



Model Curriculum

QP Name: Project Engineer – 5G Networks

QP Code: TEL/6306

QP Version: 2.0

NSQF Level: 5

Model Curriculum Version: 1.0

Telecom Sector Skill Council of India,
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Training Parameters

Sector	Telecom
Sub-Sector	Network Managed Services
Occupation	Project Engineering
Country	India
NSQF Level	5
Aligned to NCO/ISCO/ISIC Code	Nil
Minimum Educational Qualification & Experience	Completed 1st year of UG (UG Certificate) OR Pursuing 2nd year of UG OR Completed 1st year of diploma (after 12th) OR Pursuing 2nd year of 2- year diploma after 12th OR Completed 3-year diploma after 10th with 1-year relevant experience OR Previous relevant Qualification of NSQF Level 4 5G Technician – Active Network Installation and with minimum education as 8th Grade pass with 3-year relevant experience
Pre-Requisite License or Training	NA
Minimum Job Entry Age	21 Years
Last Reviewed On	31/03/2022
Next Review Date	31/03/2025
NSQC Approval Date	31/03/2022
QP Version	2.0
Model Curriculum Creation Date	31/03/2022
Model Curriculum Valid Up to Date	31/03/2025
Model Curriculum Version	1.0
Minimum Duration of the Course	660 Hours, 0 Minutes
Maximum Duration of the Course	660 Hours, 0 Minutes

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills.

- Perform 5G NR site hardware installation.
- Perform installation and commissioning of 5G tower site.
- Carry out compliance and quality checks at site.
- Carry out site monitoring and acceptance testing.
- Plan work effectively, implement safety practices and optimize use of resources.
- Communicate, develop interpersonal skills and develop sensitization towards gender and persons with disability.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
Bridge Module	20:00	10:00	00:00	00:00	30:00
Module 1: Role and Responsibilities of a 5G Project Engineer	20:00	10:00	00:00	00:00	30:00
TEL/N6319 – Check Availability of Hardware Equipment at the Site Location NOS Version No. 1.0 NSQF Level 5	40:00	60:00	20:00	00:00	120:00
Module 2: Install Hardware Equipment at the Site	40:00	60:00	20:00	00:00	120:00
TEL/N6320 – Perform installation and commissioning of 5G tower site NOS Version No. 1.0 NSQF Level 5	40:00	60:00	20:00	00:00	120:00
Module 3: Install and Commission 5G Tower Site	40:00	60:00	20:00	00:00	120:00

TEL/N6321 – Perform Compliance and Quality Check NOS Version No. 1.0 NSQF Level 5	30:00	50:00	40:00	00:00	120:00
Module 4: Perform installation and commission checks	30:00	50:00	40:00	00:00	120:00
TEL/N6322: Carry out Acceptance Testing and Site Monitoring NOS Version No. 1.0 NSQF Level 5	60:00	50:00	40:00	00:00	150:00
Module 5: Perform acceptance testing and site monitoring	60:00	50:00	40:00	00:00	150:00
TEL/N9103 – Implement effective interaction between team members and customers NOS Version No. 1.0 NSQF Level 5	10:00	20:00	00:00	00:00	30:00
Module 6: Communication and Interpersonal skills	10:00	20:00	00:00	00:00	30:00
TEL/N9104 – Manage work and safety at workplace NOS Version No. 1.0 NSQF Level 5	10:00	20:00	00:00	00:00	30:00
Module 7: Manage Work, Resources and Safety at Workplace	10:00	20:00	00:00	00:00	30:00
DGT/VSQ/N0102 Employability Skills (60 Hours) NSQF Level 4	60:00	00:00	00:00	00:00	60:00
Total Duration	270:0	270:0	120:00	00:00	660:00

Module Details

Module 1: Introduction to the Role of a Project Engineer – 5G Networks Mapped to Bridge Module

Terminal Outcomes:

