QUALIFICATION FILE–Standalone NOS

Fundamentals of Wireless Sensor networks

☐ Horizontal/Generic ☐Vertical/Specialization

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

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

NCrF/NSQF Level: 5

Submitted By:

NATIONAL INSTITUTE OF ELECTRONICS AND INFORMATION TECHNOLOGY (NIELIT)

NIELIT Bhawan, Plot No. 3, PSP Pocket, Sector-8,
Dwarka, New Delhi-110077,
Phone:- 91-11-2530 8300
e-mail:- contact@nielit.gov.in

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<tr><td>3.</td><td>Type of Qualification ☒ New ☐ Revised</td><td>NQR Code & version of the existing /previous qualification: NA</td><td>Qualification Name of the existing/previous version: NA</td></tr>
<tr><td>4.</td><td>National Qualification Register (NQR) Code & Version</td><td>NG-05-EH-02892-2024-V1-NIELIT</td><td>5. NCrF/NSQF Level: 5</td></tr>
<tr><td>6.</td><td>Brief Description of the Standalone NOS</td><td colspan="2">The purpose of this course is to provide learners with a comprehensive understanding of the fundamental concepts, architectures, and technologies underpinning WSNs. It emphasizes hands-on learning through programming exercises and practical case studies to illustrate real-world applications. The curriculum covers essential topics such as WSN architecture, communication technologies, protocol stacks, security challenges, energy efficiency, and advanced topics like QoS and cross-layer optimization.</td></tr>
<tr><td>7.</td><td>Eligibility Criteria for Entry for a Student/Trainee/Learner/Employee</td><td colspan="2">a. Entry Qualification & Relevant Experience:
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<tr><th>S. No.</th><th>Academic/Skill Qualification (with Specialization - if applicable)</th><th>Relevant Experience (with Specialization - if applicable)</th></tr>
<tr><td>1</td><td>2nd year of UG in Electronics and Communication Engineering/ Electrical Engineering/CS/IT/Physics/Electronics and allied branches</td><td>NA</td></tr>
<tr><td>2</td><td>3 Years of Diploma in Electronics and Communication Engineering/ Electrical Engineering/CS/IT/Physics/Electronics and allied branches after class 10th</td><td>1.5 Years</td></tr>
<tr><td>3</td><td>2 Year of diploma in Electronics and Communication Engineering/ Electrical Engineering/CS/IT/Physics/Electronics and allied branches after class 12th</td><td>NA</td></tr>
<tr><td>4</td><td>NSQF Level 4.5 in Electronics and Communication Engineering/ Electrical Engineering/CS/IT/Physics/Electronics and allied</td><td>1.5 Years</td></tr>
</table></td></tr>
</table>

		branches	
	5	NSQF Level 4 Electronics and Communication Engineering/ Electrical Engineering/CS/IT/Physics/Electronics and allied branches	1.5 Years

b. Age:18 years

8.	**Credits Assigned to this NOS-Qualification, Subject to Assessment** *(as per National Credit Framework (NCrF))*	2 Credits	**9. Common Cost Norm Category (I/II/III)** *(wherever applicable)***:** Category I (Electronics System Design)
10.	**Any Licensing Requirements for Undertaking Training on This Qualification** *(wherever applicable)*	NA	
11.	**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**	
12.	**Assessment Criteria**		
13.	**Is the NOS Amenable to Persons with Disability**	☒ **Yes** ☐ **No**	

Training Delivery Mode	Theory (Hours)	Practical (Hours)	Total (Hours)
Classroom (offline)	30	30	60

Training shall be conducted in any of the 3 modes depending on the regional need.

(Refer Blended Learning Annexure-V for details)

Theory (Marks)	Practical (Marks)	Project/ Presentation /Assignment (Marks)	Viva/ Internal Assessment (Marks)	Total (Marks)	Passing %age
100	60	20	20	200	50

The centralized online assessment is conducted by the Examination Wing, NIELIT Headquarters.

