



QUALIFICATION FILE

IoT Technical Service Operator

☒ Short Term Training (STT) ☐ Long Term Training (LTT) ☐ Apprenticeship

☐ Upskilling ☐ Dual/Flexi Qualification ☒ For ToT ☒ For ToA

☐ General ☐ Multi-skill (MS) ☐ Cross Sectoral (CS) ☒ Future Skills ☐ OEM

NCrF/NSQF Level: 3

Submitted By:

Submitting Body Name: Telecom Sector Skill Council

Submitting Body Contact Details:

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Section 1: Basic Details

1.	Qualification Name	IoT Technical Service Operator										
2.	Sector/s	Telecom										
3.	Type of Qualification: ☐ New ☒ Revised ☐ Has Electives/Options ☐ OEM	NQR Code & version of existing/previous qualification: QG-03-TL-00465-2023-V1.1-TSSC	Qualification Name of existing/previous version: IoT Technical Service Operator v2.0									
4.	a. OEM Name b. Qualification Name (Wherever applicable)	NA										
5.	National Qualification Register (NQR) Code &Version (Will be issued after NSQC approval)	QG-03-TL-06067-2025-V2-TSSC & 3.0	6. NCrF/NSQF Level: 3									
7.	Award (Certificate/Diploma/Advance Diploma/ Any Other) (Wherever applicable specify multiple entry/exits also & provide details in annexure)	Certificate										
8.	Brief Description of the Qualification	IoT Technical Service Operators manage IoT systems and devices, ensuring seamless data collection, communication, and functionality. They use specialized platforms, diagnostic tools, and software to optimize system operations, prioritizing real-time data processing, energy efficiency, and secure communication										
9.	Eligibility Criteria for Entry for Student/Trainee/Learner/Employee	a. Entry Qualification & Relevant Experience: <i>*Relevant experience in drone operations, electronics or hardware maintenance, IT/hardware support, telecom field work, and technical assistance.</i> <i>The relevant experience would include work, internship, or apprenticeship after completing relevant educational qualifications.</i> <table border="1"> <thead> <tr> <th>S. No.</th> <th>Academic/Skill Qualification (with Specialization - if applicable)</th> <th>Required Experience (with Specialization - if applicable)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Grade 10 pass</td> <td>No experience required</td> </tr> <tr> <td>2</td> <td>9th Grade pass</td> <td>1-year of relevant experience*</td> </tr> </tbody> </table>		S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)	1	Grade 10 pass	No experience required	2	9th Grade pass	1-year of relevant experience*
S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)										
1	Grade 10 pass	No experience required										
2	9th Grade pass	1-year of relevant experience*										

		3	Previous relevant Qualification of NSQF Level 2.5	1.5 years of relevant experience*																			
		4	Previous relevant Qualification of NSQF Level 2	3-year relevant experience*																			
		b. Age: NA																					
10.	Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))	13	11. Common Cost Norm Category (I/II/III) (wherever applicable): I																				
12.	Any Licensing requirements for Undertaking Training on This Qualification (wherever applicable)	NIL																					
13.	Training Duration by Modes of Training Delivery (Specify Total Duration as per selected training delivery modes and as per requirement of the qualification)	☒ Offline ☐ Online ☐ Blended <table border="1"> <thead> <tr> <th>Training Delivery Modes</th><th>Theory (Hours)</th><th>Practical (Hours)</th><th>OJT Mandatory (Hours)</th><th>OJT Recommended (Hours)</th><th>Total (Hours)</th></tr> </thead> <tbody> <tr> <td>Classroom (offline)</td><td>120:00</td><td>120:00</td><td>150:00</td><td>-</td><td>390:00</td></tr> <tr> <td>Online</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table> (Refer Blended Learning Annexure for details)				Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)	Classroom (offline)	120:00	120:00	150:00	-	390:00	Online	-	-	-	-	-
Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)																		
Classroom (offline)	120:00	120:00	150:00	-	390:00																		
Online	-	-	-	-	-																		
14.	Aligned to NCO/ISCO Code/s (if no code is available mention the same)	NCO-2015/3114.6214																					
15.	Progression path after attaining the qualification (Please show Professional and Academic progression)	Vertical Progression: NSQF Level 4 - Telecom Technician - IoT Devices/Systems																					
16.	Other Indian languages in which the Qualification & Model Curriculum are being submitted	Hindi																					
17.	Is similar Qualification(s) available on NQR-if yes, justification for this qualification	☐ Yes ☒ No URLs of similar Qualifications:																					
18.	Is the Job Role Amenable to Persons with Disability	☐ Yes ☒ No If "Yes", specify applicable type of Disability:																					
19.	How Participation of Women will be Encouraged	Yes, Women's engagement must be encouraged in order to advance gender equality and guarantee that they have equal opportunity in all spheres of society. In addition to training and development programs, it's critical to offer networking, mentoring, and knowledge. Women might be inspired and encouraged to seek jobs in this industry by flexible work arrangements and the promotion of successful women in this																					

		role. By implementing policies and procedures that promote work-life balance, equal compensation and advancement opportunities, and a polite and safe work environment, organizations may foster a culture of inclusion and diversity that will make women feel appreciated and accepted in these positions.	
20.	Are Greening/ Environment Sustainability Aspects Covered <i>(Specify the NOS/Module which covers it)</i>	☒ Yes ☐ No DGT/VSQ/N0101	
21.	Is Qualification Suitable to be Offered in Schools/Colleges	Schools ☒ Yes ☐ No Colleges ☒ Yes ☐ No	
22.	Name and Contact Details of Submitting / Awarding Body SPOC <i>(In case of CS or MS, provide details of both Lead AB & Supporting ABs)</i>	Name: Praveen Sirohi Email: standards@tsscindia.com Contact No.: +91-9074018901 Website: https://www.tsscindia.com	
23.	Final Approval Date by NSQC: 19-08-2025	24. Validity Duration: 3 Years	25. Next Review Date: 30-06-2028

