QUALIFICATION FILE

Embedded Software Engineer

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

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

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

NCrF/NSQF Level: 5

Submitted By:

Electronics Sector Skills Council of India (ESSCI)

Head Office: 155, 2nd Floor, ESC House

Okhla Industrial Area - Phase 3,

New Delhi – 110020

Tel: +91 -84477-38-501

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Section 1: Basic Details

<table>
<tr><td>1.</td><td>Qualification Name</td><td colspan="2">Embedded Software Engineer</td></tr>
<tr><td>1.</td><td>Sector/s</td><td colspan="2">Electronics</td></tr>
<tr><td>2.</td><td>Type of Qualification: ☐ New ☒ Revised ☐ Has Electives/Options
☐OEM</td><td>NQR Code & version of existing/previous qualification:
2022/EHW/ESSC/05108 & V3.0</td><td>Qualification Name of existing/previous version:
Embedded Software Engineer</td></tr>
<tr><td>3.</td><td>a. OEM Name
b. Qualification Name
(Wherever applicable)</td><td colspan="2">N/A</td></tr>
<tr><td>4.</td><td>National Qualification Register (NQR) Code &Version
(Will be issued after NSQC approval)</td><td>QG-05-EH-03972-2025-V4-ESSCI</td><td>5. NCrF/NSQF Level: 5</td></tr>
<tr><td>6.</td><td>Award (Certificate/Diploma/Advance Diploma/ Any Other (Wherever applicable specify multiple entry/exits also & provide details in annexure)</td><td colspan="2">Certificate</td></tr>
<tr><td>7.</td><td>Brief Description of the Qualification</td><td colspan="2">An Embedded Software Engineer is responsible for assessing the embedded systems specification requirement, develops software, tests and validates the software in coordination with design engineers for system integration.</td></tr>
<tr><td>8.</td><td>Eligibility Criteria for Entry for 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>Required Experience (with Specialization - if applicable)</th></tr>
<tr><td>1</td><td>UG Diploma in the relevant field (Physics/ Electronics/Electrical/Computer Science)</td><td>1.5 years of relevant experience</td></tr>
<tr><td>2</td><td>3 Years Diploma after 10th (Electronics/Electrical/ Computer Science)</td><td>3 years of relevant experience</td></tr>
<tr><td>3</td><td>Previous relevant qualification of NSQF level 4.5</td><td>1.5 years of relevant experience</td></tr>
<tr><td colspan="3"># Relevant Experience in Semiconductor & Components.</td></tr>
</table>
b. Age: NA</td></tr>
<tr><td>9.</td><td>Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))</td><td>19</td><td>10. Common Cost Norm Category (I/II/III) (wherever applicable): I</td></tr>
</table>

