The vocational training programs are delivered under the aegis of Directorate General of Training (DGT). Craftsman Training Scheme (CTS) with variants and Apprenticeship Training Scheme (ATS) are two pioneer programs of DGT for propagating vocational training.

'Smartphone Technician cum App Tester' trade is a newly designed trade under Craftsman Training Scheme (CTS). The course is of six months duration. It mainly consists of Domain area and Core area. Domain area (Trade Theory and Trade Practical) imparts professional skills and knowledge, while Core area (Employability Skills) imparts requisite life skills. After passing out of the training programme, the trainee is awarded National Trade Certificate (NTC) by DGT which is recognized worldwide.

Candidates broadly need to demonstrate that they are able to:

- Read and interpret technical parameters/ documentation, executes work, identify necessary materials and tools.
- Perform tasks with due consideration to safety rules, accident prevention regulations.
- Apply professional knowledge & employability skills while performing the job and maintenance work.
- Check the circuit/ equipment/ panel as per drawing for functioning, identify and rectify faults/ defects.
- Document the technical parameters related to the task undertaken.

2.2 CAREER PROGRESSION PATHWAYS

- Can join industry as Technician and will progress further as Senior Technician, Supervisor and can rise up to the level of Manager.
- Can become Entrepreneur in the related field.
- Can join Cellphone industry, information technology department, service centre, or a computer sales environment.
- Can work in a mobile repairing store or at the authorized service centre or start own repair and servicing shop.

2.3 COURSE STRUCTURE

Table below depicts the distribution of training hours across various course elements during a period of six months:-

S No.	Course Element	Notional Training Hours
1.	Professional Skill (Trade Practical)	580
2.	Professional Knowledge (Trade Theory)	140
3.	Employability Skills	80
	Total	**800**

2.4 ASSESSMENT & CERTIFICATION

The trainee will be tested for his skill, knowledge and attitude during the period of the course and at the end of the training program as notified by the DGT from time to time.

a) The Continuous Assessment (Internal) during the period of training will be done by **Formative Assessment Method** by testing for assessment criteria listed against learning outcomes. The training institute has to maintain an individual trainee portfolio as detailed in assessment guideline. 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. The All India Trade Test for awarding NTC will be conducted by Controller of examinations, DGT as per the guidelines. The pattern and marking structure is being notified by DGT from time to time. **The learning outcome and assessment criteria will be basis for setting question papers for final assessment. The examiner during final examination will also check** individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS REGULATION

For the purposes of determining the overall result, weightage of 100% is applied for six months and one year duration courses and 50% weightage is applied to each examination for two years courses. The minimum pass percent for Trade Practical and Formative assessment is 60% & for all other subjects is 33%. 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. Due consideration should 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 the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment
- Project work

Evidences of internal assessments are to be preserved until forthcoming examination for audit and verification by examination 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 produce work which demonstrates attainment of an acceptable standard of craftsmanship with occasional guidance, and due regard for safety procedures and practices	• Demonstration of good skills and accuracy in the field of work/ assignments. • A fairly good level of neatness and consistency to accomplish job activities. • Occasional support in completing the task/ job.
(b)Weightage in the range of 75%-90% to be allotted during assessment	
For this grade, a candidate should produce work which demonstrates attainment of a reasonable standard of craftsmanship, with	• Good skill levels and accuracy in the field of work/ assignments. • A good level of neatness and consistency to

little guidance, and regard for safety procedures and practices	accomplish job activities. • Little support in completing the task/ job.
(c) Weightage in the range of more than 90% to be allotted during assessment	
For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.	• High skill levels and accuracy in the field of work/ assignments. • A high level of neatness and consistency to accomplish job activities. • Minimal or no support in completing the task/ job.

3. JOB ROLE

Smartphone Technician cum App Tester; diagnoses problems and repairs the faulty module of the Smartphone. The individual at work is responsible for rectifying faults in the Smartphone brought in by the customer. The individual receives the faulty Smartphone, diagnoses the problems, performs front end or hardware level testing & replacement as required, resolves software issues and ensures effective functioning before delivering back to customer.

The individual at work is responsible for mobile app testing to verify functionality of mobile applications on Android/ iOS platforms, performs mobile app Security to find and fix mobile app security flaws, ensures prevention of malware and Troubleshoot Mobile Applications Performance.