Section 2: Module Summary

NOS/s of Qualifications

(In exceptional cases these could be described as components)

Mandatory NOS/s:

Specify the training duration and assessment criteria at NOS/ Module level. For further details refer curriculum document.

Th.-Theory **Pr.**-Practical, **OJT**-On the Job **Man.**-Mandatory Training **Rec.**-Recommended Proj. -Project

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/ Non-Core	NCrF/N SQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
1.	Carry out Troubleshooting for IoT Devices and Connectivity Issues	TEL/N6252 & V3.0	Core	3	3	30:00	30:00	30:00	-	90:00	30	60	-	10	100	15
2.	Assist in Providing IoT Solutions to Clients	TEL/N6253 & V3.0	Core	3	3	20:00	30:00	40:00	-	90:00	30	60	-	10	100	15
3.	Assist in Creating Smart Cities by Implementing Internet of Things (IoT) Solutions	TEL/N6254 & V3.0	Core	3	2	10:00	20:00	30:00	-	60:00	40	50	-	10	100	15
4.	Use Internet of Things (IoT) Technology in Agriculture	TEL/N6255 & V3.0	Core	3	2	10:00	20:00	30:00	-	60:00	40	50	-	10	100	15
5.	Organise Work and Resources as per Health and Safety Standards	TEL/N9101 & V3.0	Non-core	3	1	10:00	10:00	10:00	-	30:00	30	60	-	10	100	15
6.	Interact Effectively with Team Members and Customers	TEL/N9102 & V3.0	Non-core	3	1	10:00	10:00	10:00	-	30:00	40	50	-	10	100	15
7.	Employability Skills (30 Hours)	DGT/VSQ/N0101	Non-	3	1	30:00	-	-	-	30:00	20	30	-	-	50	10

		& V1.0	core													
Duration (in Hours) / Total Marks					13	120:00	120:00	150:00	-	390:00	230	360	-	60	650	100

Elective NOS/s: Not Applicable

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core / Non-Core	NCrF/ NSQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Pr oj.	Viva	Total	Weightage (%) (if applicable)
1.																
Duration (in Hours) / Total Marks																

Optional NOS/s: Not Applicable

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core / Non-Core	NCrF/ NSQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Pr oj.	Viva	Total	Weightage (%) (if applicable)
1.																
Duration (in Hours) / Total Marks																

Assessment - Minimum Qualifying Percentage

Please specify **any one** of the following:

Minimum Pass Percentage – Aggregate at qualification level: 50 % (Every Trainee should score specified minimum aggregate passing percentage at qualification level to successfully clear the assessment.)

Minimum Pass Percentage – NOS/Module-wise: ____ (Every Trainee should score specified minimum passing percentage in each mandatory and selected elective NOS/Module to successfully clear the assessment.)

Section 3: Training Related

1.	Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	Diploma after 10th Class in ECE / Electrical / CS / IT / Mechatronics and or any other related field with 4 years of industry experience in installation, configuration, and maintenance of basic IoT systems or sensors and 1 year of training experience in IoT device handling and maintenance OR Graduate in ECE / Electrical / CS / IT / Mechatronics and or any other related field with 1 year of industry experience in installation, configuration, and maintenance of basic IoT systems or sensors
2.	Master Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	Diploma after 10th Class in ECE / Electrical / CS / IT / Mechatronics and or any other related field with 7 years of industry experience in installation, configuration, and maintenance of basic IoT systems or sensors and 4 year of training experience in IoT device handling and maintenance OR Graduate in ECE / Electrical / CS / IT / Mechatronics and or any other related field with 4 year of industry experience in installation, configuration, and maintenance of basic IoT systems or sensors
3.	Tools and Equipment Required for Training	☒ Yes ☐ No (If "Yes", details to be provided in Annexure)
4.	In Case of Revised Qualification, Details of Any Upskilling Required for Trainer	NA