If "Yes", specify applicable type of Disability:

a. Locomotor Disability: Leprosy Cured Person, Dwarfism, Muscular Dystrophy and Acid Attack Victims
b. Visual Impairment: Low Vision

14.	**Progression Path After Attaining the Qualification, wherever applicable**	Embedded Software Engineer	
15.	**How will the participation of women be encouraged?**	Participation by women can be ensured through Government Schemes. Occasionally, exclusive batches for women would be run for the proposed courses. Funding is available for women's participation under other schemes launched by the Government from time to time.	
16.	**Other Indian languages in which the Qualification & Model Curriculum are being submitted**	Qualification file available in English & Hindi Language.	
17.	**Is similar NOS available on NQR-if yes, justification for this qualification**	**☐Yes ☒ No**	
18.	**Name and Contact Details Submitting / Awarding Body SPOC** *(In the case of CS or MS, provide details of both Lead AB & Supporting ABs)*	**Name:** Rajesh M **Email:** rajesh.m@nielit.gov.in **Website:** https://nielit.gov.in/ **Name:** Anirban Jyoti Hati **Email:** anirban@nielit.gov.in **Website:** https://nielit.gov.in/ **Name:** Ankit Kumar **Email:** ankit@nielit.gov.in **Website:** https://nielit.gov.in/	
19.	**Final Approval Date by NSQC: 25.07.2024**	**20. Validity Duration: 3 years**	**21. Next Review Date: 25.07.2027**

Section 2: Training Related

1.	**Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)**	B.E./B. Tech in Electronics/ Electronics & Communication/ Electrical/ Electrical and Electronics/Instrumentation/ Electronics & Instrumentation / Instrumentation & Control /Computer Science/Information Technology Minimum 2 year of experience in the field of Embedded Real Time systems
2.	**Master Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)**	B.E./B. Tech in Electronics/ Electronics & Communication/ Electrical/ Electrical and Electronics/Instrumentation/ Electronics & Instrumentation / Instrumentation & Control /Computer Science/Information Technology Minimum 3 year of experience in the field of Embedded Real Time systems
3.	**Tools and Equipment Required for the Training**	☒ Yes ☐No Available at Annexure-II

4.	**In Case of Revised NOS, details of Any Upskilling Required for Trainer**	Not Applicable

Section 3: Assessment Related

1.	**Assessor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	B.Tech or Equivalent as per NCrF + 3 years relevant experience
2.	**Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines), (wherever applicable)*	The assessor carries out theory online assessments through the remote proctoring methodology. Theory examination would be conducted online and the paper comprises MCQ. Conduct of assessment is through trained proctors. Once the test begins, remote proctors have full access to the candidate's video feeds and computer screens. Proctors authenticate the candidate based on registration details, pre-test image captured and I-card in possession of the candidate. Proctors can chat with candidates or give warnings to candidates. Proctors can also take screenshots, terminate a specific user's test session, or re-authenticate candidates based on video feeds.
3.	**Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	External Examiners/ Observers (Subject matter experts) are deployed including NIELIT scientific officers who are subject experts for evaluation of Practical examination/ internal assessment / Project/ Presentation/ assignment and Major Project (if applicable). Qualification is generally B.Tech
4.	**Assessment Mode***(Specify the assessment mode)*	Centralized online examination will be conducted
5.	**Tools and Equipment Required for Assessment**	Same as for training ☒ Yes ☐ No

Section 4: Evidence of the Need for the Standalone NOS

1.	Government /Industry initiatives/ requirement (Yes/No): Yes, Available at Annexure-A: Evidence of Need
2.	Number of Industry validations provided: 8
3.	Estimated number of people to be trained: 500 persons per year shall be trained.
4.	Evidence of Concurrence/Consultation with Line/State Departments (In case of regulated sectors): NIELIT is recognized as AB and AA under Government Category. NIELIT is an HRD arm of MeitY, therefore, the Line Ministry Concurrence is not required.

5.	Latest Skill Gap Study (not older than 2 years) (Yes/No): Yes, Available in Annexure-A: Evidence of Need
6.	Latest Market Research Reports or any other source (not older than 2 years) (Yes/No): Yes, Available at Annexure-A: Evidence of Need

Section 5: Annexure & Supporting Documents Check List

Specify Annexure Name / Supporting document file name.

