QUALIFICATION FILE–Standalone NOS

Fundamentals of Microcontroller architecture (ARM), programming and interfacing

☐ 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: 4

Submitted By:

NATIONAL INSTITUTE OF ELECTRONICS AND INFORMATION TECHNOLOGY (NIELIT)

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Section 1: Basic Details

<table>
<tr><td>1.</td><td>NOS-Qualification Name</td><td colspan="2">Fundamentals of Microcontroller architecture (ARM), programming and interfacing</td></tr>
<tr><td>2.</td><td>Sector/s</td><td colspan="2">Electronics</td></tr>
<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-04-EH-02887-2024-V1-NIELIT</td><td>5. NCrF/NSQF Level: 4</td></tr>
<tr><td>6.</td><td>Brief Description of the Standalone NOS</td><td colspan="2">This course focuses on theoretical understanding with practical application through hands-on exercises, real-time event management, and optimization techniques, preparing students for designing and developing embedded systems applications efficiently using ARM Cortex-M Series Microcontroller.</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:
<table>
<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>12th or equivalent in Science with Physics and Maths</td><td>NA</td></tr>
<tr><td>2</td><td>2 Years of 3-Years Diploma in Electronics and Communication Engineering/ Electrical Engineering/CS/IT and allied branches after class 10th</td><td>NA</td></tr>
<tr><td>3</td><td>NSQF Level 3.5 in Electronics and Communication Engineering/ Electrical Engineering/CS/IT and allied branches</td><td>1.5 Years</td></tr>
<tr><td>4</td><td>NSQF Level 3 in Electronics and Communication Engineering/ Electrical Engineering/CS/IT and allied branches</td><td>1.5 Years</td></tr>
</table>
b. Age:18 years</td></tr>
<tr><td>8.</td><td>Credits Assigned to this NOS-Qualification, Subject to Assessment (as per National Credit Framework (NCrF))</td><td>2 Credits</td><td>9. Common Cost Norm Category (I/II/III) (wherever applicable):

Category I (Electronics System Design)</td></tr>
</table>

<table>
<tr><td>10.</td><td>Any Licensing Requirements for Undertaking Training on This Qualification (wherever applicable)</td><td>NA</td></tr>
<tr><td>11.</td><td>Training Duration by Modes of Training Delivery (Specify Total Duration as per selected training delivery modes and as per requirement of the qualification)</td><td>☒Offline ☐ Online ☐ Blended
<table><tr><th>Training Delivery Mode</th><th>Theory (Hours)</th><th>Practical (Hours)</th><th>Total (Hours)</th></tr><tr><td>Classroom (offline)</td><td>30</td><td>30</td><td>60</td></tr></table>The mode of delivery shall be based on the regional demand and can be offered in any of the above modes mentioned.</td></tr>
<tr><td>12.</td><td>Assessment Criteria</td><td><table><tr><th>Theory (Marks)</th><th>Practical (Marks)</th><th>Project/ Presentation /Assignment (Marks)</th><th>Viva/ Internal Assessment (Marks)</th><th>Total (Marks)</th><th>Passing %age</th></tr><tr><td>100</td><td>60</td><td>20</td><td>20</td><td>200</td><td>50</td></tr></table>The centralized online assessment is conducted by the Examination Wing, NIELIT Headquarters.</td></tr>
<tr><td>13.</td><td>Is the NOS Amenable to Persons with Disability</td><td>☒ Yes ☐ No
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</td></tr>
<tr><td>14.</td><td>Progression Path After Attaining the Qualification, wherever applicable</td><td>Embedded System Developer (A-Level 'Embedded System Design')</td></tr>
<tr><td>15.</td><td>How will the participation of women be encouraged?</td><td>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.</td></tr>
<tr><td>16.</td><td>Other Indian languages in which the Qualification & Model Curriculum are being submitted</td><td>Qualification files available in English & Hindi Language.</td></tr>
<tr><td>17.</td><td>Is similar NOS available on NQR-if yes, justification for this qualification</td><td>☐Yes ☒ No</td></tr>
</table>