Section 4: Assessment Related

1.	Assessor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	Diploma after 10th Class in ECE / Electrical / CS / IT / Mechatronics and or any other related field with 4 years of industry experience in installation, configuration, and maintenance of basic IoT systems or sensors and 1 year of training experience in IoT device handling and maintenance
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		OR Graduate in ECE / Electrical / CS / IT / Mechatronics and or any other related field with 1 year of industry experience in installation, configuration, and maintenance of basic IoT systems or sensors
2.	Proctor's Qualification and experience in relevant sector (in years) <i>(as per NCVET guidelines)</i>	Diploma after 10th Class in ECE / Electrical / CS / IT / Mechatronics and or any other related field with 4 years of industry experience in installation, configuration, and maintenance of basic IoT systems or sensors and 1 year of training experience in IoT device handling and maintenance OR Graduate in ECE / Electrical / CS / IT / Mechatronics and or any other related field with 1 year of industry experience in installation, configuration, and maintenance of basic IoT systems or sensors
3.	Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years) <i>(as per NCVET guidelines)</i>	Diploma after 10th Class in ECE / Electrical / CS / IT / Mechatronics and or any other related field with 7 years of industry experience in installation, configuration, and maintenance of basic IoT systems or sensors and 4 year of training experience in IoT device handling and maintenance OR Graduate in ECE / Electrical / CS / IT / Mechatronics and or any other related field with 4 year of industry experience in installation, configuration, and maintenance of basic IoT systems or sensors
4.	Assessment Mode <i>(Specify the assessment mode)</i>	Offline or Blended
5.	Tools and Equipment Required for Assessment	☒ Same as for training ☐ Yes ☐ No <i>(details to be provided in Annexure-if it is different for Assessment)</i>

Section 5: Evidence of the need for the Qualification

Provide Annexure/Supporting documents name.

1.	Latest Skill Gap Study (not older than 2 years) (Yes/No): Yes
2.	Latest Market Research Reports or any other source (not older than 2 years) (Yes/No): Yes
3.	Government /Industry initiatives/ requirement (Yes/No): Yes
4.	Number of Industry validation provided: 5
5.	Estimated nos. of persons to be trained and employed: 35000
6.	Evidence of Concurrence/Consultation with Line Ministry/State Departments: If "No", why: Approved

Section 6: Annexure & Supporting Documents Check List

Specify Annexure Name / Supporting document file name

1.	Annexure: NCrf/NSQF level justification based on NCrf level/NSQF descriptors <i>(Mandatory)</i>	Yes
2.	Annexure: List of tools and equipment relevant for qualification <i>(Mandatory, except in case of online course)</i>	Yes
3.	Annexure: Detailed Assessment Criteria <i>(Mandatory)</i>	Yes
4.	Annexure: Assessment Strategy <i>(Mandatory)</i>	Yes
5.	Annexure: Blended Learning <i>(Mandatory, in case selected Mode of delivery is “Blended Learning”)</i>	No
6.	Annexure: Multiple Entry-Exit Details <i>(Mandatory, in case qualification has multiple Entry-Exit)</i>	Yes
7.	Annexure: Acronym and Glossary <i>(Optional)</i>	Yes
8.	Supporting Document: Model Curriculum <i>(Mandatory – Public view)</i>	Yes
9.	Supporting Document: Career Progression <i>(Mandatory - Public view)</i>	Yes
10.	Supporting Document: Occupational Map <i>(Mandatory)</i>	Yes
11.	Supporting Document: Assessment SOP <i>(Mandatory)</i>	Yes
12.	Any other document you wish to submit:	No

Annexure: Evidence of Level

NCrF/NSQF Level Descriptors	Key requirements of the job role/ outcome of the qualification	How the job role/ outcomes relate to the NCrF/NSQF level descriptor	NCrF/NSQF Level
Professional Theoretical Knowledge/Process	The IoT Technical Service Operator must possess a foundational understanding of electronic components such as sensors, actuators, microcontrollers, and IoT gateways. They are required to know the basic functioning of networking systems like Wi-Fi, Bluetooth, and ZigBee. Additionally, they should be familiar with the basic principles of device connectivity, power systems, troubleshooting methods, and safety practices during installations. Their work requires an understanding of how devices interact in an IoT environment and the significance of following standard procedures.	The knowledge expected at NSQF Level 3 includes awareness of standard procedures and the ability to use defined processes to perform work under familiar conditions. The IoT Technical Service Operator fits this level as they use basic theoretical knowledge to execute known tasks such as installing and servicing IoT equipment, interpreting device manuals, and identifying standard errors. Their learning helps them make predictable decisions within structured environments.	3
Professional and Technical Skills/ Expertise/ Professional Knowledge	The role demands the ability to use basic tools and instruments to assemble, test, and maintain IoT devices. The operator should be capable of configuring sensor networks, updating firmware, checking device connectivity, and performing physical installations. They should understand basic testing protocols and be able to troubleshoot common issues, either independently or under guidance. This also includes the use of basic diagnostic tools such as multimeters, power supplies, and network testers to identify faults in wiring, connections, or sensors.	At NSQF Level 3, candidates are expected to apply technical skills within familiar settings, where the issues are generally predictable and routine. The IoT Technical Service Operator's tasks align with this by involving standard practices and procedures. Their technical skills enable them to support higher-level technicians by preparing devices, performing quality checks, and ensuring the system is functional after service or installation. They can identify common problems and respond with known solutions.	3
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	This role requires individuals to demonstrate strong communication and teamwork abilities. The operator must report clearly to supervisors, follow instructions precisely, and maintain professional behavior in both individual and group settings. They should be punctual, organized, and safety-conscious. They must also understand basic concepts of digital tools, use mobile applications or basic software for data entry, and exhibit a customer-focused attitude. Awareness of basic entrepreneurship skills, such as service cost estimation and	NSQF Level 3 emphasizes the development of employability and entrepreneurial skills in familiar contexts. The IoT Technical Service Operator must display a positive work attitude, willingness to learn, and the ability to collaborate effectively with other team members. Their readiness to work under structured supervision while showing initiative reflects the level's requirement for accountability in delivering tangible outputs. The role requires intermediate communication and digital literacy skills, essential for	3