- Identify the role and responsibilities of 5G project engineer

Duration: 20:00	Duration: 10:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the role and responsibilities of 5G project engineer • Describe the various electrical and electronic components. • Prepare a list of the standard operating procedures (SOP) to be followed for use of tools and equipment, service, and minor repairs. • Discuss the documentation involved in the different processes of maintenance. • State the safety, health and environmental policies and regulations for the workplace as well as for telecom sites in general. 	<ul style="list-style-type: none"> • Demonstrate how to conduct research to evaluate new emerging technologies and maintain up-to-date trends in cellular / mobile network communication with focus on 5G. • Ensure the specifications and configuration of the 5G core solutions implemented are in-line with the best practices. • Analyze and troubleshoot different 5G core deployments and solutions.
Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements	
Labs equipped with the following: PCs/Laptops Internet with Wi-Fi (Min 2 Mbps Dedicated) Documents of standard operating procedures, code of conduct, checklists, schedules tools and equipment, status report	

Module 2: Install Hardware Equipment at the Site

Mapped to TEL/N6319, v1.0

Terminal Outcomes:

- Perform installation of 5G NR site hardware equipment
- Implement steps to prepare site for 5G implementation

Duration: 40:00	Duration: 60:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Define radio access technology (4G/5G) and 5G access domain. • Elaborate cloud technologies, open edge server and xHaul deployments in a cloud environment. • Discuss 3GPP specs/standards, budget, architectural and other design documents. • Describe VoLTE, VoWiFi, Advanced Messaging (RCS), Multi-ID, vEPC, Virtualized RAN (vRAN), O-RAN, network function virtualization orchestration (MANO), Virtualized Network Functions (VNF). • Explain the message flows and parameters used in the messages for 5G procedures. • Outline the basic parameters for implementation of 5G antenna viz. Multiple Input, Multiple Output (MIMO) antenna. • Explain radiation pattern, network slicing, and network function virtualization (NFV). • List all passive and active equipment required at the site. • Summarise the processes of installation and commissioning of the equipment. • Describe solution life cycle management activities and ways to analyse the solutions. • Define the proof of concepts as well as the process of preparation and implementation. • Outline the parameters to check the signal strength. 	<ul style="list-style-type: none"> • Illustrate the process of transforming top-level architectures and designs into deployment deliverables a site. • Employ appropriate techniques to analyse the radiation pattern of MIMO antenna. • Plan software test with automated scripts and mapping of backhaul network with 5G site programs after installation. • Perform steps to check the working of different utilities as required. • Apply suitable ways to integrate orchestration among teams for effective productivity. • Prepare proof of concepts (PoC) to assure delivery as per requirements. • Demonstrate how to install and commission the equipment. • Perform steps to check the parameters of signal strength as per specifications. • Employ suitable techniques to adjust/tilt antenna for appropriate zenith and azimuth angle. • Perform steps to report emergency incidents like passive equipment failures, fire and power failures etc. to the management.

Classroom Aids:	
Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements	
Network cables, electrical wires, alarms, indicators, tools and equipment, AC, DG, PIU, SMPS and battery bank, Auto Man Failure (AMF) panel, alarm panel, tools like pliers, power drill, screwdrivers, spanner, measurement tools, like multi-meter and thermometer, diagnostic tools Sample of preventive and corrective maintenance formats and checklists Laptop with software such as MS Office and CRM	

Module 3: Install and Commission 5G Tower Site

Mapped to TEL/N6320, v1.0

Terminal Outcomes:

- Perform pre-installation activities
- Implement steps to install and commission gNodeB