The individual may also work for the following job roles in the field of smartphone, Tablet computer & and testing:

- Mobile Application Tester
- Mobile Software Platform Architect/ Mobile Architect
- Mobile Phone System Engineer
- Tab Repairing Technician

Reference NCO-2015:

a) 7422.2301 - Smartphone Repair Technician

4. GENERAL INFORMATION

Name of the Trade	**SMARTPHONE TECHNICIAN CUM APP TESTER**
Trade Code	**DGT/2004**
NCO - 2015	7422.2301
NSQF Level	Level-3
Duration of Craftsmen Training	Six Month (800 Hours)
Entry Qualification	Passed 10th Class Examination
Minimum Age	14 years as on first day of academic session.
Eligibility for PwD	LD, LC, DW, AA, LV, DEAF, AUTISM, SLD
Unit Strength (No. of Student)	24 (There is no separate provision of supernumerary seats)
Space Norms	35 Sq. m
Power Norms	3 KW
Instructors Qualification for:	
(i) SMARTPHONE TECHNICIAN CUM APP TESTER Trade	B.Voc/ Degree in Electronics/ Electronics and Telecommunication/ Electronics and communication Engineering from AICTE/UGC recognized Engineering College/ university with one year experience in the relevant field. **OR** 03 years Diploma in Electronics / Electronics and telecommunication/ Electronics and communication from AICTE/ recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant field. **OR** NTC/ NAC passed in the trade of "Smartphone Technician cum App Tester" With 3 years' experience in the relevant field. **Essential Qualification:** Relevant National Craft Instructor Certificate (NCIC) in any of the

	variants under DGT. ***NOTE: Out of two Instructors required for the unit of 2(1+1), one must have Degree/Diploma and other must have NTC/NAC qualifications. However both of them must possess NCIC in any of its variants.***
(ii) Employability Skill	MBA/ BBA / Any Graduate/ Diploma in any discipline with Two years' experience with short term ToT Course in Employability Skills from DGT institutes. (Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above) **OR** Existing Social Studies Instructors in ITIs with training in Employability skills from DGT Institutes.
(iii) Minimum Age for Instructor	21 Years
List of Tools and Equipment	As per Annexure – I

Distribution of training on hourly basis: (Indicative only)

Total hours / week	Trade practical	Trade theory	Employability Skill
40 Hours	29 Hours	7 Hours	4 Hours

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 LEARNING OUTCOMES (TRADE SPECIFIC)

1. Identify and check basic electronic components & their functioning following safety precautions.
2. Identify different sections of various mobile phones and explain concept of mobile Network.
3. Identify defects in Multimedia handset (Non-android based), replace faulty components and perform testing.
4. Disassemble and assemble various Smartphones, identify different types of ICs and perform basic editing in different apps, OS installation, reboot procedure, password cracking etc.
5. Identify defects in Smartphones, replace faulty components and perform testing.
6. Perform removal of virus, Install firmware, encryption/ decryption, use third party software, flash different android dead phones, etc.
7. Troubleshoot Software problems using internet, backup data, update and provide hard drive solutions.
8. Trace the PCB through jumper/ schematic diagrams, repair track using jumpering techniques, Perform flashing and troubleshooting of high end software.
9. Disassemble and assemble various Tablets, identify defects, replace faulty components and perform testing.
10. Identify functionality of different types of apps, their settings, parameters & various sources.
11. Test different functional parameters such as purpose, performance, storage, compatibility of different mobile apps.
12. Check different functionality parameters of mobile Apps such as memory leakage, load, backup, power consumption etc.
13. Examine defects in smartphone/ software, using Graphical User Interface.
14. Set & test network connections, check SD Card Interactions, mobile App settings on different platforms.
15. Comply with basic security features of mobile app testing.

6. ASSESSMENT CRITERIA

LEARNING OUTCOME	ASSESSMENT CRITERIA
1. Identify and check basic electronic components for their functioning following safety precautions.	Observe safety/ precaution during soldering/ de-soldering.
	Identify different Electronic components.
	Check Value of resistance & capacitance by using appropriate procedures.
	Identify given Conductor/ Semiconductor/ Insulator.
	Demonstrate testing of Transistor & verify their characteristics.
	Demonstrate use of transistor as a switch/ amplifier.
	Identify Transformer & check step-up/ step-down transformer.
	Solder/ de-solder given electronic components.
	Identify different types of digital ICs.
2. Identify different sections of various mobile phones, tablets and explain concept of mobile Network.	Explain Block/ Circuit diagram of basic mobile phone viz. DCT 3, 4 or similar.
	Identify & test given components of Mobile Phone.
	Disassemble/ assemble mobile phones.
	Identify basic faults in given mobile handsets.
	Troubleshoot GSM/ WCDMA mobile, their testing/ repair.
	Identify given network connection problem and resolve it.
	Demonstrate lock/ unlock of SIM, check mobile IMEI number.
	Explain working process of USB/ Ethernet port.
3. Identify defects in Multimedia handset (Non-android based), replace faulty components and perform testing.	Identify various multimedia handsets.
	Test Battery using multi meter
	Explain function of given multimedia handset.
	Check the connection of given motherboard of basic multimedia handset.
	Explain working & replacement procedure of speaker/mic/ vibrartor/earphone connector/charging connector/data cable connector.
	Demonstrate connection between display and keypad of given handset.
	Identify problem of display/ keypad of basic mobile handset & their replacement.