	time management, is beneficial.	professional success in field service operations.	
Broad Learning Outcomes/Core Skill	The operator should be capable of interpreting basic wiring diagrams, device manuals, and installation instructions. They must document service records, note errors and issues encountered, and communicate findings to senior technicians. Understanding and applying safety norms, environmental regulations, and data handling protocols are crucial. They should also be able to complete checklists, basic forms, and input digital data using mobile or computer interfaces. Learning outcomes include familiarity with routine documentation and the use of standard formats for reporting.	NSQF Level 3 expects individuals to apply a range of basic learning outcomes related to understanding and executing standard procedures. IoT Technical Service Operators carry out defined tasks and are expected to process and record information correctly. They demonstrate learning by accurately following processes, noting down service or maintenance records, and applying established formats in communication. Their learning supports the consistent delivery of quality service in predictable settings.	3
Responsibility	The IoT Technical Service Operator is responsible for the delivery and quality of their own assigned tasks. They are expected to complete installations, testing, and service activities under minimal supervision, though they report to senior technicians or supervisors. They are accountable for ensuring safety at the site, minimizing errors, and maintaining equipment condition. Their role may include coordinating with customers during installation and updating them about basic functionality.	At Level 3, individuals are expected to take responsibility for their own work and its output. The IoT Technical Service Operator fits this description well, as they are accountable for delivering reliable and safe installations or maintenance services. While the job involves routine tasks, it requires care, judgment, and consistency. The operator must also support junior workers like helpers and assist in planning basic steps for task execution within the defined scope.	3

Annexure: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment

Batch Size: 30

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1.	Screwdriver Set (Flat & Philips)	IS 844:2018 (Screwdrivers – General Requirements)	1 set
2.	Combination Pliers	IS 3650:1981 (Reaffirmed)	1 set

3.	Wire Stripper and Cutter	No specific Indian standard; choose low-cost brands like Taparia or Stanley	1
4.	Digital Multimeter	Follow BIS general safety guidelines; entry-level models like Meco 108B+ or Mextech DT830D are budget-friendly	1
5.	Soldering Iron (25W – 60W)	IS 4013:1967 (Soldering and Brazing Tools – Reaffirmed)	1
6.	Desoldering Pump	No specific Indian standard; available from local manufacturers (budget plastic types)	1
7.	Hot Glue Gun (Small)	IS 8154 may apply (for adhesives); low-cost versions from brands like iBELL or local market options	5
8.	Electric Drill (Handheld)	IS 7558:2004 (Electric Hand Tools – Safety Standards)	1
9.	Measuring Tape (3m or 5m)	IS 1269:1997 (Measuring Tapes – Steel Tape)	5
10.	Insulation Tape (PVC)	IS 7809 (Part 1/Sec 1):1994 – General purpose electrical insulation tape	3
11.	Safety Gloves (Rubber or PVC)	IS 4770:1991 (Rubber Gloves for Electrical Purposes)	5 pairs
12.	Wire Crimping Tool	IS 9848:1987 (for crimped joints in electrical cables)	1
13.	Small Tool Bag/Kit	No standard; use low-cost canvas or polyester bags available in local markets	3
14.	Portable LED Work Light	Follow BIS safety standards for electrical equipment; budget options available in Indian hardware stores	1
15.	Mini Hacksaw	IS 2594:2003 (Hacksaw blades and frames)	1

16.	ESD Wrist Straps	Adjustable with grounding cord	5
17.	Waste Bins (Recyclable/Non-recyclable/Hazardous)	Colour-coded, 20L with lid	1 each
18.	Digital Logbook/Task Management App	Google Sheets, Trello, or custom MIS	2 accounts
19.	Mobile/Tablet Device	3GB+ RAM, GPS-enabled	2
20.	Sample E-waste Materials	Used wires, PCBs, batteries	Assorted set
21.	Cleaning Supplies	Disinfectants, cloths, gloves	As required
22.	Tool Trolley	Metal trolley with drawers (e.g., Tata Agrico)	2
23.	Lockout/Tagout equipment	Safety LOTO padlocks and tags	2 kits
24.	Feedback forms	Printed or digital	30
25.	Communication tool	Installed apps (e.g., WhatsApp, MS Teams)	Pre-installed
26.	UPS	1KVA backup UPS (e.g., APC BX1100C-IN)	2
27.	Scanner cum Printer	All-in-one device (e.g., HP Ink Tank 416)	1

Classroom Aids

The aids required to conduct sessions in the classroom are:

1. Training Kit (Trainer Guide, Presentations)
2. Whiteboard

3. Markers
4. Notebooks
5. Pens
6. Laptop/Computer with an Internet connection
7. Speakers
8. Projector or Large screen.

Annexure: Industry Validations Summary

Provide the summary information of all the industry validations in table. This is not required for OEM qualifications.