1.	**Annexure:** NCrF/NSQF level justification based on NCrF/NSQF descriptors *(Mandatory)*	*Available at* Annexure-I: Evidence of Level
2.	**Annexure:** List of tools and equipment relevant for NOS *(Mandatory, except in case of online course)*	*Available at* Annexure-II: Tools and Equipment
3.	**Annexure: Industry Validation**	*Available at* Annexure-III: Industry Validation
4.	**Annexure: Training Details**	*Available at* Annexure-IV: Training Details
5.	**Annexure:** Blended Learning *(Mandatory, in case the selected Mode of delivery is Blended Learning)*	*Available at* Annexure-V: Blended Learning
6.	**Annexure/Supporting Document:** Standalone NOS-Performance Criteria Details Annexure/Document with PC-wise detailing as per NOS format (Mandatory- Public view)	*Available at* Annexure-VI: Standalone NOS- Performance Criteria details
7.	**Annexure:** Performance and Assessment Criteria *(Mandatory)*	*Available at* Annexure-VII: Detailed Assessment Criteria
8.	**Annexure:** Assessment Strategy *(Mandatory)*	*Available at* Annexure-VIII: Assessment Strategy
9.	**Annexure:** Acronym and Glossary *(Optional)*	*Available at* Annexure-IX: Acronym and Glossary
10.	**Supporting Document:** Model Curriculum	*Available at* Annexure-C: Model Curriculum

Annexure-I: 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	• Theoretical understanding of how different components interact and communicate within a WSN, including the principles behind various communication technologies. • Understanding the theoretical basis for each layer in the protocol stack and the security challenges and mechanisms, including encryption, authentication, and key management. • Theoretical knowledge of power consumption metrics, optimization techniques, and how advanced features contribute to the overall efficiency and functionality of WSN.	• Understanding the theoretical aspects of how different components interact and communicate in a WSN is foundational knowledge. • It includes comprehending the underlying principles of communication technologies like radio frequency, Zigbee, Bluetooth, and Wi-Fi.	5
Professional and Technical Skills/ Expertise/ Professional Knowledge	• Expertise in various communication technologies such as Zigbee, Bluetooth, Wi-Fi, and radio frequency, as well as proficiency in MAC protocols (CSMA, TDMA) and routing protocols (Proactive, Reactive, Hybrid). • Strong programming skills in languages and tools specific to WSN platforms, such as Contiki OS and TinyOS, are essential for developing and deploying applications. • Expertise in ensuring QoS in WSN applications by managing bandwidth, latency, and reliability to meet specific requirements.	• Expertise in various communication technologies like Zigbee, Bluetooth, Wi-Fi, and radio frequency, along with proficiency in MAC protocols (CSMA, TDMA) and routing protocols (Proactive, Reactive, Hybrid), showcases technical knowledge in establishing and managing network communications efficiently. • Programming Skills: Strong programming skills in languages and tools specific to WSN platforms such as Contiki OS and TinyOS demonstrate technical proficiency in software development for WSN applications	5
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	• Demonstrate mastery in configuring and implementing various communication technologies and protocols within WSNs. • Understand market needs and identify opportunities for deploying WSN solutions, driving	1. Mastery in configuring and implementing various communication technologies and protocols within WSNs enhances employment readiness by showcasing technical competence and the ability to work effectively in roles	5

	innovation and competitiveness in the industry. • Business Development: Develop business plans for WSN-based startups, including market strategy, financial planning, and resource management.	requiring WSN deployment and management. 2. Understanding market needs and identifying opportunities for deploying WSN solutions demonstrates readiness for entrepreneurship by enabling the identification of niche markets, driving innovation, and enhancing competitiveness in the industry.	
Broad Learning Outcomes/ Core Skill	• Mastery in comprehending the architecture, communication models, and protocols like MAC and Routing. • Proficiency in documenting network architectures, protocols, and programming code for clear communication. • Capability to work effectively in multidisciplinary teams, share insights, and contribute to project success.	1. Mastery in comprehending the architecture, communication models, and protocols like MAC and Routing demonstrates a core skill in understanding the fundamental technical aspects of WSNs, which is crucial for designing, implementing, and troubleshooting WSN solutions effectively. 2. Documentation and Communication: Proficiency in documenting network architectures, protocols, and programming code for clear communication signifies a core skill in effective communication and documentation.	5
Responsibility	• Understand and apply the principles of wireless sensor network (WSN) architecture, communication technologies, and protocol stack to design and implement efficient WSN solutions for various applications. • Security and Energy Management: Address security challenges in WSN by implementing encryption, authentication, and key management mechanisms. Develop strategies for energy-efficient operation through optimization techniques and energy-aware protocols. • Technical Documentation and Reporting: Document system designs, programming code, and project progress effectively. Present findings, solutions, and project outcomes in reports and presentations, demonstrating clear communication and technical proficiency.	1. Takes complete responsibility for delivery and quality of own work and output as also the subordinates. 2. Shares responsibility for the group tasks.	5