<table>
<tr><td>11.</td><td>Any Licensing requirements for Undertaking Training on This Qualification (wherever applicable)</td><td colspan="2">N/A</td></tr>
<tr><td>12.</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 colspan="2">☐Offline ☐Online ☒Blended
<table>
<tr><th>Training Delivery Modes</th><th>Theory (Hour)</th><th>Practical (Hours)</th><th>OJT Mandatory (Hours)</th><th>OJT Recommended (Hours)</th><th>Total (Hours)</th></tr>
<tr><td>Classroom (offline)</td><td>00:00</td><td>210:00</td><td>180:00</td><td>00:00</td><td rowspan="2">570:00</td></tr>
<tr><td>Online</td><td>180.00</td><td>00:00</td><td>00:00</td><td>00:00</td></tr>
</table>
(Refer Blended Learning Annexure for details)</td></tr>
<tr><td>13.</td><td>Aligned to NCO/ISCO Code/s (if no code is available mention the same)</td><td colspan="2">NCO-2015/2512.0501</td></tr>
<tr><td>14.</td><td>Progression path after attaining the qualification
(Please show Professional and Academic progression)</td><td colspan="2">Embedded Product Design Engineer –Technical Lead</td></tr>
<tr><td>15.</td><td>Other Indian languages in which the Qualification & Model Curriculum are being submitted</td><td colspan="2">Hindi</td></tr>
<tr><td>16.</td><td>Is similar Qualification(s) available on NQR-if yes, justification for this qualification</td><td colspan="2">☐ Yes ☒ No URLs of similar Qualifications: N/A</td></tr>
<tr><td>17.</td><td>Is the Job Role Amenable to Persons with Disability</td><td colspan="2">☐ Yes ☒ No
If “Yes”, specify applicable type of Disability:</td></tr>
<tr><td>18.</td><td>How Participation of Women will be Encouraged</td><td colspan="2">No gender sensitization</td></tr>
<tr><td>19.</td><td>Are Greening/ Environment Sustainability Aspects Covered (Specify the NOS/Module which covers it)</td><td colspan="2">☒ Yes ☐ No
Employability Skills [DGT/VSQ/N0102]</td></tr>
<tr><td>20.</td><td>Is Qualification Suitable to be Offered in Schools/Colleges</td><td colspan="2">Schools ☐ Yes ☒ No Colleges ☒ Yes ☐ No</td></tr>
<tr><td>21.</td><td>Name and Contact Details of Submitting / Awarding Body SPOC
(In case of CS or MS, provide details of both Lead AB & Supporting ABs)</td><td colspan="2">Name: Mr. Saleem Ahmed
Email: ceo@essc-india.org
Contact No.: 011 – 8447738501
Website: https://www.essc-india.org/</td></tr>
<tr><td>22.</td><td>Final Approval Date by NSQC: 07.05.2025</td><td>23. Validity Duration: 3 Years</td><td>24. Next Review Date: 30.04.2028</td></tr>
</table>

Section 2: Module Summary

NOS/s of Qualifications
(In exceptional cases these could be described as components)

Mandatory NOS/s:

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

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

S. No	NOS/Module Name	NOS/Module Code & Version *(if applicable)*	Core/ Non-Core	NCrF/ NSQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT - Man.	OJT- Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) *(if applicable)*
1	Understanding Project Needs Analysis and System Design using Agile and MBSE	ELE/N1508 & V1.0	Core	5	6	36	84	60	0	180	40	60	0	0	100	30
2	Embedded Software Development with Modular Tools	ELE/N1509 & V1.0	Core	5	5.5	60	45	60	0	165	40	60	0	0	100	30
3	Structured Digital Documentation with Quality and Traceability	ELE/N1510 & V1.0	Core	5	5.5	60	45	60	0	165	40	60	0	0	100	30
4	Employability Skills (60 Hours)	DGT/VSQ/N0102 & V1.0	Non-Core	4	2	24	36	0	0	60	20	30	0	0	50	10
Duration (in Hours) / Total Marks					19	180	210	180	0	570	140	210	0	0	350	100

Elective NOS/s:

S. No	NOS/Module Name	NOS/Module Code & Version *(if applicable)*	Core/ Non-Core	NCrF/NSQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) *(if applicable)*
1.																
2.																
Duration (in Hours) / Total Marks																

Optional NOS/s:

S. No	NOS/Module Name	NOS/Module Code & Version *(if applicable)*	Core/ Non-Core	NCrF/NSQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) *(if applicable)*
1.																
2.																
Duration (in Hours) / Total Marks																

Assessment - Minimum Qualifying Percentage

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

Minimum Pass Percentage – Aggregate at qualification level: 70 % *(Every Trainee should score specified minimum aggregate passing percentage at qualification level to successfully clear the assessment.)*

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

Section 3: Training Related

1.	**Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	Diploma/ ITI/ Degree in Electronics/ Electrical/Computer Science with 2 years of experience in System Software Development (Embedded Software) and preferably 1 year as Trainer in Electronics Or Certified in relevant CITS Trade
2.	**Master Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	Diploma/ ITI/ Degree in Electronics/ Electrical/Computer Science with 3 years of experience in System Software Development (Embedded Software) and preferably 1 year as Trainer in Electronics. Or Certified in relevant CITS Trade
3.	**Tools and Equipment Required for Training**	☒Yes ☐No (*If "Yes", details to be provided in Annexure)*
4.	**In Case of Revised Qualification, Details of Any Upskilling Required for Trainer**	NA