4. Disassemble and assemble various Smartphones, identify different types of ICs and perform basic editing in different apps, OS installation, reboot procedure, password cracking etc.	Identify applications used in windows/ android mobile system.
	Demonstrate process of making Ringtone/Sing tone/ Editing Video Clip/ Basic photo editing using apps.
	Demonstrate downloading procedure/ registration procedure via banking/sharing internet via hotspot/ file sharing procedure of Bluetooth/data cable/ OTG/ card reader.
	Assemble/Disassemble of Smartphone via different tools.
	Identify different types of ICs and replace with blower machine.
	Apply Process of password cracking.
	Install various Operating Systems (OS) in given Smartphone handset.
	Demonstrate Reboot procedure.
5. Identify defects in Smartphones, replace faulty components and perform testing.	Plan work in compliance with standard safety norms.
	Set different parameters for efficient use of different machines viz., blower/DC power supply/ Charging booster machine etc.
	Identify and resolve problems like water damaged.
	Identify the hanging issues of given Smartphone and resolve it.
	Replace touch sensor/ camera/ finger print sensor of given faulty Smartphones.
	Apply hot air using SMD rework station.
	Desolder / remove the BGA IC from the PCB.
	Clean the solder from the bottom of the IC of the given phone.
	Use a soldering iron (10W & 25W)/desoldering wire/ wick.
	Select the right size of the IC depending on the number of balls from the stencil supplied with the kit.
	Place the IC on the stencil and tightly hold it with the stencil using clip or tape.
	Apply solder paste from the other side of the stencil.
	Clean the IC with Acetone or IPA solution and remove it from the stencil.
6. Perform removal of virus, perform installation of firmware, encryption/	Use different Flashing box/Flashing tools for flashing software.
	Select software used for security/ locking & blocking adds.
	Remove virus from the given Smartphone via apps.
	Demonstrate process of lock and unlock system.

	Install a new firmware in given Smartphone.
	Encrypt/ Decrypt password in given mobile phone.
	Connect Smartphone via Third party software like ammy and team viewer using computer.
	Flash android for working phone using Odin.
	Flash android for dead phone with UFI.
	Flash Android phone with MTK/SPD/Qualcomm.
7. Troubleshoot Software problems using internet, backup data, update and provide hard drive solutions.	Test network connection/ establish new connection.
	Update/ Reinstall software in given Smartphones.
	Create & restore Backup data from Smartphone to a computer.
	Demonstrate defragmentation of hard drive.
	Set up secure Wi-Fi protection from unauthorized users.
8. Trace the PCB through jumper/ schematic diagrams, repair track using jumpering techniques, Perform flashing and troubleshooting of high end software.	Comply with safety norms while working on PCBs.
	Disassemble mobile phone and place it on a PCB holder.
	Find faulty PCB track using multimeter/ missing track needing jumper.
	Apply liquid soldering flux to the points needing solder jumper wire.
	Cut jumper wire to desired length and remove its lamination using blade cutter.
	Hold one end of the jumper wire and solder it to one point of the given faulty circuit track.
	Use a good quality tweezers to hold the wire and good quality of soldering iron and solder wire to solder.
	Hold the other end of the jumper wire and solder to the other point of the track.
	Check the jumper using multimeter.
	Fix Flashing map problem.
	Troubleshoot server issues.
9. Disassemble and assemble various Tablets, identify defects, replace faulty components and perform testing.	Identify Tablet PCs & install Software/ Operating Systems.
	Disassemble and Assemble Tablet PCs.
	Demonstrate Repairing of motherboard/ hard disk of Tablet PC.
	Identify ICs, test the damaged/ working components and explain its functions.
	Troubleshoot sections like sim detection/ mic/ speaker/ Bluetooth/ wi-fi/ touch screen / Display Light Problem/ Touchpad Problem/ Finger Prints Problem.