Annexure II: 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	Classroom	1 (750 Sq. ft to 1000 Sq. ft.)	30
2	Students Chair	30	30
3	Students Table	15 (2 students sharing 1 table)	15
4	Desktop computer with accessories / Laptop	Laptop with minimum specifications: Intel I3 or Celeron processor with at least 8GB RAM, 512GB SSD Hard disk integrated with graphics card, Display size 15.6-inch, Wi-Fi connectivity and Wired Optical Mouse	15
5	Internet Connectivity	Seamless internet connectivity with at least 100 Mbps without firewall	
6	Development Board	Wireless sensor nodes, development boards, communication modules (Zigbee, Bluetooth, Wi-Fi), WSN operating system platforms (Contiki OS, TinyOS), programming tools, and access to documentation on WSN protocols and techniques.	15

Classroom Aids for offline and blended mode of training:

The aids required to conduct sessions in the classroom are:

1. LCD Projector/Smart Board

Annexure III: Industry Validations/ Government Recognition Summary

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID
1	Aajivika Global Skill Private Limited	Mukesh Kumar Verma	Director	Beside Vishal Trade, dasmile chowk, Khunti Road Ranchi, Jharkhand-835221	9507952882	aajivikaglobal@gmail.com
2	AISECT Ltd.	Teena Panthi	Assistant Manager	AISECT Ltd. 1-1-387, 3rd floor, Flat No. 403/404, GNR Heights, Above SBI,Bakaram Road, Musheerabad, Hydrabad-500020	7879982075	Teena.panthi@aisect.org
3	B. G. Infotech	Amal Das	Centre Head	Kakdihi, Mecheda, Purba, Medinipur	9434996748	Bginfotech2007@gmail.com
4	Devendra Nath Institute of Information Mation Technology (DNIIT)	Amit Kumar Tripathy	Director	Uska Road, Near Naveen Sabji Mandi, Tetari Bazar, Siddharth Nagar-272207	8765562815	aktjob@gmail.com
5	Inditech Software Wizard Pvt. Ltd.	Sandip Ghosh	Course Coordinator	Mohiari Chanpiritala, Po: Andul Mouri, PS: Domjur, Distt: Howrah, West Bengal-711302	9230027415	swizardrecruitment@gmail.com
6	Prasanthi Polytechnic	D. Prasad	Principal	Duppituru (Vill), Atchutapuram (Md). Visakhapatnam (Dist), Andhara Pradesh-531011	9849952573	prasadreddy.1279@gmail.com
7	Sidhi Vinayak Academy	Neha Verma	Director	Shiv Narayan Kunj, B Block, Shivaji Nagar, Hethu, Ranchi, JH-834002	8789837772	sidhiacadmey@gmail.com
8	Surekha IT Services	Anjani K	Manager	8-3-191/84/302, Sharan Residency, Vengalrao Nagar, Hyderabad-500038, Telangana	8125134134	info@surekhaitservices.com

Annexure IV: Training Details

Training Projections:

Year	Estimated Training # of Total Candidates	Estimated training# of Women	Estimated training# of People with Disability
2024-25	500	200	20
2025-26	500	200	20
2026-27	1000	200	20

Data to be provided year-wise for the next 3 years.