Section 4: Assessment Related

1.	**Assessor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Diploma/ ITI/ Degree in Electronics/ Electrical/Computer Science with 3 years of experience in System Software Development (Embedded Software) and preferably 1 year as Trainer in Electronics Or Certified in relevant CITS Trade
2.	**Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Diploma/ ITI/ Degree in Electronics/ Electrical/Computer Science with 4 years of experience in System Software Development (Embedded Software) and preferably 1 year as Trainer in Electronics. Or Certified in relevant CITS Trade
3.	**Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Diploma/ ITI/ Degree in Electronics/ Electrical/Computer Science with 4 years of experience in System Software Development (Embedded Software) and preferably 1 year as Trainer in Electronics. Or Certified in relevant CITS Trade
4.	**Assessment Mode** *(Specify the assessment mode)*	**Blended**
5.	**Tools and Equipment Required for Assessment**	☒ Same as for training ☐ Yes ☐ No *(details to be provided in Annexure-if it is different for Assessment)*

Section 5: Evidence of the need for the Qualification

Provide Annexure/Supporting documents name.

1.	**Latest Skill Gap Study (not older than 2 years) (Yes/No):** Yes
2.	**Latest Market Research Reports or any other source (not older than 2 years) (Yes/No):** Yes
3.	**Government /Industry initiatives/ requirement (Yes/No):** Yes
4.	**Number of Industry validation provided:** 21
5.	**Estimated nos. of persons to be trained and employed:** 1000
6.	**Evidence of Concurrence/Consultation with Line Ministry/State Departments:** Yes If "No", why:

Section 6: Annexure & Supporting Documents Check List

Specify Annexure Name / Supporting document file name

1.	**Annexure:** NCrF/NSQF level justification based on NCrF level/NSQF descriptors *(Mandatory)*	*Attached*
2.	**Annexure:** List of tools and equipment relevant for qualification *(Mandatory, except in case of online course)*	*Attached*
3.	**Annexure:** Detailed Assessment Criteria *(Mandatory)*	*Attached*
4.	**Annexure:** Assessment Strategy *(Mandatory)*	*Attached*
5.	**Annexure:** Blended Learning *(Mandatory, in case selected Mode of delivery is "Blended Learning")*	*Filled*
6.	**Annexure:** Multiple Entry-Exit Details *(Mandatory, in case qualification has multiple Entry-Exit)*	*Filled*
7.	**Annexure:** Acronym and Glossary *(Optional)*	*Attached*
8.	**Supporting Document:** Model Curriculum *(Mandatory – Public view)*	*Attached*
9.	**Supporting Document:** Career Progression *(Mandatory - Public view)*	*Attached*
10.	**Supporting Document:** Occupational Map *(Mandatory)*	*Attached*
11.	**Supporting Document:** Assessment SOP *(Mandatory)*	
12.	**Any other document you wish to submit:**	

Annexure: Evidence of Level

NCrF/NSQF Level Descriptors	Key requirements of the job role/ outcome of the qualification	How the job role/ outcomes relate to the NCrF/NSQF level descriptor	NCrF/NSQF Level
Professional Theoretical Knowledge/Process	**Demands a wide range of specialised technical skill, clarity of knowledge and practice in a broad range of activity involving standard and non-standard practices**. ● Capability to understand the Design process and Work flow. ● Plan activity based on work-flow and deliverables. ● Develop the interface and functional requirements for the embedded software.	An Embedded Software Engineer is responsible for assessing the embedded systems specification requirement, develops software, tests and validates the software in coordination with design engineers for system integration. Hence Level 5	5
Professional and Technical Skills/ Expertise/ Professional Knowledge	**Factual and theoretical knowledge in broad contexts within a field of work or study.** ● Knowledge of the principles and processes used in the field of Electronics Design Programmable Devices, Software Design, System design using ● Embedded Software and constraints ● Know the circuit design, functionality, logic involved in the system and be aware of the software development process.	An Embedded Software Engineer should know the principles and processes used in the field of Electronics Design Programmable Devices, Software Design, System design using Embedded Software and constraints. Hence Level 5	5
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	**A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study.** ● Communicate with customer, team and supervisor to understand the work requirement ● Understanding of the general design flow and activities involved	An Embedded Software Engineer should be able to plan activity based on workflow and deliverables. He/she assists in code reviews and rework the code to fix identified defects. Hence Level 5	5