	Identify different connector/ socket.
10. Identify functionality of different types of apps, their settings, parameters & various sources.	Plan work in compliance with standard norms related to mobile app testing.
	Check given mobile info, settings and other parameters.
	Install & examine functionality of Govt. promotional App
11. Test different functional parameters such as purpose, performance, storage, compatibility of different mobile apps.	Conduct functional testing of given App.
	Conduct Performance testing of device.
	Troubleshoot given mobile application performance.
12. Check different functionality parameters of mobile Apps such as memory leakage, load, backup, power consumption etc.	Demonstrate Techniques of Storage testing/compatibility testing/application response testing.
	Check usability Conditions of given mobile app.
	Upgrade existing software in given Smartphone.
	Perform memory leakage testing/Certification testing/location testing/load testing/back up & re-store testing/power consumption testing.
13. Examine defects in smartphone/ software, using Graphical User Interface.	Test & Identify the presence of defects in a product/software using Graphical User Interface [GUI].
	Demonstrate User Interface Testing: Screen Orientation/ Resolution/ Check Touch Screens, Soft & Hard Keys/ Trackballs/Track wheels & Touchpad's.
	Test & Verify screen validation/ all navigation.
	Verify the date Field/ Numeric Field Formats.
14. Set & test network connections, check SD Card Interactions, mobile App settings on different platforms.	Establish and test network connection/SD Card Interactions
	Demonstrate Bluetooth testing.
	Perform mobile app setting testing.
15. Comply with basic	Check settings/configuration/network connectivity of given mobile

security features of mobile app testing.	handset for given mobile app.
	Perform web security testing.
	Boost the Look and Feel of the application with UI Testing.

SYLLABUS FOR SMARTPHONE TECHNICIAN CUM APP TESTER TRADE			
DURATION: SIX MONTHS			
Duration	**Reference Learning outcome**	**Professional Skills (Trade Practical) With Indicative Hours**	**Professional Knowledge (Trade Theory)**
Professional Skill 58 Hrs; Professional Knowledge 14 Hrs	Identify and check basic electronic components for their functioning following safety precautions.	1. Visit to various sections of the institute and identify location of various installations. (07 hrs) 2. Identify safety signs for danger, warning, caution & personal safety message. (04 hrs) 3. Perform Use of Personal Protective Equipment (PPE). (06 hrs) 4. Perform elementary first aid. (03 hrs) 5. Perform Preventive measures for electrical accidents & steps to be taken in such accidents. (05 hrs) 6. Perform Use of Fire extinguishers. (04 hrs)	Familiarization with the working of Industrial Training Institute system. Importance of safety and precautions to be taken in the industry/ shop floor. Introduction to PPEs. Introduction to First Aid. Importance of housekeeping & good shop floor practices. Occupational Safety & Health: Health, Safety and Environment guidelines, legislations & regulations as applicable. (07hrs)
		7. Identify various electronic components. (02 hrs) 8. Check Value of resistance & capacitance by using appropriate procedures. (03hrs) 9. Identify conductors, Semiconductors & Insulators. (02 hrs) 10. Identify all types of diodes & verify their	Introduction to the trade and future scope. Overview of current, Voltages, Resistance (including color code),Conductors, semiconductors, insulator, Diodes (PN Junction, Zener, LED, Varactor), Rectifiers, Various types Capacitors (including color code), Transistors (Transistor as a

		characteristics. (02 hrs) 11. Perform testing of Transistor & verify their characteristics. (02 hrs) 12. Demonstrate use of transistor as a switch and amplifier. (03 hrs) 13. Identify various transformers & checking procedure of step-up & step-down transformer. (03 hrs) 14. Identify various types of Multimeters. (03 hrs). 15. Perform checking of all components using Multimeter. (03 hrs) 16. Perform Soldering & de-soldering of various Electronic components. (03 hrs) 17. Identify different types of digital ICs. (03 hrs)	switch and amplifier) Concept of open and close circuit, Brief knowledge about RELAY, Overview of Transformer (step up and step down); Overview of Multimeter (Analog & Digital), Soldering technique, numbering system (Binary, Hexadecimal, BCD), Overview of Digital IC & T-T-L, Concept of CMOS Familiarization of different types of Logic gates. (basic & universal gates) (07 hrs)
Professional Skill 29 Hrs; Professional Knowledge 07 Hrs	Identify different sections of various mobile phones and explain concept of Mobile Network.	18. Demonstrate block diagram, circuit diagram of basic mobile phone viz. DCT 3, 4 or similar. (04 hrs) 19. Identify and check the Basic Components of Mobile Phones. (05 hrs) 20. Disassemble and assemble different mobile phones. (04 hrs) 21. Identify basic faults in different mobiles. (03 hrs) 22. Identify GSM/ WCDMA mobile handset and check functionality. (03 hrs)	History of Mobile Phone and common features of mobile phone (DCT 3, 4, BB 5 etc.). Basics of Mobile Communication Familiarization with generation of mobiles viz., GSM/CDMA/ WCDMA etc. Mobile phone structure, Frequency, Channels, GPS, EDGE, HSPA. Overview of SIM & IMEI numbers. Introduction of GPRS, Bluetooth & Infrared technology and working

