

QUALIFICATION FILE – Certificate Course in Embedded System Design using ARM/ Cortex Microcontroller

NSDA Reference
To be added by NSDA

CONTACT DETAILS OF THE AWARDING BODY FOR THE QUALIFICATION

Name and address of awarding body:

National Institute of Electronics and Information Technology
6–CGO Complex, Electronics Niketan
Lodhi Road, New Delhi. 110003.

Name and contact details of individual dealing with the submission

Name: Manoj N

Designation: Senior Technical Officer

Mobile: 9446783170

Email: manoj.n@nielit.gov.in, manoj@calicut.nielit.in

List of documents submitted in support of the Qualifications File

1. Annexure I - Course Curriculum
2. Annexure II - Evidence of Job market/ Course requirement in industry
3. Annexure III - Industry validation

Mapping: Since the proposed jobrole has not been identified by SSC, the industry mapping will be as per progression pathways indicated in the QF

QUALIFICATION FILE – Certificate Course in Embedded System Design using ARM/ Cortex Microcontroller

SUMMARY

Qualification Title:	Certificate Course in Embedded System Design using ARM/ Cortex Microcontroller
Qualification Code	
Nature and purpose of the qualification:	<p>Nature of the qualification: Modular employable skills award</p> <p>Purpose: To allow people in embedded system sectors to learn programming/Interfacing peripherals to ARM cortex based microcontroller and learn troubleshooting of microcontroller based Embedded electronic systems/products.</p>
Body /bodies which will award the qualification:	National Institute of Electronics and Information Technology
Body which will accredit providers to offer courses leading to the qualification:	National Institute of Electronics and Information Technology
Body /bodies which will Be responsible for assessment:	Examination Cell, National Institute of Electronics and Information Technology
Occupation(s) to which the qualification gives access:	<p>Embedded System Developer</p> <p>Hardware support for any embedded development based on ARM cortex microcontrollers and improving the existing designs and new ones. And also able to troubleshooting of ARM based Embedded electronic systems/ products</p>
Licensing Requirements	N/A
Proposed level of the qualification in the NSQF	Level 5
Anticipated volume of training/learning required to complete the qualification	80 hours
Entry requirements/ Recommendations	Undergoing B.Tech in Electronics/Electronics & Communication/

QUALIFICATION FILE – Certificate Course in Embedded System Design using ARM/ Cortex Microcontroller

	Electrical/ Electrical and Electronics/Instrumentation/ Basic knowledge about microprocessors/ microcontrollers like 8051 and PIC and peripherals used in the embedded system field are required to be successful in the qualification.
Progression from the Qualification	Professional : Embedded System Developer -> Senior Embedded System Developer Academic: PG Diploma in Embedded system Design(Level-6)
Planned arrangements for RPL.	<ul style="list-style-type: none"> ➤ Presently only candidates who undergo training shall be assessed. ➤ It will be incorporated once RPL strategy is finalized
International Compatibility where Known.	NA
Date of Planned review of the Qualification	After Every 2 Years

Formal structure of the qualification

Title of component and identification code.	Mandatory/ Optional	Estimated size (learning hours)	Level
Embedded C	M	20	5
ARM /Cortex Architecture	M	20	5
ARM/Cortex Peripherals (LCD, Stepper motor, Keypad etc)	M	20	5
Interfacing ARM/ Cortex to peripheral devices	M	20	5

QUALIFICATION FILE – Certificate Course in Embedded System Design using ARM/ Cortex Microcontroller

Curriculum attached as Annexure -I

SECTION 1

ASSESSMENT

Body/Bodies which will carry out assessment:

Examination Cell, National Institute of Electronics and Information Technology
6-CGO Complex, Electronics Niketan
Lodhi Road, New Delhi 1110003

Main body/bodies responsible for assessing candidates against the learning outcomes and assessment criteria of the qualification:

Examination Cell, National Institute of Electronics and Information Technology
6-CGO Complex, Electronics Niketan
Lodhi Road, New Delhi 1110003

Main body/bodies responsible for checking or verifying assessments.

Examination Cell, National Institute of Electronics and Information Technology
6-CGO Complex, Electronics Niketan
Lodhi Road, New Delhi 1110003

How will RPL assessment be managed and who will carry it out?

RPL Policy will be described as and when available

ASSESSMENT POLICY

Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, consistent and fair and show that these are in line with the requirements of the NSQF:

The emphasis is on practical demonstration of skills & knowledge based on the performance criteria. Student is required to pass in all OUTCOMES individually and marks are allotted.

Following assessment methodologies are used.

QUALIFICATION FILE – Certificate Course in Embedded System Design using ARM/ Cortex Microcontroller

The Following assessment methodologies are used.

- A. Written Assessment (Multiple Choice Questions)
- B. Practical Assessment

The assessment results are backed by following evidences.

1. The assessor collects a copy of the attendance for the training done under the scheme. The attendance sheets are signed and stamped by the In-charge / Head of the Training Centre.
2. The assessor verifies the authenticity of the candidate by checking the photo ID card issued by the institute as well as any one Photo ID card issued by the Central/Government. The same is mentioned in the attendance sheet.
3. The assessor assigns roll number.