Duration: 40:00	Duration: 60:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Analyse installation plan received from planning team and make required amendments. • List the specification of the material required for installation viz. g-NodeB, transmission units, transmission racks, MCB. • Elaborate kubernetes/Dockers, continuous integration (CI)/ continuous delivery (CD) (Ansible, Jenkins's pipeline). • Discuss the use of basic Python in software upgradation. • List the application of traffic generators such as iPerf, IxLoad etc. • Discuss Layer 2-3G/LTE/5G or Layer 3 Protocols RRC, RLC, PDCP. • Discuss the different types of tools and equipment required to carry out installation and commissioning such as radio Network Design, Parameter Tuning, Radio network optimisation, OSS, RAN optimisation tools. • Explain the installation process of gNode inside/outside of the tower and Non Stand Alone (NSA) mode of 5G equipment. • Describe configuration processes of all equipment and network elements including network equipment. • Discuss the parameters of Quality of Service (QoS) for Operations, Administration and Maintenance (OAM) parameter and their methods of measurement. • List the parameters to measure performance for monitoring day-to-day network operations. 	<ul style="list-style-type: none"> • Demonstrate how to verify the availability of material in line with Bill of Material (BoM) and requirement of any additional equipment/accessories. • Perform steps to measure the current capacity of cables and equipment using appropriate tools. • Implement ways to ensure ground connectivity and use of MCB - 48 V DC at the rack for installation. • Demonstrate how to mount the antenna on the tower, connect cables to the tower shelter and check inter-connection of cables. • Employ suitable techniques to arrange the equipment properly in the rack. • Demonstrate how to route cables and traffic cable as per architecture and design. • Prepare labels/stickers/markers for the cables. • Implement ways to ensure that feeder and jumper cable are supported by earthing wire, electrical wiring is closed properly, and there is proper power connection. • Apply appropriate methods to avoid damage to cables and connectors at all stages. • Perform steps to install gNode inside/outside of the tower and interconnect microwave equipment. • Demonstrate how to configure equipment and network elements. • Perform steps to install Non Stand Alone (NSA) mode of 5G equipment and configure network equipment. • Employ appropriate techniques to measure Quality of Service (QoS) parameters for Operations, Administration and Maintenance (OAM).

<ul style="list-style-type: none"> • Outline network rollout activities and the processes of upgrading software of network nodes, as well as onboarding and validation of enterprise VNF. • Explain the importance of providing congestion free network. • Discuss the process of integrating new roll out sites and expand existing sites. • Summarise the factors involved in successful site installation and commissioning such as scientific computation and data acquisition. • Describe the records and documentation pertaining to installation and commissioning. 	<ul style="list-style-type: none"> • Implement steps to upgrade software of network nodes, onboarding and validation of VNF and other network rollout activities. • Apply suitable methods to integrate new rollout sites and expand existing sites. • Perform steps for successful site installation and commissioning, including scientific computation and data acquisition.
<p>Classroom Aids:</p>	
<p>Whiteboard and Markers, Chart paper and sketch pens, LCD Projector and Laptop for presentations</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>Network cables, electrical wires, alarms, indicators, tools and equipment, AC, DG, PIU, SMPS and battery bank, Auto Mains Failure (AMF) panel, alarm panel tools like pliers, power drill, screwdrivers, spanner, measurement tools like multi-meter and thermometer, diagnostic tools</p>	

Module 4: Perform Installation and Commissioning Checks

Mapped to TEL/N6321, v1.0

Terminal Outcomes:

- Perform quality checks pertaining to installation and commissioning
- Implement steps to prepare compliance report