		23. Identify Network connection problem and solve it. (02 hrs) 24. Practice lock/ unlock of SIM and check mobile IMEI number. (02 hrs) 25. Demonstrate working process of USB and Ethernet port. (04 hrs) 26. Demonstrate different types of network/ data cables. (02 hrs)	principle. Circuit Tracing of Different Section of Mobile Phone. Description of USB, Ethernet port and different types of network/ data cables. Concept of mobile Network, LAN, MAN, WAN. 2G/3G/4G network protocols. (07 hrs)
Professional Skill 29 Hrs; Professional Knowledge 07 Hrs	Identify defects in Multimedia handset (Non-android based), replace faulty components and perform testing.	28. Identify different multimedia handsets. (04 hrs) 29. Perform testing of mobile battery using multimeter. (04 hrs) 30. Demonstrate functions of multimedia handset. (05 hrs) 31. Identify the different functional areas/ blocks of motherboard of basic multimedia handset. (03 hrs) 32. Perform voltage test of speaker, mic, vibrartor, earphone connector, charging connector, data cable connector, etc. (03 hrs) 33. Perform replacement of components viz., speaker, mic, vibrartor, earphone connector, charging connector, data cable connector, etc. (03 hrs) 34. Perform connections	Concept of multimedia. Battery system & different type of Cells/ Batteries uses. Circuit Diagram and block diagram of basic multimedia handset and different types of antenna used in handsets. Standard safety precautions while repairing handsets. PCB and concept of its connections. Overview and working process of speaker, mic, vibrartor, earphone connector, charging connector, data cable connector. Concept of Display change procedure. Concept of keypad change procedure. (07 hrs)

		between display and keypad of handset. (03 hrs) 35. Identify problems and replace display and keypad of basic mobile handset. (04 hrs)	
Professional Skill 58 Hrs; Professional Knowledge 14 Hrs	Disassemble and assemble various Smartphones, identify different types of ICs and perform basic editing in different apps, OS installation, reboot procedure, password cracking, etc.	36. Identify popular applications used in android mobile system. (08 hrs) 37. Identify popular applications used in windows based mobile system. (08 hrs) 38. Demonstrate process of making Ringtone, Sing tone, Editing Video Clip, Basic photo editing using apps. (08 hrs) 39. Demonstrate downloading procedure, registration procedure via banking, sharing internet via hotspot, file sharing procedure of Bluetooth, data cable, OTG, card reader, etc. (06 hrs) 40. Perform assembling and disassembling of Smartphone using different tools. (06 hrs) 41. Identify different types of ICs and practice of replacement with the blower machine. (07 hrs) 42. Demonstrate process of password cracking. (05 hrs)	Difference between SmartPhone and basic mobile phone. Study various part of Smartphone architecture. Overview of mobile operating system and types of OS. Concept of Android and windows technology in mobile system. Basic features of Android & windows and its applications. Functions of Smartphone components. Concept of Wi-Fi. Downloading through internet, share with Blue tooth, share internet via hotspot, Data cable & Card reader, concept of OTG, NFC. Study Various tools and equipment used in Smartphone repairing. Concept of different type of IC that is used in Smartphone (windows and android). Different kind of application that is used in windows and android. Android Mobile recovery procedure through coding. Windows mobile recovery

		43. Install various Operating Systems (OS) in mobile phones. (05 hrs) 44. Perform Reboot procedure. (05 hrs)	procedure through coding. Techniques of crack password code of windows and android mobile phone. Procedure of reboot (window and android). Overview of BTS, MTS (14 hrs)
Professional Skill 58 Hrs; Professional Knowledge 14 Hrs	Identify defects in Smartphones, replace faulty components and perform testing.	45. Practice setting different parameters for proper use of various machine viz., blower, DC power supply, charging booster machine etc. (08 hrs) 46. Demonstrate SMD rework station and BGA IC Reballing and Installing. (08 hrs) 47. De-solder and remove the BGA IC from the PCB and clean the solder from the bottom of the IC. (08 hrs) 48. Practice use of different soldering iron (10W & 25W) and de-soldering wire or wick. (08 hrs) 49. Replace various ICs on mobile handsets. (06 hrs) 50. Identify damages from ingress of water and practice to resolve. (05 hrs) 51. Analyze the hanging issues and practice to resolve it. (05 hrs) 52. Perform replacement of touch sensor and finger print sensor in Smartphones. (05 hrs) 53. Replace camera of faulty Smartphones. (05 hrs)	Testing of various parts and components that are used in mobile phone for hardware repairing. Recognize and troubleshoot common handset problems like hanging issues, camera problems. Study various radiation Levels of Smartphone. Study Compliance standards for mobile phones in India. Study Mobile phone hardware troubleshooting procedure (hanging, USB charging & touch sensor problems). Concept of Ultrasonic cleaning. Overview of SMD rework station Overview of BGA, BGA Soldering. IC Reballing and Installation. Concept of Power failure of mobile phone and process to solve it. (dead handsets) (14 hrs)