ASSESSMENT EVIDENCE

Title of Unit/Component: Certificate Course in Embedded System Design using ARM/ Cortex Microcontroller

Job Role	Embedded System developer				
				Marks Allocation	
Outcome	Assessment Criteria for the out come	Total Marks (100)	Out Of	Theory	Skills Practical
Certificate Course in Embedded System Design using ARM/ Cortex Microcontroller					
Module 1 Demonstrate Embedded C	Solve Embedded C Programming with KEIL		20	8	12
Module 2 Model ARM/Cortex Architecture	Identify Architecture of ARM/Cortex Family of Microcontrollers Memory map peripherals Register Configuration		20	8	12

QUALIFICATION FILE – Certificate Course in Embedded System Design using ARM/ Cortex Microcontroller

Module 3 Generalize ARM/Cortex Peripherals (Timers/Interrupts/Serial port)	Configure Timers on ARM/Cortex Family of Microcontrollers		10	4	6
	Configure Interrupts on ARM/Cortex Family of Microcontrollers		10	4	6
	Configure Serial port on ARM/Cortex Family of Microcontrollers		10	4	6
Module 4 Interfacing ARM/Cortex to peripheral devices(LCD , Stepper motor, Keypad etc)	Interpret ARM/Cortex Family of Microcontrollers with LCD		10	4	6
	Interfacing ARM/Cortex Family of Microcontrollers with key board		10	4	6
	Interpret ARM/Cortex Family of Microcontrollers with stepper motor		10	4	6
			100	40	60

Pass/Fail

Following Grading Scheme (on the basis of total marks) will be followed:

Grade	S	A	B	C	D	E	Fail
Marks Range (in %)	≥90%	80%-89%	70%-79%	60%-69%	50%-59%	40-49%	<40%

QUALIFICATION FILE – Certificate Course in Embedded System Design using ARM/ Cortex Microcontroller

SECTION 2

EVIDENCE OF LEVEL

Title : Certificate Course in Embedded System Design using ARM/ Cortex Microcontroller			Level : 5
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF Level Descriptors	NSQF Level
Process required	The candidate is required to apply the embedded C coding skills and ARM/Cortex based system design skills for solving real life problems while interfacing peripherals to ARM/Cortex microcontrollers.	Job that requires well developed skill, with clear choice of procedures in familiar context.	5
Professional knowledge	knowledge about:- Embedded C syntax, coding principles, micro controller based system design concepts, Development and debugging tools etc.	Knowledge of A facts, principles, processes and general concepts, in a field of work or study.	5
Professional skill	Embedded C programming and micro controller based system design Skills for translation of specification to prototype	A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information	5
Core skill	Requires knowledge of language, good communication skills to interact with the team of workers. Requires documentations skill for coding documentation. Interacting with superior briefing them on status of work-completion and pending targets.	Desired mathematical skill; understanding of social, political; and some skill of collecting and	5

QUALIFICATION FILE – Certificate Course in Embedded System Design using ARM/ Cortex Microcontroller

	Maintain good peer group relation and capability of learning from their technical and behavioral experiences.	organizing information, communication.	
Responsibility	Candidate will be able to do programming and embedded based system design independently with some responsibility to other's work.	Responsibility for own work and learning and some responsibility to other's works and learning.	5

SECTION 3

EVIDENCE OF NEED

What evidence is there that the qualification is needed?

1. Report of taskforce to suggest measures to stimulate the growth of IT, ITES, and Electronics Hardware manufacturing Industry in India – Dec 2009.
2. Challenges and Solutions in bridging the gap of Skilled human Resource (HR) in Electronics System Design and Manufacturing System. Workshop report Feb 2012.
3. Proposal to NSDC on the formation of Sector Skills Council: Electronics.
4. Employability and skills set of newly graduated Engineers in India – Andreas Blom, Hiroshi Sakei policy research working paper (5640). World Bank.
5. Human Resource and skill Requirements in the Electronics and IT Hardware Industry.
 “Study on mapping of human resource Skill gaps in India till 2022” – NSDC / ICRA management Consulting Services Limited. (IMACS)

QUALIFICATION FILE – Certificate Course in Embedded System Design using ARM/ Cortex Microcontroller

6. *View Point – Make in India – “A Way to Boost Manufacturing and Employment opportunities” Electronics for You, June 2016.*

What is the estimated uptake of this qualification and what is the basis of this estimate?

Estimated uptake is 40 students / Batches with 2 Batches / Year and on the basis of identified skill gap in the following report

Human Resource and skill Requirements in the Electronics and IT Hardware Industry.

“Study on mapping of human resource Skill gaps in India till 2022” – NSDC / ICRA management Consulting Services Limited. (IMACS)

What steps were taken to ensure that the qualification(s) does/do not duplicate already existing or planned qualifications in the NSQF?

The Qualification does not exist as per the information available in public domain.

What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated?

Based on feedback by participants, employers and market survey the qualification will be reviewed, revised and updated in every 2 years.

SECTION 4

EVIDENCE OF PROGRESSION

What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?

This qualification has comprises both technical and analytic skills and this course give link to higher qualification.

QUALIFICATION FILE – Certificate Course in Embedded System Design using ARM/ Cortex Microcontroller

SECTION 5

EVIDENCE OF INTERNATIONAL COMPARABILITY

List any Comparisons which have been established – NIL