	• Plan activity based on workflow and deliverables • Assist in code reviews and rework the code to fix identified defects		
Broad Learning Outcomes/Core Skill	• Assesses the embedded systems specification requirement • Develops software, tests and validates the software	An Embedded Software Engineer needs to know how to assess the embedded systems specification requirement, develops software, tests and validates the software. The technician should keep the workplace clean and managed Hence Level 5	5
Responsibility	Responsibility of completing the work assigned and reporting the same as per standards. • Understand the job role and follow the organisational policy • Record and report about the work status • Follow safety regulations at work place • Work along with colleagues and supervisors	An Embedded Software Engineer should record the issues and report about the same to the supervisor and also update the status of the work as per organisations policy. Hence Level 5	5

Annexure: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment
Batch Size: 30

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1	Turbo C Compiler	30	Nos
2	Altium/OrCAD/PADS Design	30	Nos
3	Proteus (ISIS/ARES)	30	Nos
4	MPLABX IDE/Atmel studio/Keil IDE	30	Nos
5	MPLAB XC Compiler/GCC Compiler	30	Nos
6	PICKIT2 Programmer/Debugger	30	Nos
7	ICD3 Programmer/Debugger	30	Nos
8	AVR ONE!	30	Nos
9	STM32 Discovery kit	30	Nos
10	Oscilloscope(CRO/DSO)	6	Nos
11	Digital Multimeter	30	Nos

12	Soldering Iron,Desoldering PUMP	30	Nos
13	Development Boards	30	Nos
14	Hand tools (Cutter,stripper etc.)	30	Nos
15	Logic Analyzer	6	Nos
16	Personal computer	30	Nos

Classroom Aids

The aids required to conduct sessions in the classroom are:

1. Whiteboard
2. Projector
3. Computer/Laptop
4. Chairs
5. Tables
6. Whiteboard marker

Annexure: Industry Validations Summary

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

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile *(if available)*
1	Nagdeo Education Welfare Society	Vijay Nagdeo	General Manager	Ward No. 11 Junnardeo Dist. Chhindwara M.P. 480551	9425461093	Vijaynagdeo02@gmail.com	
2	Access Edutech Pvt. Ltd.	Sanjay Kumar Mishra	Director	96, Vrindavan Nagar Ayodhya Bypass Road Bhopal	7000650224	sanjaymishra@accessedutech.com	
3	SHIV SHAKTI TECKNIKI EVAM SAMANAYA SHIKSHAN SANSTHAN	Jitendra Kumar Garg	President	B 32 MAHESH NAGAR JAIPUR RAJASTHAN-302015	9782912782	jitendra.garg303@gmail.com	
4	YADUVANSHI PRIVATE ITI	YADVENDRA	PRINCIPAL	TC229199 - YADUVANSHI PVT ITI, HASAMPUR The-NEEMKATHANA DIST-SIKAR	8432882688	yaduvanshicollege2008@gmail.com	