Duration: 30:00	Duration: 50:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Analyse the commissioning requirements of the site as per service provider. • Outline the factors of pre-defined report format to record test results. • Summarise the procedure of testing 5G gNodeBs along with the use of testing tools, channel and network emulators. • Discuss UE simulators like Aeroflex TM500 and Keysight and UE debuggers like QXDM, XCAL and TEMS. • Explain the different types of issues/bugs that occur during the test run and their possible solutions. • Describe the different processes/tasks/activities to maintain the site in running condition. • Discuss the importance of maintaining different types of documentation/reports/logs, including compliance report of installation and commissioning of equipment. • Recall the process of compliance closure for the site after inspection and sign off on all reports by the concerned authority. 	<ul style="list-style-type: none"> • Perform the steps to carry out test run of all the upgraded software/equipment to identify issues/bugs. • Demonstrate use of testing tools IXIA, Spirent for traffic generation and monitoring at local level. • Employ appropriate techniques to resolve the issues and incorporate the changes to keep equipment running. • Maintain draft documentation/reports/logs, as per the required format, including status report of the nodes and compliance report. • Demonstrate how to get the reports signed off by the concerned authority after inspection.
Classroom Aids:	
<p>Whiteboard and Markers Chart paper and sketch pens LCD Projector and Laptop for presentations</p>	
Tools, Equipment and Other Requirements	
<p>passive infrastructure equipment like DG set, PIU panel, earthing systems, transformer, SMPS, air conditioner, battery list of certifications applicable for sites</p>	

Module 5: Communication and Interpersonal Skills

Mapped to TEL/N9103, v1.0

Terminal Outcomes:

- Communicate effectively
- Develop interpersonal skills
- Develop sensitization towards gender and person with disability

Duration: 10:00	Duration: 20:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Identify roles and responsibilities and understand organisation’s policies. • List organisational guidelines for dress code, time schedules, language and other soft skill aspects. • List the different methods of communication. • Explain the importance of effective communication and interpersonal skills. • Analyse the common reasons for interpersonal conflicts and ways of managing them effectively. • Identify types of information needed by colleagues and its importance. • Identify the need for implementing standards, guidelines and practices pertaining to gender sensitivity, including work ethics and workplace etiquettes. • Explain the work ethics, workplace etiquettes as well as standards and guidelines for all genders and PwD. • List health and safety requirements for persons with disability. • List the rights, duties and benefits available at workplace for person with disability. • Identify the process of recruiting people with disability for a specific job. • Analyse the specific ways to help persons with disability overcome the challenges. 	<ul style="list-style-type: none"> • Demonstrate how to interact with superiors in terms of escalating problems, reporting work completion and receiving feedback. • Apply team building skills to assist colleagues in maximising effectiveness and efficiency of carrying out tasks. • Demonstrate appropriate communication skills and etiquettes while interacting with others. • Resolve conflicts with colleagues and adhere to commitment. • Demonstrate ideal workplace ethics while interacting with colleagues with respect to sharing information, co-ordinating work and showing respect. • Follow organisation’s policy for working with team members. • Illustrate importance of team goals over individual goals. • Use inclusive language irrespective of the gender/ disability of the person. • Demonstrate appropriate behaviour towards all genders and differently abled people.
Classroom Aids:	
White board/ black board marker / chalk, duster, computer or Laptop attached to LCD projector	
Tools, Equipment and Other Requirements	
Sample of escalation matrix, organisation structure.	

Module 6: Manage Work, Resources and Safety at Workplace Mapped to TEL/N9104, v1.0

Terminal Outcomes:

- Plan work effectively
- Implement safety practices
- Optimize use of resources

Duration: 10:00	Duration: 20:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List the importance of following the standard operating procedures of the company w.r.t. privacy, confidentiality and security. • List the key performance indicators for the new tasks. • Identify the opportunities for team building workshops and motivational trainings. • List and explain work requirements to be followed by the team. • Identify the issues with and handle them. • Discuss correct way to show emotions at workplace. • Describe the importance of timely completion of tasks. • Explain the importance of escalation matrix. • Explain the importance of providing and receiving feedback constructively. • Analyse ways to optimize usage of resources. • List the importance, cause and effect of greening of jobs. • Identify different types of hazards such as illness, accidents, fires etc. • List the causes of risks and potential hazards in a work area and ways to prevent them. • List the steps to report accident and health related issues as per SOP. • Explain the concept of waste management. • List the methods of waste disposal. • Identify the different categories of waste for the purpose of segregation. • Differentiate between recyclable and non-recyclable waste. 	<ul style="list-style-type: none"> • Demonstrate techniques to save on cost and time. • Demonstrate routine cleaning of tools, equipment and machines to ensure team follows the same. • Use resources such as water judiciously. • Check for malfunctions in equipment and report as per SOP. • Report any breaches in safety and security to the concerned person. • Illustrate ways to keep work area clean such as mopping spills and leaks, cleaning grease stains etc. • Check for spills and leaks and plug the same. • Demonstrate segregation of types of hazardous waste. • Illustrate steps to minimise waste. • Illustrate proper waste disposal procedures and how to dispose-off hazardous waste. • Illustrate ways to find exact cause of a problem and validate the same in case done by a team member.