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile (if available)
1	Altruist Technologies Private Limited	Mr Manik Roy	-	Plot No.2, Sector-22, HSIIDC IT Park, Panchkula, Haryana-134109	0172-2970008	careers@altruistindia.com	-
2	Virtusa Consulting Services Private Limited	Mr. Sundararajan Narayanan	Chief People Officer & Global Head of Human Resource	Sy No. 115/Part, Plot No. 10, TSIIC Limited, SEZ, Nanakramguda Village, Serilingampalli Mandal, Ranga Reddy District, Hyderabad – 500 032	+91 404 452 8000 +91 402 341 2310	-	-
3	Esquare India Pvt. Ltd.	MD ALI	Director Operation India & Asia Pacific	Park Landing 5AC-709, 2nd Floor, 2nd Block, HRBR Layout Extension, Outer Ring Rd, Bengaluru, Karnataka -560043.	+ 91 - 8660834187	sales@esquareinfo.com	-
4	Capital Numbers Infotech	Mrs. Paromita Biswas Panja	HR	Mani Casadona, Unit No 8E4, Action Area #2 F, New Town, Kolkata 700156, West Bengal, India	033 6799 2222	info@capitalnumbers.com	-
5	ESM Square Technologies Pvt.Ltd.	Mr Rakshid Gaud	-	334, 27th Main Rd, 2nd Sector, Sector 2, HSR Layout,	080 3521 6856	hr@esquaredhr.com	-

				Bengaluru, Karnataka 560102			
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Annexure: Training & Employment Details

Training and Employment Projections:

Year	Total Candidates		Women		People with Disability	
	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities
2025	1120					
2026	1568					
2027	2195					

Data to be provided year-wise for next 3 years

Training, Assessment, Certification, and Placement Data for previous versions of qualifications: NA

Qualification Version	Year	Total Candidates				Women				People with Disability			
		Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed

Applicable for revised qualifications only, data to be provided year-wise for past 3 years.

List Schemes in which the previous version of Qualification was implemented: NA

- 1.
- 2.

Content availability for previous versions of qualifications: NA

☐ Participant Handbook ☐ Facilitator Guide ☐ Digital Content ☐ Qualification Handbook ☐ Any Other:

Languages in which Content is available: NA

Annexure: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools: NA

Refer NCVET "Guidelines for Blended Learning for Vocational Education, Training & Skilling" available on:

<https://ncvet.gov.in/sites/default/files/Guidelines%20for%20Blended%20Learning%20for%20Vocational%20Education,%20Training%20&%20Skilling.pdf>

S. No.	Select the Components of the Qualification	List Recommended Tools – for all Selected Components	Offline : Online Ratio
1	☐ Theory/ Lectures - Imparting theoretical and conceptual knowledge	Smart classroom, projector, whiteboard, drone models (non-flying), reference books, learner handbooks, digital presentations, videos	
2	☐ Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners	Role-play scripts, digital communication platforms (MS Teams, Zoom), e-learning content, feedback forms	
3	☐ Showing Practical Demonstrations to the learners	Live drones (with controller), maintenance toolkits, safety gear (PPE), open demo space, visualizer camera, LCD screen for close-up demonstrations	
4	☐ Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training	Real drones (multirotor), drone diagnostics software, battery charging stations, firmware update kits, maintenance toolkits	
5	☐ Tutorials/ Assignments/ Drill/ Practice	Worksheets, online quizzes, drone maintenance logs, drone inspection checklists	
6	☐ Proctored Monitoring/ Assessment/ Evaluation/ Examinations	Assessment sheets, LMS platforms with proctoring capability, MCQ questionnaire	
7	☐ On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training	Industrial-grade drones, field operation area, maintenance workbench, PPE, inspection reports, logbook, observation checklist	

Annexure: Detailed Assessment Criteria

Detailed assessment criteria for each NOS/Module are as follows:

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
TEL/N6252: Carry out Troubleshooting for IoT Devices and Connectivity Issues	<i>Diagnose IoT Device Issues</i>	8	20	-	2
	PC1. assess symptoms of device malfunction, such as sensor errors, unresponsiveness, or erratic readings	2	5	-	1
	PC2. check physical components for damage, loose connections, or environmental interference	2	5	-	-
	PC3. test hardware functionality using diagnostic tools and built-in self-test (BIST) features	2	5	-	-
	PC4. validate correct configuration settings such as device ID, thresholds, and sampling intervals	2	5	-	1
	<i>Troubleshoot Connectivity Problems</i>	8	15	-	3
	PC5. identify network disconnection, bandwidth bottlenecks, or signal strength issues	2	3	-	1
	PC6. verify network settings such as SSID, IP address, protocol, and firewall rules	2	4	-	1
	PC7. reset or reconfigure the network interface on the IoT device	2	5	-	-
	PC8. coordinate with IT/network teams to resolve router, gateway, or cloud server issues	2	3	-	1
	<i>Restore and Test Functionality</i>	7	16	-	3
	PC9. apply firmware updates, patches, or rollbacks as needed	1	4	-	1
	PC10. replace defective components or peripheral modules	2	4	-	1
	PC11. test device functionality post-troubleshooting to ensure restored operation	2	5	-	-