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:** Prashant Pal **Email:** prashantpal@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 Systems Development
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-C: Evidence of Need
2.	Number of Industry validations provided: 10
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	• Develop a strong theoretical understanding of embedded systems, including their architecture, hardware/software components, application areas, and recent trends. • Acquire theoretical knowledge and expertise in programming languages such as C and assembly language, along with essential programming concepts like data types, program flow control, memory management, and handling interrupts. • Gain a deep understanding of power management principles, techniques, and strategies specific to microcontrollers and embedded systems.	1. Possesses specialized operational knowledge and understanding of the work. 2. Have complete knowledge of the concept of time required for delivery; and Quality for a range of issues	4
Professional and Technical Skills/ Expertise/ Professional Knowledge	• Mastery of C programming language specifically tailored for embedded systems, including knowledge of storage classes, data types, program flow control, memory management, pointers, arrays, and structures, unions, and data structures. • Comprehensive understanding of embedded systems principles, architectures, hardware-software interactions, application areas, and recent trends in the field, coupled with expertise in development and debugging tools for embedded systems. • In-depth knowledge of ARM Cortex architectures, including Cortex M4 and Cortex-A, covering topics such as register set, instruction set architecture, memory hierarchy, interrupt handling mechanisms, and development environment tools like assemblers, compilers, linkers, and debuggers.	1. Possesses specialized professional and technical skills; displays clarity of professional knowledge and technical skills in a broad range of activities/ tasks. 2. Have knowledge of collecting and interpreting the available information, drawing conclusions & communicating the same	4
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	• Develop a strong understanding of embedded C programming, ARM Cortex architecture, and assembly language programming for microcontrollers, enabling graduates to work effectively in embedded systems development roles in industries such as automotive, aerospace, and consumer electronics. • Acquire the ability to analyze and solve complex problems related to memory management, peripheral control, and real-time event handling in embedded systems, which are crucial skills sought after by employers in the embedded systems domain.	1. Can explain Entrepreneurial Mindset and describe the importance of it in the context of opportunity curation for future jobs. 2. Can comfortably use most of the basic software with proficiency 3. Have the ability to relate to the 5	4

	• Cultivate an innovative mindset and the ability to adapt to new technologies and industry trends, empowering graduates to contribute to the development of cutting-edge embedded systems solutions and explore entrepreneurial opportunities in the IoT (Internet of Things) and smart device markets.	pillars of Social Emotional Skills and describe the similarities between SES and Emotional Intelligence	
Broad Learning Outcomes/ Core Skill	• Mastery in C programming for embedded systems, including knowledge of storage classes, data types, program flow control, and typecasting. • In-depth comprehension of embedded systems architecture, including hardware and software aspects, memory hierarchy, and application development on Cortex M4 microcontrollers. • Advanced understanding of ARM Cortex architecture, including 32-bit processors, register sets, instruction sets, modes of operation, assembly language programming	1. Proficiency in C programming for embedded systems, covering storage classes, data types, program flow control, and typecasting, is a core skill. 2. Advanced understanding of ARM Cortex architecture, encompassing 32-bit processors, register sets, instruction sets, modes of operation, and assembly language programming, is a core skill.	4
Responsibility	Ability to manage the system resources in the most effective manner by appropriate planning, estimation, coordination and control of the activities involved in the design & development of any Embedded Applications using - ARM Cortex Microcontroller.	1. Takes complete responsibility for delivery and quality of own work and output as also the subordinates. 2. Shares responsibility for the group tasks.	4

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	ARM Cortex-M4 microcontroller development board, compiler and assembler software, debugging tools, access to ARM Cortex-A processor documentation, and a computer with necessary software installed.	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	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
2	NICE SHIKSHA VIKAS KENDRA	Motilal Ohdar	Secretory	Moti House, (Nice Computer Gali), Prince Chowk, Simdega, Jharkhand	7992489955	vtpnice12@gmail.com
3	Aajivika Global Skill Private Limited	Mukesh Kumar Verma	Director	Beside Vishal Trade, dasmile chowk, Khunti Road Ranchi, Jharkhand-835221	9507952882	aajivikaglobal@gmail.com

4	B. G. Infotech	Amal Das	Centre Head	Kakdihi, Mecheda, Purba, Medinipur	9434996748	bginfotech2007@gmail.com
5	Devendra Nath Institute of Information Mation Technology	Amit Kumar Tripathy	Director	Uska Road, Near Naveen Sabji Mandi, Tetari Bazar, Siddharth Nagar-272207	8765562815	aktjob@gmail.com
6	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
7	Prasanthi Polytechnic	D. Prasad	Principal	Duppituru (Vill), Atchutapuram (Md). Visakhapatnam (Dist), Andhara Pradesh-531011	9849952573	prasadreddy.1279@gmail.com
8	JAN SAMRIDHI DUMKA	Gobind Nath Maji	Director	Near Gyan School, Dudhani, Dumka, Jharkhand-814101	8789620133	Gobind107@gmail.com
9	Sidhi Vinayak Academy	Neha Verma	Director	Shiv Narayan Kunj, B Block, Shivaji Nagar, Hethu, Ranchi, JH-834002	8789837772	sidhiacadmey@gmail.com
10	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 Simulation Software (Proteus- VSM) 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 Simulation Software (Proteus- VSM) 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	Simulated Platform	Either 100% online in a virtual environment Or 100% offline in the Industry.