- List electronic waste disposal procedures.

Classroom Aids:

White board/ black board marker / chalk, duster, computer or Laptop attached to LCD projector

Tools, Equipment and Other Requirements

Personal Protection Equipment: safety glasses, head protection, rubber gloves, safety footwear, warning signs and tapes, fire extinguisher and first aid kit

Module 7: Perform Acceptance Testing and Site Monitoring

Mapped to TEL/N6322, v1.0

Terminal Outcomes:

- Prepare for acceptance testing (AT) and monitoring
- Perform acceptance test of new site
- Monitor site performance and traffic
- Communicate test results and record

Duration: 60:00	Duration: 50:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Identify the various procedures for testing to be followed by the team. • Explain the functioning and availability of test equipment required to perform AT. • Explain how to verify the correct software version is installed and ready to use. • Discuss the importance of consulting with development and infrastructure engineers in resolution of problems. • Coordinate with the infrastructure engineer and the riggers to complete testing of passive infrastructure. • Describe the validation process of solution configurations and functionality. • Discuss the importance of taking backup prior to OMC stop, start and shutdown, re-sync OMCR Databases. • Discuss various performance trends to keep a constant check on network performance and successful monitoring of site’s key statistics. • Explain the importance of timely logical fault analysis and rectification. • Discuss the importance of communicating with the project team about the remaining punch points before site handover and inform all relevant stake holders of the test results. • Explain the importance of written and verbal feedback to other teams and supervisors/managers for technical appraisals. • Discuss the importance of maintaining the records and implication of non-maintenance. 	<ul style="list-style-type: none"> • Prepare a sample test strategy for site testing with the available resources and tools/simulators. • Employ various techniques for testing 5G gNodeB functionalities based on various standards and client requirements. • Apply appropriate practices for analysing the test scripts using available test tools. • Demonstrate how to build test setups as per the approved/finalized test strategy. • Prepare a sample checklist to perform site AT from the supervisor and other site documents and specifications. • Implement the steps to test cases and validate the test status based on the expectations. • Perform the steps for physical and logical testing as per the checklist. • Demonstrate how to debug and identifying and recreating the potential problems for future references. • Perform the tests for the optimum functionality and suggest corrective action, if any discrepancies. • Demonstrate performance monitoring and use authorised test instruments for analysing mobile/radio network. • Perform various network health checks such as Continuous CFCs monitoring, etc. • Demonstrate how to fix and resolve problems to stabilize and optimize customer networks. • Perform steps for routine check-ups, update and backup system logs, etc. as per specifications. • Perform steps for updating all required

	<p>documents and their availability as per organisational norms and formats.</p> <ul style="list-style-type: none"> • Prepare a sample of different documentation of test results to assist in debugging and modification of software for future. • Illustrate ways of finding suitable solutions for issues reported by customers. • Demonstrate the testing of 5G gnodeBs.
<p>Classroom Aids:</p>	
<p>Laptop, white board, marker, projector</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>Tools and equipment, different AI devices Service Manual/ User Manuals, Customer Registration, Program Authentication Form, Customer Feedback form</p>	

Module 8: On-the-Job Training

Mapped to 5G – Project Engineer (Installation & Commissioning of 5G rollout site)