Annexure V: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools:

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	Online interaction platforms like JitSi Meet, Bharat VC, Google Meet, MS Teams, etc.	70:30
2	Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners	Online interaction platforms like JitSi Meet, Bharat VC, Google Meet, MS Teams, etc.	70:30
3	Showing Practical Demonstrations to the learners	Through Virtual Software and Online interaction platforms like JitSi Meet, Bharat VC, Google Meet, MS Teams, etc.	70:30
4	Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training	Through Virtual Software and Online interaction platforms like JitSi Meet, Bharat VC, Google Meet, MS Teams, etc.	70:30
5	Tutorials/ Assignments/ Drill/ Practice	Online interaction platforms like JitSi Meet, Bharat VC, Google Meet, MS Teams, etc.	70:30
6	Proctored Monitoring/ Assessment/ Evaluation/ Examinations	NIELIT Remote Proctored Software	Online: 100% Theory Offline: 100% Practical

7	On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training	Virtual Software Platform	Either 100% online in a virtual environment Or 100% offline in the Industry.

Annexure VI: Standalone NOS- Performance Criteria details

1. Description

This course provides a comprehensive introduction to Wireless Sensor Networks (WSN), covering fundamental concepts, architectures, communication technologies, protocols, and advanced topics. Designed for students and professionals, the course aims to equip participants with the knowledge and skills required to design, develop, and implement efficient and secure WSN applications across various domains.

2. Scope

The scope of this course is to provide learners with a comprehensive understanding of the fundamental concepts, architectures, and technologies underpinning WSNs. It emphasizes hands-on learning through programming exercises and practical case studies to illustrate real-world applications. The curriculum covers essential topics such as WSN architecture, communication technologies, protocol stacks, security challenges, energy efficiency, and advanced topics like QoS and cross-layer optimization.

3. Elements and Performance Criteria

WSN Protocol Stack

- Demonstrate a comprehensive understanding of the functions and interactions between the Physical, MAC, Network, Transport, and Application layers.
- Accurately differentiate between CSMA, TDMA, and Hybrid protocols, explaining their respective advantages and limitations in various WSN scenarios.
- Develop and simulate routing protocols (Proactive, Reactive, and Hybrid) for different network configurations, demonstrating an understanding of their operational principles.

WSN Security and Energy Efficiency

- Identify and articulate the primary security challenges in WSNs, including potential vulnerabilities and attack vectors.
- Implement encryption, authentication, and key management techniques in WSN scenarios to ensure data integrity and security.

- Apply optimization techniques and energy-aware protocols to design and manage WSNs that minimize power consumption while maintaining performance.

WSN Operating Systems and Programming

- Explain the key features and functionalities of various WSN operating systems, such as Contiki OS and TinyOS.
- Utilize appropriate platforms, languages, and tools to write and debug WSN applications, demonstrating practical programming skills.
- Complete hands-on exercises that involve setting up and programming WSN nodes, showcasing the ability to apply theoretical knowledge in real-world scenarios.

4. **Knowledge and Understanding (KU):**

The individual on the job needs to know and understand:

WSN Protocol Stack

- Develop a thorough understanding of the protocol stack for wireless sensor networks, including the functions and interactions of the Physical, MAC, Network, Transport, and Application layers.

WSN Security and Energy Efficiency

- Acquire knowledge about the primary security challenges in wireless sensor networks, including common vulnerabilities and types of attacks.

WSN Operating Systems and Programming

- Gain an understanding of the features and functionalities of WSN operating systems such as Contiki OS and TinyOS, including their architectures and use cases.

5. Generic Skills (GS):

User/individual on the job needs to know how to:

1. Critical Thinking and Problem Solving

- Enhance skills in troubleshooting network issues, diagnosing protocol errors, and optimizing network performance.

2. Technical Communication

- Improve skills in documenting system architectures, protocol configurations, and programming code to ensure clarity and reproducibility.

3. Adaptability and Lifelong Learning

- Foster an independent learning attitude to explore new tools, operating systems, and programming languages relevant to WSN.