	PC12. document troubleshooting steps, outcomes, and future recommendations	2	3	-	1
	<i>Escalation and Support Communication</i>	7	9	-	2
	PC13. escalate unresolved or complex issues to senior technicians or OEMs	2	3	-	1
	PC14. provide detailed error reports with logs, screenshots, and device IDs	3	3	-	
	PC15. maintain clear communication with customers or stakeholders during issue resolution	2	3	-	1
	Total	30	60	-	10
TEL/N6253: Assist in Providing IoT Solutions to Clients	<i>Discuss Client Requirements</i>	6	12	-	2
	PC1. interact with clients to gather technical and functional requirements	2	4	-	1
	PC2. document client needs related to data capture, monitoring, control, and reporting	2	4	-	-
	PC3. analyze site or business constraints such as environment, scale, and connectivity	2	4	-	1
	<i>Support IoT Solution Design</i>	8	16	-	3
	PC4. suggest compatible IoT devices, sensors, and communication protocols for the given use case	2	4	-	1
	PC5. assist in drafting the system architecture including cloud/edge components	2	4	-	1
	PC6. recommend power, data, and network configurations suited to the operational environment	2	4	-	1
	PC7. support estimation of resource and budget requirements for solution deployment	2	4		-
	<i>Assist in System Integration and Testing</i>	8	16	-	3
	PC8. help assemble and configure system components as per design	2	4	-	1
	PC9. perform preliminary testing to validate device communication and data flow	2	4	-	1
	PC10. assist in integrating APIs, dashboards, or cloud platforms as needed	2	4	-	-

	PC11. troubleshoot and fix basic issues during setup and trial runs	2	4	-	1
	<i>Document and Communicate Solution Details</i>	8	16	-	2
	PC12. create basic documentation such as component lists, network diagrams, and configuration steps	2	4	-	1
	PC13. maintain logs of client interactions and technical decisions taken	2	4	-	-
	PC14. gather feedback from clients on performance during trial or pilot phases	2	4	-	-
	PC15. communicate observations and suggestions to the design or product development team	2	4	-	1
	Total	30	60	-	10
TEL/N6254: Assist in Creating Smart Cities by Implementing Internet of Things (IoT) Solutions	<i>Identify and Deploy IoT Solutions</i>	17	18	-	3
	PC1. gather information on urban, transport, and healthcare challenges	-	2	-	-
	PC2. identify and select appropriate IoT devices (e.g., smart meters, medical sensors, GPS trackers)	3	2	-	1
	PC3. assess feasibility based on network availability, power supply, and site-specific factors	3	3	-	-
	PC4. prepare and secure installation sites in public, medical, and transport environments	3	3	-	-
	PC5. install, test, and calibrate IoT sensors and communication modules	3	3	-	-
	PC6. configure devices for tracking, monitoring, alerts, and real-time data sharing	3	3	-	1
	PC7. ensure proper network/cloud connectivity for centralized control and monitoring	2	2	-	1
	<i>Monitor Data and Ensure Transmission</i>	11	12	-	2
	PC8. monitor device data (e.g., health vitals, traffic flow, waste levels, energy use) using dashboards and software	2	3	-	-
	PC9. verify data is recorded accurately and transmitted securely to cloud or control centers	3	3	-	1

	PC10. ensure real-time alerts are triggered when thresholds or anomalies occur	3	3	-	-
	PC11. follow data privacy, encryption, and regulatory protocols (e.g., HIPAA, transport safety)	3	3	-	1
	<i>Maintain and Troubleshoot IoT Systems</i>	7	10	-	2
	PC12. conduct regular checks on device status, battery life, firmware, and connectivity	1	3	-	-
	PC13. identify and resolve issues like sensor failure, data gaps, or signal loss	3	2	-	1
	PC14. update firmware/app configurations and maintain device version control	-	3	-	-
	PC15. document and escalate unresolved technical issues to specialized teams	3	2	-	1
	<i>Support Users and Stakeholders</i>	5	10	-	3
	PC16. coordinate with municipal bodies, healthcare professionals, fleet managers, and vendors	2	2	-	1
	PC17. train patients, drivers, and end-users in system usage and mobile/desktop interfaces	-	2	-	1
	PC18. record installation details, user feedback, and incident reports	2	3	-	-
	PC19. communicate insights from field data to stakeholders for performance improvement	1	3	-	1
	Total	40	50	-	10
TEL/N6255: Use Internet of Things (IoT) Technology in Agriculture	<i>Identify IoT Applications in Agriculture</i>	11	9	-	2
	PC20. identify key agricultural activities that can benefit from IoT-based automation (e.g., irrigation, soil health, weather tracking)	4	3	-	1
	PC21. assess the suitability of IoT sensors and devices based on crop type, farm size, and local conditions	3	4	-	-
	PC22. suggest appropriate IoT solutions such as smart irrigation, greenhouse monitoring, livestock tracking, etc.	4	2	-	1
	<i>Install and Configure Agricultural IoT Devices</i>	11	15	-	2

	PC23. prepare agricultural land, polyhouses, or animal enclosures for IoT device installation	4	3	-	1
	PC24. install and calibrate sensors for soil moisture, temperature, humidity, pH, etc.	3	4	-	-
	PC25. connect devices to power sources, solar panels, or batteries as required	-	4	-	1
	PC26. configure communication settings for seamless data transfer to mobile or cloud-based dashboards	4	4		-
	<i>Monitor and Troubleshoot IoT Systems in Agriculture</i>	9	14	-	3
	PC27. monitor real-time data collected by IoT devices and check for anomalies	4	2	-	1
	PC28. diagnose device errors, network issues, or faulty sensor readings	1	4	-	1
	PC29. perform routine maintenance of sensors and controllers as per guidelines	4	4	-	-
	PC30. update firmware or software for agricultural IoT systems as needed	-	4	-	1
	<i>Support Farmers and Agricultural Stakeholders</i>	9	12	-	3
	PC31. train farmers on interpreting IoT data for better farming decisions	-	2	-	1
	PC32. respond to user queries regarding device operation and troubleshooting	3	3	-	-
	PC33. escalate technical issues to senior technicians when unresolved	3	4	-	1
	PC34. provide suggestions for optimizing water use, fertilizer application, or crop monitoring using IoT insights	3	3	-	1
	Total	40	50	-	10
TEL/N9101: Organise Work and Resources as per Health and Safety Standards	<i>maintain logs of client interactions and technical decisions taken</i>	1	1	-	-
	PC1. gather feedback from clients on performance during trial or pilot phases	1	1	-	-
	PC2. communicate observations and suggestions to the design or product development team	1	1	-	1
	PC3. digitally log work completed, including time stamps, material usage, and issues faced	1	3	-	1