Mandatory Duration: 120:00	Recommended Duration: 00:00
Location: On-Site	
Terminal Outcomes	
<ol style="list-style-type: none"> 1. Install and commission 5G NR hardware equipment on site. 2. Validate the signal strength as per the requirements. 3. Demonstrate inspecting routing of power, IF, and RF cables. 4. Avoid any kind of damage to cables and connectors. 5. Install gNodeB inside/outside of the tower. 6. Install Non-Stand Alone (NSA) mode of 5G equipment. 7. Configure network equipment. 8. Measure all necessary parameters for operations and maintenance. 9. Test g-Node, microwave equipment, Non Stand-Alone mode of 5G. 10. Demonstrate how to use the various testing tools. 11. Troubleshoot and fix the faults. 12. Prepare compliance report. 13. Run acceptance test of new site. 14. Monitor site performance and traffic. 15. Record test results in pre-defined report formats. 	

Module 9: DGT/VSQ/N0102 Employability Skills (60 hours)

Mapped to 5G – Project Engineer (Installation & Commissioning of 5G rollout site)

Mandatory Duration: 60:00

Location: On-Site

S.No.	Module Name	Key Learning Outcomes	Duration (hours)
1.	Introduction to Employability Skills	<ul style="list-style-type: none"> Discuss the Employability Skills required for jobs in various industries. List different learning and employability related GOI and private portals and their usage. 	1.5
2.	Constitutional values - Citizenship	<ul style="list-style-type: none"> Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen. Show how to practice different environmentally sustainable practices. 	1.5
3.	Becoming a Professional in the 21st Century	<ul style="list-style-type: none"> Discuss importance of relevant 21st century skills. Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life. Describe the benefits of continuous learning. 	2.5
4.	Basic English Skills	<ul style="list-style-type: none"> Show how to use basic English sentences for every day conversation in different contexts, in person and over the telephone. Read and interpret text written in basic English Write a short note/paragraph / letter/e -mail using basic English. 	10
5.	Career Development & Goal Setting	<ul style="list-style-type: none"> Create a career development plan with well-defined short- and long-term goals. 	2
6.	Communication Skills	<ul style="list-style-type: none"> Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette. Explain the importance of active listening for effective communication. Discuss the significance of working collaboratively with others in a team. 	5
7.	Diversity & Inclusion	<ul style="list-style-type: none"> Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD. Discuss the significance of escalating sexual harassment issues as per POSH act. 	2.5
8.	Financial and Legal Literacy	<ul style="list-style-type: none"> Outline the importance of selecting the right financial institution, product, and service. Demonstrate how to carry out offline and online financial transactions, safely and securely. List the common components of salary and compute income, expenditure, taxes, investments etc. Discuss the legal rights, laws, and aids. 	5
9.	Essential Digital Skills	<ul style="list-style-type: none"> Describe the role of digital technology in today's life. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely. 	10

		<ul style="list-style-type: none"> • Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely. • Create sample word documents, excel sheets and presentations using basic features. • Utilize virtual collaboration tools to work effectively. 	
10.	Entrepreneurship	<ul style="list-style-type: none"> • Explain the types of entrepreneurship and enterprises. • Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan. • Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement. • Create a sample business plan, for the selected business opportunity. 	7
11	Customer Service	<ul style="list-style-type: none"> • Describe the significance of analyzing different types and needs of customers. • Explain the significance of identifying customer needs and responding to them in a professional manner. • Discuss the significance of maintaining hygiene and dressing appropriately. 	5
12	Getting Ready for Apprenticeship & Jobs	<ul style="list-style-type: none"> • Create a professional Curriculum Vitae (CV). • Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively. • Discuss the significance of maintaining hygiene and confidence during an interview. • Perform a mock interview. • List the steps for searching and registering for apprenticeship opportunities. 	8

LIST OF TOOLS & EQUIPMENT FOR EMPLOYABILITY SKILLS

S No.	Name of the Equipment	Quantity
1.	Computer (PC) with latest configurations – and Internet connection with standard operating system and standard word processor and worksheet software (Licensed) (all software should either be latest version or one/two version below)	As required
2.	UPS	As required
3.	Scanner cum Printer	As required
4.	Computer Tables	As required
5.	Computer Chairs	As required
6.	LCD Projector	As required
7.	White Board 1200mm x 900mm	As required

Note: Above Tools & Equipment not required, if Computer LAB is available in the institute.