				RAJASTHAN PIN CODE NO - 332718			
5	Balaji Private ITI	Rakesh Kumar	PRINCIPAL	Moonpur Mundawar Alwar Rajasthan	9829745313	rakeshiti@gamil.com	
6	EdgeFX Technologies Pvt. Ltd	Tarun Agarwal	COO	105, Liberty Plaza, Himayatnagar Hedrabad Telangana 500029		info@edgefxkits.in	
7	Sri Venkateswara College of Engineering	Dr C Chandrasekhar	Head R &D & Professor in ECE	Karakmbadi Road,Tirupati 517507	9177217190	dr.chandrasekhar.c@svcolleges.edu.in	
8	EMC Testing and Compliance LLP	Amit	Director	461, Phase V, Udyog Vihar Gurgaon 122016 Haryana India	8432882688	info@emc.com	
9	Rastriya Khushali Sansthan	Ramkaran Sinsinwar	President	VOP Tajsar Fatehpur Rajasthan	6350658040	Rkstajsar1998@gmail.com	
10	XJS Electronics Pvt Ltd.	Juned Khan	Engineer	B 105 Phase 3 Gautam Budh Nagar Noida 201305 India	9719598463	juned@gmail.com	
11	Nexgen Exhibitions Pvt. Ltd.	Saurabh Purwar	Director	1201/1206 Pragati Tower, 26 Rajendra Place, New Delhi-110008, India	9457306691	fbvidgo@gmail.com	
12	Manav Shiksha			Vill+Post – OlE, Dis. Mathura	7500000637		
13	Annur Indutrial Training Institute	Shridevikr	Director		9489675146	skill@gmail.com	
14	Involute Automation Pvt. Ltd	Vijaya Chandra	Operationa In Charge	Plot No. 12 Tecgnocrats Industrial Estate Balanaga, Hyderabad, Telangna 500037 india		Vijaya.chandra@involutetraining.in	
15	Jnana Ganga Vidya Pith	Jagdish Parsad Yadav	Manager		9448467800	jagdishprasadyadav@gmail.com	

16	Johnson Control India	Dr. Ashish	Sr. Manager		9923200958	Ashishkardam958@gmail.com	
17	JAP	Deepak Gupta	President	A 24/9 Mohan Co – Operative, Industrial Easte, Mathura Road 110044 new delhi	9958204111	deepak@justaboutpower.com	
18	Varujh Infotech Pvt. Ltd	Gaurav Prakash	M.D.	Kanpur Uttar Pradesh	8886634504	Skill.akyone@gmail.com	
19	Vedh Narayan Singh Sheva Sansthan	Manoj Kumar	Director	Dholpur Rajasthan	9216692269	Msharmadholpur1@gmail.com	
20	Vedham Academy Madurai	Sundar Rajan	Admin	Tamilnadu	9787551862		
21	Bright Power Semiconductor's design and strategic partnership for India	Manoj	President	Noida Sector 132, Noida	022 42333700	Manoj02@gmail.com	

Annexure: Training & Employment Details

Training and Employment Projections:

Year	Total Candidates	Women	People with Disability
	Estimated Training # Total	Estimated Training # Women	Estimated Training # PwD
2025-26	250	NA	NA
2026-27	250	NA	NA
2027-28	500	NA	NA

Data to be provided year-wise for next 3 years

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

Qualification Version	Year	Total Candidates				Women				People with Disability			
		Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed
3.0	2022-23	110	87	73	NA	NA	NA	NA	NA	NA	NA	NA	NA
3.0	2023-24	85	80	73	NA	NA	NA	NA	NA	NA	NA	NA	NA
3.0	2024-25	1140	937	912	NA	NA	NA	NA	NA	NA	NA	NA	NA

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

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

1. PMKVY
2.

Content availability for previous versions of qualifications:

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

Languages in which Content is available: English

Annexure: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools:

Refer NCVET "Guidelines for Blended Learning for Vocational Education, Training & Skilling" available on:
https://ncvet.gov.in/sites/default/files/Guidelines%20for%20Blended%20Learning%20for%20Vocational%20Education,%20Training%20&%20Skilling.pdf

S. No.	Select the Components of the Qualification	List Recommended Tools – for all Selected Components	Offline : Online Ratio
1	☒Theory/ Lectures - Imparting theoretical and conceptual knowledge	• Books/ e-books • Presentations • Reference Material • Audio / Video Modules	30:70
2	☒Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners	• Self-Learning Videos • Broadcasts • Mobile Learning • Curated Digital content	30:70
3	☒Showing Practical Demonstrations to the learners	• Video Content • E-Resource library • AR/ VR/ XR	30:70
4	☒Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training	• Training tools (tools list attached) • Video Play • Presentations	30:70
5	☒Tutorials/ Assignments/ Drill/ Practice	• Online Question Bank • Mobile Quick test app • MCQ based tests	30:70
6	☒Proctored Monitoring/ Assessment/ Evaluation/ Examinations	• Assessment engine for Essays • Up-loadable file examinations • Mock test sessions	30:70
7	☒On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training	• Online tests • Offline assessments	30:70