Professional Skill 58 Hrs; Professional Knowledge 14 Hrs	Perform removing of virus, Install firmware, encryption/ decryption, use third party software, flash different android dead phones etc.	54. Use different flashing box and flashing tools for flashing software. (07 hrs) 55. Identify different tools and boxes as per specific handsets. (06 hrs) 56. Identify & select software for various handsets, used for security, locking & blocking adds. (06 hrs) 57. Practice to remove virus from the Smartphone via apps. (07 hrs) 58. Perform process of locking and unlocking system. (06 hrs) 59. Practice installation of a new firmware in Smartphones. (06 hrs) 60. Perform encryption and decryption of password in mobile phone. (05 hrs) 61. Connect Smartphone via third party software using computer. (05 hrs) 62. Apply procedure of flash android specific software for working phone with Odin. (05 hrs) 63. Apply procedure of flash android specific software for dead phone with UFI. (05 hrs) 64. Apply procedure of flash Android phone with MTK, SPD, Qualcomm etc. Flash tool. (05 hrs)	Concept of third party software. Procedure of removing virus from infected codes. Knowledge about locking system (lock & unlock). Role of firmware in a mobile handset. Steps to install a new firmware. Overview of encryption and decryption of password in mobile phone. Flashing of various brands of handsets. (14 hrs)
Professional Skill 29 Hrs;	Troubleshoot Software problems	65. Check network connection and set up new	Use of internet for trouble shooting faults.

Professional Knowledge 07 Hrs	using internet, backup data, update and provide hard drive solutions.	connection. (07 hrs). 66. Perform updation& reinstallation of software in different types of Smartphones. (05 hrs) 67. Create & restore backup data from mobile phone to a computer. (07 hrs) 68. Perform defragmentation of hard drive. (05 hrs) 69. Establish secure Wi-Fi protection from unauthorized users. (05 hrs)	Overview of handling troubleshooting procedure. Steps to update the software of popular mobiles and create a backup of data to a computer. Knowledge of defragmentation of hard drive. Defragmentation of hard drive. Wi-Fi protection. (07 hrs)
Professional Skill 29 Hrs; Professional Knowledge 07 Hrs	Trace the PCB through jumper/ schematic diagrams, repair track using jumpering techniques, Perform flashing and troubleshooting of high end software.	70. Disassemble mobile phone and place it on a PCB holder. (07 hrs) 71. Check physical conditions of PCB. (07 hrs) 72. Check PCB tracks using multimeter and find the fault/ missing tracks that need jumper. (02 hrs) 73. Perform soldering of jumper wire by applying liquid soldering flux. (03 hrs) 74. Check the continuity of jumper using multimeter. (02 hrs) 75. Identify and fix flashing map problem. (03 hrs) 76. Identify and practice troubleshooting of network issues. (02 hrs) 77. Demonstrate working process of heat-sink. (03 hrs)	Circuit Diagram Reading Circuit tracing, Description of Jumpering techniques and solutions. Study of Phone Upgradation. Flashing Map Problem. Concept of heat-sink and working principle. (07 hrs)
Professional	Disassemble and	78. Identify various Tablets	Introduction to Tablet type

Skill 58 Hrs; Professional Knowledge 14 Hrs	assemble various Tablets, identify defects, replace faulty components and perform testing.	and perform installation of different software & different Operating Systems. (07 hrs) 79. Create & restore backup data from tablet to a computer. (07 hrs) 80. Disassemble and Assemble tablet, Crystal, RTC, etc. (07 hrs) 81. Identify Different connectors and sockets. (07 hrs) 82. Repair motherboard and hard disk of tablet. (05 hrs) 83. Identify & indicate ICs, test the damaged and working component, detect fault using multimeter. (05 hrs) 84. Check different sections viz., SIM detection, mic, speaker, camera, Bluetooth, wi-fi section, touch screen section, Display light problem, Touchpad problem, Finger prints module and replace components. (20 hrs)	Computer. Procedures of Assembling and Dissembling Tablet. Functions and block diagrams of Tablet. Study of parts of Tablet. Working of Tablet Motherboard. Identification of ICs detail and its functions. Damaged and working components. Study of Initial failure identification procedure. Overview of troubleshooting & replacing methods of sections like SIM detection, mic , speaker, Bluetooth, wi-fi section, touch screen section, etc. (14 hrs)
Professional Skill 29 Hrs; Professional Knowledge 07 Hrs	Identify functionality of different types of apps, their settings, parameters & various sources.	85. Mobile app info, settings & parameters. (14hrs) 86. Install and check functionality of different govt. Promotional app. (15 hrs)	Introduction to different types of Mobile Apps – Native (one time download from app store), web (Every time downloaded from Mobile Bowser), Study of Importance of Mobile App Testing – Phones getting truly smarter, more mobile usages, faster networks.