ANNEXURE

Trainer Requirements (Project Engineer – 5G Networks)

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
B.E./B.Tech	Electronics/Telecom/IT and other relevant fields	2	Telecom (5G Networks)	0	NA	Eligible for ToT Program

Trainer Certification	
Domain Certification	Platform Certification
Job Role: “Project Engineer – 5G Networks” “TEL/Q6306 v2.0”, Minimum accepted score is 80%	Job Role: “Trainer”, “MEP/Q2601” v2.0, Minimum accepted score is 80%

Assessor Requirements (Project Engineer – 5G Networks)

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
B.E./B.Tech	Electronics/Telecom/IT and other relevant fields	2	Telecom (5G Networks)	0	NA	Eligible for ToA Program

Assessor Certification	
Domain Certification	Platform Certification
Job Role: “Project Engineer – 5G Networks” “TEL/Q6306 v2.0”, Minimum accepted score is 80%	Job Role: “Assessor” “MEP/Q2701”v2.0, Minimum accepted score is 80%

Trainer Requirements (Employability Skills 60 hours)

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Graduate/CITS	Any discipline			2	Teaching experience	Prospective ES trainer should:
Current ITI trainers	Employability Skills Training (3 days full-time course done between 2019-2022)					<ul style="list-style-type: none"> • have good communication skills • be well versed in English • have digital skills • have attention to detail • be adaptable • have willingness to learn
Certified current EEE trainers (155 hours)	from Management SSC (MEPSC)					
Certified Trainer	Qualification Pack: Trainer (MEP/Q0102)					

Trainer Certification	
Domain Certification	Platform Certification
Certified in 60-hour Employability NOS (2022), with a minimum score of 80% OR Certified in 120-, 90-hour Employability NOS (2022), with a minimum score of 80%	NA

Master Trainer Requirements (Employability Skills 60 hours)

Master Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Graduate/CITS	Any discipline			3	Employability Skills curriculum training experience with an interest to train as well as orient other peer trainers	Prospective ES Master trainer should: <ul style="list-style-type: none"> • have good communication skills • be well versed in English • have basic digital skills
Certified Master Trainer	Qualification Pack: Master Trainer (MEP/Q2602			3	EEE training of Management SSC (MEPSC) (155 hours)	<ul style="list-style-type: none"> • have attention to detail • be adaptable • have willingness to learn • be able to grasp concepts fast and is creative with teaching practices and likes sharing back their learning with others

Master Trainer Certification	
Domain Certification	Platform Certification
Certified in 60-hour Employability NOS (2022), with a minimum score of 90% . OR Certified in 120-, 90-hour Employability NOS (2022), with a minimum score of 90%	NA

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
 - 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 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
 - Assessor must be ToA certified & trainer must be ToT Certified
 - 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:
 - Surprise visit to the assessment location
 - 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

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.

References

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
SOP	Standard Operating Procedures
CRM	Customer Relationship Management
AC	Air Conditioner
DG	Diesel Generator
PIU	Power Interface Unit
SMPS	Switch Mode Power Supply
BB	Battery Bank
IPMS	Integrated Power Management System
AMF	Auto Man Failure
PPE	Personal Protective Equipment
FM	Field Maintenance
PwD	Persons with Disabilities
EB	Electricity Board
MCB	Miniature Circuit Breaker
NOC	Network Operating Centre
SLA	Service Level Agreement
ES	Employability Skills