Annexure: Detailed Assessment Criteria

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

NOS/Module Name	Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
ELE/N1508 : Understanding Project Needs Analysis and System Design using Agile and MBSE	*Identifying the work requirement*	**20**	**30**	**-**	**-**
	PC1. Interact with the lead engineer for understanding the work schedules, shifts, and delivery dates using collaborative tools like JIRA, Trello, or Asana.	7	10	-	-
	PC2. Identify and plan the work activities for software development, incorporating Agile methodologies and tools such as Scrum boards and Kanban charts to optimize workflow and deliverables.	7	10	-	-
	PC3. Comply with organization's policies, procedures, and guidelines when developing embedded system software codes ensuring adherence to cybersecurity standards (e.g., ISO 27001, AUTOSAR Security)	6	10	-	-
	Identifying the system design specifications	**20**	**30**	**-**	**-**
	PC4. interact with the lead engineer and embedded system design engineers to understand the system and software requirements Model-Based System Engineering (MBSE) tools such as MATLAB/Simulink or Enterprise Architect.	7	10	-	-
	PC5. read and interpret the Business Requirement Specification (BRS) and Software Requirement Specification (SRS) document for interpreting the project specifications, coding, testing and debugging requirements leveraging Natural Language Processing (NLP)-based requirement analysis tools.	7	10	-	-
	PC6. identify the circuit design, functionality and logic involved in the embedded system software using IoT-specific design tools and cloud simulation platforms like AWS IoT Core or Azure IoT Hub.	6	10	-	-
	NOS Total	**40**	**60**	**-**	**-**
	Developing software for embedded system	**40**	**60**	**-**	**-**

ELE/N1509: Embedded Software Development with Modular Tools	**PC1.** create a software design for the embedded system as per requirement specification and get approval from superior and relevant department on the same	5	8	-	-
	PC2. access reusable components, code generation tools and unit testing tools from the company's database open-source libraries and microservices architecture for modularity.	5	8	-	-
	PC3. create software modules to meet the requirements of software adhering to Real-Time Operating System (RTOS) standards and ensuring compatibility with IoT-enabled devices.	5	8	-	-
	PC4. create Unit Test Cases (UTCs) as per the specifications and requirements	5	8	-	-
	PC5. review the code and UTCs with the support team and lead engineer for any defects	5	8	-	-
	PC6. rework on the code and UTCs to fix identified defects, ensuring compliance with Continuous Integration/Continuous Deployment (CI/CD) pipelines.	5	8	-	-
	PC7. carryout testing, verification and debugging of software codes for any errors and submit the tested codes and documents for approval as per organisational standards	5	8	-	-
	PC8. support the embedded system design engineers in system testing, product verification and validation using Digital Twin Technology for real-time simulations.	5	4	-	-
	NOS Total	**40**	**60**	**-**	**-**

ELE/N1510: Structured Digital Documentation with Quality and Traceability	*Creating Documentation*	15	20		
	PC 1. Document design using standard templates and approved styles.	7	10		
	PC 2. Use AI tools like Doxygen or Confluence for documentation.	8	10		
	Managing Documentation	15	20		
	PC 3. Ensure documentation quality and timely submission.	7	10		
	PC 4. Publish documents in agreed formats and repositories.	8	10		
	Compliance & Traceability	10	20		
	PC 5. Adhere to documentation standards and version control.	5	10		
	PC 6. Integrate block chain audit trails to maintain traceability and transparency.	5	10		
	NOS Total	**40**	**60**	**-**	**-**
DGT/VSQ/N0102: Employability Skills (60 Hours)	*Introduction to Employability Skills*	**1**	**1**	**-**	**-**
	PC1. identify employability skills required for jobs in various industries	-	-	-	-
	PC2. identify and explore learning and employability portals	-	-	-	-
	Constitutional values – Citizenship	**1**	**1**	**-**	**-**
	PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
	PC4. follow environmentally sustainable practices	-	-	-	-
	Becoming a Professional in the 21st Century	**2**	**4**	**-**	**-**
	PC5. recognize the significance of 21st Century Skills for employment	-	-	-	-
	PC6. practice the 21st Century Skills such as Self- Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
	Basic English Skills	**2**	**3**	**-**	**-**
	PC7. use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-

	PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
	PC9. write short messages, notes, letters, e-mails etc. in English	-	-	-	-
	Career Development & Goal Setting	**1**	**2**	**-**	**-**
	PC10. understand the difference between job and career	-	-	-	-
	PC11. prepare a career development plan with short- and long-term goals, based on aptitude	-	-	-	-
	Communication Skills	**2**	**2**	**-**	**-**
	PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-	-	-	-
	PC13. work collaboratively with others in a team	-	-	-	-
	Diversity & Inclusion	**1**	**2**	**-**	**-**
	PC14. communicate and behave appropriately with all genders and PwD	-	-	-	-
	PC15. escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-
	Financial and Legal Literacy	**2**	**3**	**-**	**-**
	PC16. select financial institutions, products and services as per requirement	-	-	-	-
	PC17. carry out offline and online financial transactions, safely and securely	-	-	-	-
	PC18. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
	PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
	Essential Digital Skills	**3**	**4**	**-**	**-**
	PC20. operate digital devices and carry out basic internet operations securely and safely	-	-	-	-
	PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively	-	-	-	-
	PC22. use basic features of word processor, spreadsheets, and presentations	-	-	-	-
	Entrepreneurship	**2**	**3**	**-**	**-**
	PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
	PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
	PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
	Customer Service	**1**	**2**	**-**	**-**

	PC26. identify different types of customers	-	-	-	-
	PC27. identify and respond to customer requests and needs in a professional manner.	-	-	-	-
	PC28. follow appropriate hygiene and grooming standards	-	-	-	-
	Getting ready for apprenticeship & Jobs	**2**	**3**	**-**	**-**
	PC29. create a professional Curriculum vitae (Résumé)	-	-	-	-
	PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
	PC31. apply to identified job openings using offline/ online methods as per requirement	-	-	-	-
	PC32. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
	PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
	NOS Total	20	30		
	Grand Total	**140**	**210**		

Annexure: 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.

Mention the detailed assessment strategy in the provided template.

<1. Assessment System Overview:

- Batches assigned to the assessment agencies for conducting the assessment on 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:

- Check the Assessment location, date and time
- 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.

3. Assessment Quality Assurance levels/Framework:

- Question bank is created by the Subject Matter Experts (SME) are verified by the other SME
- Questions are mapped to the specified assessment criteria
- Assessor must be ToA certified & trainer must be ToT Certified

4. Types of evidence or evidence-gathering protocol:

- Time-stamped & geotagged reporting of the assessor from assessment location
- Centre photographs with signboards and scheme specific branding

5. Method of verification or validation:

- Surprise visit to the assessment location

6. Method for assessment documentation, archiving, and access

- Hard copies of the documents are stored

On the Job

1. Each module (which covers the job profile of Embedded Software Engineer) will be assessed separately.
2. The candidate must score 60% in each module to successfully complete the OJT.
3. Tools of Assessment that will be used for assessing whether the candidate is having desired skills and etiquette of dealing with customers, understanding needs & requirements, assessing the customer and performing Soft Skills effectively:
    - Videos of Trainees during OJT
    - Answer Sheets of Question Banks
    - Assessing the Log Book entries of Trainees at Employer location
    - Employer Performance Feedback •
4. Assessment of each Module will ensure that the candidate is able to:

- Understand the concept of embedded systems.
- Understand the development of embedded system software
- Work effectively at the workplace

Annexure: Acronym and Glossary

Acronym

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

Glossary

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