			Introduction to app testing and sources of app (such as Play store, App store etc.) Familiarization with govt. promotional apps such as *BHIM, IRCTC* etc. (07 hrs)
Professional Skill 29 Hrs; Professional Knowledge 07 Hrs	Test different functional parameters such as purpose, performance, storage, compatibility of different mobile apps.	87. Perform functional test to check if the App meets its purpose. (10 hrs) 88. Test App performs well in the background. (09 hrs) 89. Demonstrate Storage testing, compatibility testing and application response testing. (10 hrs)	Overview of different types of mobile testing procedures & methods. Familiarization with different types of mobile application testing. (07 hrs)
Professional Skill 29 Hrs; Professional Knowledge 07 Hrs	Check different functionality parameters of mobile Apps such as memory leakage, load, backup, power consumption etc.	90. Perform memory leakage testing, interrupt testing, usability testing, Installation testing, certification testing, location testing, upgrading existing software, load testing, uninstallation testing, backup & restore testing, power consumption testing. (29 hrs)	Familiarization with memory leakage testing, interrupt testing, usability testing, Installation testing, certification testing, location testing, upgrading existing software, load testing, uninstallation testing, backup & restore testing, power consumption testing. (07 hrs)
Professional Skill 29 Hrs; Professional Knowledge 07 Hrs	Examine defects in smartphone/ software, using Graphical User Interface.	91. Test download, Installation, Execution, Integration, Auto Updates, Cross OS, cross Device, cross versions. (07 hrs) 92. Conduct User Interface Testing: Screen Orientation/ Resolution, Check Touch Screens, Soft & Hard Keys, Trackballs, Track wheels & Touchpad's. (07 hrs)	Overview of user interface testing, defect in a product/ software, screen validation and navigation system. (07 hrs)

		93. Identify the presence of defects in a product/ software under test by using Graphical user interface (GUI). (05 hrs) 94. Check screen validations and verify all navigations. (05 hrs) 95. Verify the date Field and Numeric Field Formats. (05 hrs)	
Professional Skill 29 Hrs; Professional Knowledge 07 Hrs	Set & test network connections, check SD Card Interactions, mobile App settings on different platforms.	96. Perform network connections, SD Card Interactions and Bluetooth testing. (10 hrs) 97. Test Mobile Apps on different platforms. (10 hrs) 98. Apply Best Practices in Mobile app & setting testing. (09 hrs)	Different SD cards and their features and best practices related to mobile app and setting testing. (07 hrs)
Professional Skill 29 Hrs; Professional Knowledge 07 Hrs	Comply basic security features of mobile app testing.	99. Check Settings, Configurations, Network/Connectivity and Security of data exchanged. (10 hrs) 100. Perrform web security testing. (10 hrs) 101. Boost the Look and Feel of the application with UI Testing. (09 hrs)	Overview of security features related to mobile app testing. (07 hrs)

Project/ Industrial Visit:

Broad Area: -

a) Multimedia handset (Non-android based)
b) Hardware/ software of Smartphone/ tablet.
c) Removal of virus.
d) Mobile App testing.

SYLLABUS FOR CORE SKILLS
1. Employability Skills (Common for all CTS trades) (160 Hrs)

Learning outcomes, assessment criteria, syllabus and Tool List of Core Skills subjects which is common for a group of trades, provided separately in www.bharatskills.gov.in.

List of Tools & Equipment			
SMARTPHONE TECHNICIAN CUM APP TESTER (For batch of 24 Candidates)			
S No.	**Name of the Tools and Equipment**	**Specification**	**Quantity**
A. TRAINEES TOOL KIT			
1.	Soldering Iron	10 watt & 25 watt	25 (24+1) Nos. each
2.	PCB Holder / PCB Stand for mobile		25 (24+1) Nos.
3.	Blade Cutter		25 (24+1) Nos.
4.	Nose Cutter		25 (24+1) Nos.
5.	Tweezers	6 inch	25 (24+1) Nos.
6.	Multimeter	Digital	12 Nos.
7.	Screwdriver Kit	Screwdrivers of different shapes and sizes	12 Nos.
8.	Different types Mobile Opener		02 sets each
9.	Magnifying glass with stand and lamp	50 mm dia	25 (24+1) Nos.
10.	Rework Station (Hot Air Blowers for mobile)		25 (24+1) Nos.
A. TOOLS & EQUIPMENT			
11.	Battery Booster		02 Nos.
12.	Different types of test JIG Box (04 types)		01 set of each
13.	Ultrasonic Cleaner		02 Nos.
14.	BGA Kit		02 Nos.
15.	DC Power Supply	9 – 15V; 2 Amp	02 Nos.
16.	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.	03 Nos.
B. CONSUMABLES			