PC4.	track and update digital task checklists, inventories, or handovers through mobile/desktop apps	1	3	-	-
PC5.	identify delays, workflow inefficiencies, or material constraints and escalate appropriately.	1	2	-	1
<i>Adhere to health, safety, and environmental guidelines</i>		13	24	-	5
PC6.	comply with organisational health, safety, and environment (HSE) policies at all times	1	3	-	1
PC7.	use personal protective equipment (PPE) such as ESD wrist straps, gloves, masks, and safety footwear	1	3	-	-
PC8.	report any breaches in safety protocols, near misses, or unsafe practices immediately to supervisor/concerned authorities	2	2	-	1
PC9.	detect hazards, including spillage, loose wiring, excessive noise, or EMI sources and respond as per SOP	1	3	-	1
PC10.	follow lockout/tagout procedures when working around electrical or moving parts	2	3	-	-
PC11.	adhere to safe lifting techniques, workstation posture norms, and equipment handling procedures	2	3	-	-
PC12.	handle tools, drones, or heavy components using trolleys or assistive equipment when needed	1	3	-	1
PC13.	identify early signs of physical or mental fatigue and report for preventive action	2	2	-	1
PC14.	inform supervisor of symptoms related to communicable diseases or unsafe coworker behaviour.	1	2	-	-
<i>Conserve energy and manage resources efficiently</i>		7	14	-	2
PC15.	minimise wastage of consumables, components, and materials by adhering to industry best practices	1	3	-	-

	PC16. use electricity, lighting, and climate-control systems responsibly	1	3	-	-
	PC17. power off equipment, tools, and terminals when not in use	1	2	-	-
	PC18. ensure routine maintenance, cleaning, and calibration of machines/tools to improve performance	1	2	-	1
	PC19. report leakages, overheating, or malfunctions immediately for rectification	2	2	-	1
	PC20. use digital tools to monitor and reduce environmental footprint, where applicable.	1	2	-	-
	<i>Implement safe and sustainable waste disposal practices</i>	4	9	-	1
	PC21. segregate and dispose of hazardous, recyclable, and general waste as per guidelines	2	3	-	-
	PC22. deposit e-waste or used batteries at designated collection points following e-waste protocols	1	3	-	-
	PC23. follow ESD-safe disposal procedures for sensitive electronic components	1	3	-	1
	Total	30	60	-	10
TEL/N9102: Interact Effectively with Team Members and Customers	<i>Interact effectively with supervisors and stakeholders</i>	11	13	-	2
	PC 1. receive and clarify work instructions, technical requirements, and priorities from supervisors or clients using appropriate communication tools (e.g., messaging apps, emails, virtual meetings)	3	3	-	-
	PC 2. inform supervisors or relevant stakeholders in a timely manner about any issues, risks, or deviations from planned tasks	2	3	-	-
	PC 3. contribute to team decisions by providing relevant data, suggestions, and professional feedback during team discussions	3	4	-	1
	PC 4. act promptly on constructive feedback and incorporate learnings to improve future work outcomes	3	3	-	1
	<i>Collaborate effectively with team members and customers</i>	16	21	-	4

	PC 5. follow organisational norms and digital etiquette when working in hybrid or remote teams	3	4	-	1
	PC 6. communicate respectfully and effectively using face-to-face, phone, email, or collaboration platforms (e.g., MS Teams, Zoom)	3	3	-	1
	PC 7. seek clarification and respond to queries from customers and team members accurately and promptly	3	3	-	1
	PC 8. identify and de-escalate conflicts tactfully to maintain a productive and harmonious work environment	2	4	-	-
	PC 9. demonstrate emotional intelligence in team settings by recognising and responding to others' perspectives and emotional states	2	3	-	-
	PC 10. align personal efforts with team and organisational goals to ensure shared success.	3	4	-	1
	<i>Promote inclusivity, respect, and accessibility in the workplace</i>	13	16	-	4
	PC 11. foster an inclusive workplace culture that respects gender, cultural, and socio-economic diversity	3	3	-	1
	PC 12. demonstrate respectful language and conduct toward colleagues and customers of all genders and backgrounds	2	3	-	-
	PC 13. support team members with disabilities by helping remove work-related barriers or by assisting them as needed	3	4	-	1
	PC 14. practice appropriate verbal and non-verbal communication while engaging with persons with disabilities (PwDs)	2	3	-	1
	PC 15. promote equal opportunity and participation for all in meetings, decision-making, and teamwork.	3	3	-	1
	Total	40	50	-	10
	DGT/VSQ/N0101: Employability Skills				
	<i>Introduction to Employability Skills</i>	1	1	-	-
	PC1. understand the significance of employability skills in meeting the job	-	-	-	-