Annexure VI: Standalone NOS- Performance Criteria details

1. Description

The Standalone NOS equips the students to have the skills necessary to develop, optimize, and manage embedded applications, ensuring efficient and effective use of microcontroller resources.

2. Scope

The scope covers the following:

This course provides a comprehensive understanding of Embedded C programming, embedded systems concepts, and ARM Cortex microcontroller architectures. Students will learn the fundamentals and advanced concepts of C programming, including memory management, pointers, and file operations. They will gain insights into the application areas, architecture, and development tools for embedded systems, with a focus on recent trends. The course covers ARM Cortex architectures in depth, including the M4 and A processors, and their development environments.

3. Elements and Performance Criteria

Embedded C Programming:

- Demonstrate proficiency in writing and understanding complex C programs involving control flow, data structures, and memory management.
- Implement algorithms using pointers and understand their role in memory manipulation and efficient programming.
- Develop error-free programs with correct usage of bitwise operators and typecasting for optimized code execution.

ARM Cortex Architecture:

- Demonstrate the ability to configure and utilize Cortex M4 peripherals effectively in embedded applications, including GPIO, timers, UARTs, and ADCs.
- Develop and debug assembly language programs for ARM Cortex-M4 processors, ensuring proper memory access and interrupt handling.
- Design and implement interrupt service routines (ISRs) for real-time event management on Cortex M4 microcontrollers.

Power Management in Embedded Systems:

- Design power optimization strategies using various power modes like Active, Sleep, and Standby to extend battery life and improve energy efficiency.
- Implement clock management techniques, including clock gating and dynamic frequency scaling, to minimize power consumption during idle periods.
- Develop energy profiling techniques and utilize power management APIs to optimize energy usage and enhance system performance.

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

The individual on the job needs to know and understand:

Embedded C Programming:

- Gain knowledge of advanced topics such as conditional compilation, pre-processor directives, and file operations in C programming.

ARM Cortex Architecture:

- Comprehend the architecture and organization of ARM Cortex processors, including the Cortex-M4 register set, instruction set architecture (ISA), and memory hierarchy.

Power Management in Embedded Systems:

- Understand the principles of power management in embedded systems, including power modes and clock management techniques.

5. Generic Skills (GS):

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

Problem-solving: Develop the ability to analyze complex problems in embedded systems programming and find efficient solution using C programming, ARM Cortex architecture, and power management strategies.

Critical Thinking: Enhance critical thinking skills by evaluating different approaches to memory management, peripheral control, and power optimization in embedded systems development.

Technical Communication: Improve communication skills by documenting code, explaining programming concepts, and presenting project findings effectively to peers and stakeholders in the field of embedded systems and microcontroller programming.

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 Microcontroller architecture (ARM), programming and interfacing NOS Code: **NIE/ELE/N0222**	*Embedded C Programming*	**30**	**20**	-	6
	• Demonstrate proficiency in writing and understanding complex C programs involving control flow, data structures, and memory management.	-	-	-	-
	• Implement algorithms using pointers and understand their role in memory manipulation and efficient programming.	-	-	-	-
	• Develop error-free programs with correct usage of bitwise operators and typecasting for optimized code execution.	-	-	-	-
	ARM Cortex Architecture:	**30**	**20**	-	7
	• Demonstrate the ability to configure and utilize Cortex M4 peripherals effectively in embedded applications, including GPIO, timers, UARTs, and ADCs.	-	-	-	-
	• Develop and debug assembly language programs for ARM Cortex-M4 processors, ensuring proper memory access and interrupt handling.	-	-	-	-
	• Design and implement interrupt service routines (ISRs) for real-time event management on Cortex M4 microcontrollers.	-	-	-	-
	Power Management in Embedded Systems:	**40**	**20**	-	7
	• Design power optimization strategies using various power modes like Active, Sleep, and Standby to extend battery life and improve energy efficiency.	-	-	-	-
	• Implement clock management techniques, including clock gating and dynamic frequency scaling, to minimize power consumption during idle periods.	-	-	-	-
	• Develop energy profiling techniques and utilize power management APIs to optimize energy usage and enhance	-	-	-	-

	system performance.				
		100	**60**	**20**	**20**
	NOS Total	**200**			

Annexure VIII: Assessment Strategy

This section includes the processes involved in identifying, gathering, and interpreting information to evaluate the Candidate on the required competencies of the program.

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) examination.

About Examination Pattern:

1. The question papers for the theory 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. Theory examination would be conducted online and the paper comprise of MCQ

4. Pass percentage would be 50% marks.

5. 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.