17.	Old/ Used Mobile PCB		10 Nos.
18.	Old/ Used Smartphone		06 Nos.
19.	Old/ Used Tab		03 Nos.
20.	Solder Wire	The composition of most solder wire is Tin/ Lead in the ratio 60:40 or 63:37	01 roll (extra As required)
21.	Brush	Only ESD-Safe cleaning brushes	05 Nos.
22.	Thinner or PCB Cleaner		01 Ltr
23.	Jumper Wire		01 roll (extra As required)
24.	Solder Paste		12 Nos.
25.	Liquid Flux		05 Nos.
26.	Cleaning Cotton		05 pkts
27.	Paste Flux		05 Nos.
28.	De-soldering Wire		12 Nos.
29.	Wrist Strap/ Band		12 Nos.
30.	Antistatic Hand Gloves		12 Nos.
31.	Antistatic Mat		06 Nos.
32.	Antistatic Apron		12 Nos.
33.	Smoke Absorber (Mouth Mask)		01 each

Note:

1. *All the tools and equipment are to be procured as per BIS specification.*

ANNEXURE - II

The DGT sincerely acknowledges contributions of the Industries, State Directorates, Trade Experts, Domain Experts, trainers of ITIs, NSTIs, faculties from universities and all others who contributed in revising the curriculum.

Special acknowledgement is extended by DGT to the following expert members who had contributed immensely in this curriculum.

List of member attended the Trade committee meeting to finalize the course curriculum of Smartphone Technician cum App Tester.

S No.	Name & Designation Sh/Mr/Ms	Organization	Remarks
1.	B.V.S. Sesha Chari, Director	CSTARI, Kolkata	Chairman
2.	Nirmalya Nath, ADT	CSTARI, Kolkata	Co-ordinator cum Member
3.	Dipaloke Das, Principal	Dubrajpur Govt ITI	Member
4.	Nityanand Tewary, GM (Mobile)	AVJ Infotech (P) Ltd. Kolkata	Member
5.	Amit Brahma, Technician	Micromax Service Center, Kolkata.	Member
6.	Debmalya Kundu, Technician	Oppo Service Center, Kolkata	Member
7.	Sushanta Paul, Technician	VIVO Service Center, Kolkata	Member
8.	Shuvajit Sadhu, Technician	Samsung Service Center, Kolkata	Member
9.	Anjan Biswas, Principal	Illambazar, Govt ITI	Member
10.	Rajkumar Ghosh, DRS Technician	Jio Service Center, Kolkata	Member
11.	Mangesh Rewandkar, Area Manager	Samsung, Pune	Expert
12.	Premananda Bal, Sr. Technician	AVJ Infotech (P) Ltd., Kolkata	Expert
13.	R.N. Bandopadhya, Ex-Director CSTARI	Swadhin Trust	Member
14.	R.C. Mandal, DDT	CSTARI, Kolkata	Member
15.	B.K. Nigam, T.O.	-do-	Member
16.	R.N. Manna, T.O.	-do-	Member
17.	KVS Narayana, T.O.	-do-	Member
18.	Biswanath Khan, Jr. Consultant	-do-	Member
19.	Poonam Kumari, Jr. Consultant	-do-	Member
20.	Sumana De, Jr. Consultant	-do-	Member

ABBREVIATIONS

CTS	Craftsmen Training Scheme
ATS	Apprenticeship Training Scheme
CITS	Craft Instructor Training Scheme
DGT	Directorate General of Training
MSDE	Ministry of Skill Development and Entrepreneurship
NTC	National Trade Certificate
NAC	National Apprenticeship Certificate
NCIC	National Craft Instructor Certificate
LD	Locomotor Disability
CP	Cerebral Palsy
MD	Multiple Disabilities
LV	Low Vision
HH	Hard of Hearing
ID	Intellectual Disabilities
LC	Leprosy Cured
SLD	Specific Learning Disabilities
DW	Dwarfism
MI	Mental Illness
AA	Acid Attack
PwD	Person with disabilities


कौशलं बलम्