Annexure VII: Assessment Criteria

Detailed PC-wise assessment criteria and assessment marks for the NOS are as follows:

NOS/Module Name	Assessment Criteria for Performance Criteria	Theory Marks	Practical Marks	Project /Presentation /Assignment Marks	Viva/ Internal Assessment (Marks)
NOS1:Fundamentals of Wireless Sensor networks NOS Code: **NIE/ELE/N0521**	*WSN Protocol Stack*	**30**	**20**	**-**	**6**
	• Demonstrate a comprehensive understanding of the functions and interactions between the Physical, MAC, Network, Transport, and Application layers.	-	-	-	-
	• Accurately differentiate between CSMA, TDMA, and Hybrid protocols, explaining their respective advantages and limitations in various WSN scenarios.	-	-	-	-
	• Develop and simulate routing protocols (Proactive, Reactive, and Hybrid) for different network configurations, demonstrating an understanding of their operational principles.	-	-	-	-

	WSN Security and Energy Efficiency	**30**	**20**	-	**7**
	• Identify and articulate the primary security challenges in WSNs, including potential vulnerabilities and attack vectors.	-	-	-	-
	• Implement encryption, authentication, and key management techniques in WSN scenarios to ensure data integrity and security.	-	-	-	-
	• Apply optimization techniques and energy-aware protocols to design and manage WSNs that minimize power consumption while maintaining performance.	-	-	-	-
	WSN Operating Systems and Programming:	**40**	**20**	-	**7**
	• Explain the key features and functionalities of various WSN operating systems, such as Contiki OS and TinyOS.	-	-	-	-
	• Utilize appropriate platforms, languages, and tools to write and debug WSN applications, demonstrating practical programming skills.	-	-	-	-
	• Complete hands-on exercises that involve setting up and programming WSN nodes, showcasing the ability to apply theoretical knowledge in real-world scenarios.				
		100	**60**	**20**	**20**
	NOS Total	**200**			

Annexure VIII: Assessment Strategy

Assessment of the qualification evaluates candidates to ascertain that they can integrate knowledge, skills and values for carrying out relevant tasks as per the defined learning outcomes and assessment criteria.

The underlying principle of assessment is fairness and transparency. The evidence of the outcomes and assessment criteria. Competence acquired by the candidate can be obtained by conducting Theory (Online), Practical assessment, internal assessment, Project/Presentation/

Assignment, Major Project. The emphasis is on the practical demonstration of skills & knowledge gained by the candidate through the training. Each OUTCOME is assessed & marked separately. A candidate is required to pass all OUTCOMES individually based on the passing criteria.

About Examination Pattern:

1. The question papers for the theory and practical exams are set by the Examination wing (assessor) of NIELIT HQS.

2. The assessor assigns roll number.

3. The assessor carries out theory online assessments through remote proctoring methodology. Theory examination would be conducted online and the paper comprise of MCQ. Conduct of assessment are through trained proctors. Once the test begins, remote proctors have full access to candidate's video feeds and computer screens. Proctors authenticate the candidate based on registration details, pre-test image captured and I-card in possession of the candidate. Proctors can chat with candidates or give warnings to candidates. Proctors can also take screenshots, terminate a specific user's test session, or re-authenticate candidates based on video feeds.

4. An External Examiner/ Observer may be deployed including NIELIT officials for evaluation of Practical examination/ internal assessment / Project/ Presentation/. Major Project (if applicable) would be evaluated preferably by external/ subject expert including NIELIT officials.

5. Pass percentage would be 50% marks in each component.

6. Candidates may apply for re-examination within the validity of registration (only in the assessment component in which the candidate failed).

7. For re-examination prescribed examination fee is required to be paid by the candidate only for the assessment component in which the candidate wants to reappear.

8. There would be no exemption for any paper/module for candidates having similar qualifications or skills.

9. The examination will be conducted in English language only.

Quality assurance activities: A pool of questions is created by a subject matter expert and moderated by other SME. Test rules are set beforehand. Random set of questions which are according to syllabus appears which may differ from candidate to candidate. Confidentiality and impartiality are maintained during all the examination and evaluation processes.

Annexure IX: Acronym and Glossary

Acronym

Acronym	Description
AA	Assessment Agency
AB	Awarding Body
NCrF	National Credit Framework
NOS	National Occupational Standard(s)
NQR	National Qualification Register
NSQF	National Skills Qualifications Framework

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.