(30 Hours)	requirements				
	<i>Constitutional values – Citizenship</i>	1	1	-	-
	PC2. identify constitutional values, civic rights, duties, personal values, ethics and environmentally sustainable practices	-	-	-	-
	<i>Becoming a Professional in the 21st Century</i>	1	3	-	-
	PC3. explain 21st Century Skills such as Self-Awareness, Behaviour Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset, etc.	-	-	-	-
	<i>Basic English Skills</i>	2	3	-	-
	PC4. speak with others using some basic English phrases or sentences	-	-	-	-
	<i>Communication Skills</i>	1	1	-	-
	PC5. follow good manners while communicating with others	-	-	-	-
	PC6. work with others in a team	-	-	-	-
	<i>Diversity & Inclusion</i>	1	1	-	-
	PC7. communicate and behave appropriately with all genders and PwD	-	-	-	-
	PC8. report any issues related to sexual harassment	-	-	-	-
	<i>Financial and Legal Literacy</i>	3	4	-	-
	PC9. use various financial products and services safely and securely	-	-	-	-
	PC10. calculate income, expenses, savings, etc.	-	-	-	-
	PC11. approach the concerned authorities for any exploitation as per legal rights and laws	-	-	-	-
	<i>Essential Digital Skills</i>	4	6	-	-
	PC12. operate digital devices and use their features and applications securely and safely	-	-	-	-

	PC13. use internet and social media platforms securely and safely	-	-	-	-
	<i>Entrepreneurship</i>	3	5	-	-
	PC14. identify and assess opportunities for potential business	-	-	-	-
	PC15. identify sources for arranging money and associated financial and legal challenges	-	-	-	-
	<i>Customer Service</i>	2	2	-	-
	PC16. identify different types of customers	-	-	-	-
	PC17. identify customer needs and address them appropriately	-	-	-	-
	PC18. follow appropriate hygiene and grooming standards	-	-	-	-
	<i>Getting ready for apprenticeship & Jobs</i>	1	3	-	-
	PC19. create a basic biodata	-	-	-	-
	PC20. search for suitable jobs and apply	-	-	-	-
	PC21. identify and register apprenticeship opportunities as per the requirement	-	-	-	-
	Total	20	30	-	-
Grand Total		230	360	-	60

Annexure: Assessment Strategy

1. Assessment System Overview:

- Batches assigned to the assessment agencies for conducting the assessment on SDSM/SIP or email.
- Assessment agencies send the assessment confirmation to VTP/TC looping SSC.
- The assessment agency deploys the ToA certified Assessor for executing the assessment.
- SSC monitors the assessment process & records.

2. Testing Environment:

- Confirm that the centre is available at the same address as mentioned on SDMS or SIP.
- Check the duration of the training.
- Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
- If the batch size is more than 30, then there should be 2 Assessors.
- Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
- Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
- Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
- Check the availability of the Lab Equipment for the particular Job Role.

3. Assessment Quality Assurance levels / Framework:

- Question papers created by the Subject Matter Experts (SME).
- Question papers created by the SME verified by the other subject Matter Experts.
- Questions are mapped with NOS and PC.
- Question papers are prepared considering that level 1 to 3 is for the unskilled & semi- skilled individuals, and level 4 and above are for the skilled, supervisor & higher management.
- An assessor must be ToA certified & the trainer must be ToT Certified.
- The assessment agency must follow the assessment guidelines to conduct the assessment.

4. Types of evidence or evidence-gathering protocol:

- Time-stamped & geotagged reporting of the assessor from assessment location.
- Center photographs with signboards and scheme-specific branding.
- Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period.
- Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos.

5. Method of verification or validation:

- A surprise visit to the assessment location.
- A random audit of the batch.
- Random audit of any candidate.

6. Method for assessment documentation, archiving, and access:

- Hard copies of the documents are stored.
- Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage.
- Soft copies of the documents & photographs of the assessment are stored in the Hard Drives.

7. Assessment Strategy (Employability Skills 60 hours)

The trainee will be tested for the acquired skill, knowledge and attitude through formative/summative assessment at the end of the course and as this NOS and MC is adopted across sectors and qualifications, the respective AB can conduct the assessments as per their requirements.

Annexure: Acronym and Glossary

Acronym

Acronym	Description
AA	Assessment Agency
AB	Awarding Body
ISCO	International Standard Classification of Occupations
NCO	National Classification of Occupations
NCrF	National Credit Framework
NOS	National Occupational Standard(s)
NQR	National Qualification Register
NSQF	National Skills Qualifications Framework
OJT	On the Job Training

Glossary

Term	Description
National Occupational Standards (NOS)	NOS define the measurable performance outcomes required from an individual engaged in a particular task. They list down what an individual performing that task should know and also do.
Qualification	A formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards
Qualification File	A Qualification File is a template designed to capture necessary information of a Qualification from the perspective of NSQF compliance. The Qualification File will be normally submitted by the awarding body for the qualification.
Sector	A grouping of professional activities on the basis of their main economic function, product, service or technology.
Long Term Training	Long-term skilling means any vocational training program undertaken for a year and above. https://ncvet.gov.in/sites/default/files/NCVET.pdf