



## QUALIFICATION FILE

### Embedded Full Stack IoT Analyst

- ☒ 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:

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## Section 1: Basic Details

| 1.     | Qualification Name                                                                                                                                                             | Embedded Full Stack IoT Analyst                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |        |                                                                    |                                                           |   |                                                                                      |                                            |   |                                                                         |                                 |   |                                                   |                                   |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------|-----------------------------------------------------------|---|--------------------------------------------------------------------------------------|--------------------------------------------|---|-------------------------------------------------------------------------|---------------------------------|---|---------------------------------------------------|-----------------------------------|
| 2.     | Sector/s                                                                                                                                                                       | Electronics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                     |        |                                                                    |                                                           |   |                                                                                      |                                            |   |                                                                         |                                 |   |                                                   |                                   |
| 3.     | Type of Qualification: <input type="checkbox"/> New <input checked="" type="checkbox"/> Revised <input type="checkbox"/> Has Electives/Options<br><input type="checkbox"/> OEM | NQR Code & version of existing/previous qualification: 2022/EHW/ESSC/05132 & V3.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Qualification Name of existing/previous version:<br>Embedded Full Stack IoT Analyst |        |                                                                    |                                                           |   |                                                                                      |                                            |   |                                                                         |                                 |   |                                                   |                                   |
| 4.     | a. OEM Name<br>b. Qualification Name<br>(Wherever applicable)                                                                                                                  | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                     |        |                                                                    |                                                           |   |                                                                                      |                                            |   |                                                                         |                                 |   |                                                   |                                   |
| 5.     | National Qualification Register (NQR) Code &Version<br>(Will be issued after NSQC approval)                                                                                    | QG-05-EH-03981-2025-V4-ESSCI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 6. NCrF/NSQF Level: 5                                                               |        |                                                                    |                                                           |   |                                                                                      |                                            |   |                                                                         |                                 |   |                                                   |                                   |
| 7.     | Award (Certificate/Diploma/Advance Diploma/ Any Other (Wherever applicable specify multiple entry/exits also & provide details in annexure)                                    | Certificate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                     |        |                                                                    |                                                           |   |                                                                                      |                                            |   |                                                                         |                                 |   |                                                   |                                   |
| 8.     | Brief Description of the Qualification                                                                                                                                         | The individual in this job role creates and implements new embedded OS based on system requirements and/or industry specifications. The individual builds and manages OS drivers for any custom hardware and to enhance existing applications with new features.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                     |        |                                                                    |                                                           |   |                                                                                      |                                            |   |                                                                         |                                 |   |                                                   |                                   |
| 9.     | Eligibility Criteria for Entry for Student/Trainee/Learner/Employee                                                                                                            | <b>a. Entry Qualification &amp; Relevant Experience:</b> <table border="1"> <thead> <tr> <th>S. No.</th> <th>Academic/Skill Qualification (with Specialization - if applicable)</th> <th>Required Experience (with Specialization - if applicable)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>UG Diploma in the relevant field (Physics/ Electronics /Electrical/Computer Science)</td> <td>1.5 years of relevant experience required.</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> </tbody> </table> # Relevant Experience in Semiconductor & Components. <b>b. Age:</b> NA |                                                                                     | S. No. | Academic/Skill Qualification (with Specialization - if applicable) | Required Experience (with Specialization - if applicable) | 1 | UG Diploma in the relevant field (Physics/ Electronics /Electrical/Computer Science) | 1.5 years of relevant experience required. | 2 | 3 Years Diploma after 10th (Electronics/ Electrical / Computer Science) | 3 years of relevant experience. | 3 | Previous relevant qualification of NSQF level 4.5 | 1.5 years of relevant experience. |
| S. No. | Academic/Skill Qualification (with Specialization - if applicable)                                                                                                             | Required Experience (with Specialization - if applicable)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                     |        |                                                                    |                                                           |   |                                                                                      |                                            |   |                                                                         |                                 |   |                                                   |                                   |
| 1      | UG Diploma in the relevant field (Physics/ Electronics /Electrical/Computer Science)                                                                                           | 1.5 years of relevant experience required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                     |        |                                                                    |                                                           |   |                                                                                      |                                            |   |                                                                         |                                 |   |                                                   |                                   |
| 2      | 3 Years Diploma after 10th (Electronics/ Electrical / Computer Science)                                                                                                        | 3 years of relevant experience.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |        |                                                                    |                                                           |   |                                                                                      |                                            |   |                                                                         |                                 |   |                                                   |                                   |
| 3      | Previous relevant qualification of NSQF level 4.5                                                                                                                              | 1.5 years of relevant experience.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                     |        |                                                                    |                                                           |   |                                                                                      |                                            |   |                                                                         |                                 |   |                                                   |                                   |
| 10.    | Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))                                                                        | 19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 11. Common Cost Norm Category (I/II/III)<br>(wherever applicable): I                |        |                                                                    |                                                           |   |                                                                                      |                                            |   |                                                                         |                                 |   |                                                   |                                   |

| 12.                     | <b>Any Licensing requirements for Undertaking Training on This Qualification</b> <i>(wherever applicable)</i>                                                                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |                         |                                         |  |                         |                |                   |                       |                         |               |                     |       |        |        |       |        |        |        |       |       |       |  |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------|-----------------------------------------|--|-------------------------|----------------|-------------------|-----------------------|-------------------------|---------------|---------------------|-------|--------|--------|-------|--------|--------|--------|-------|-------|-------|--|
| 13.                     | <b>Training Duration by Modes of Training Delivery</b> <i>(Specify <b>Total Duration</b> as per selected training delivery modes and as per requirement of the qualification)</i> | <input type="checkbox"/> Offline <input type="checkbox"/> Online <input checked="" type="checkbox"/> Blended<br><table border="1"> <thead> <tr> <th>Training Delivery Modes</th> <th>Theory (Hours)</th> <th>Practical (Hours)</th> <th>OJT Mandatory (Hours)</th> <th>OJT Recommended (Hours)</th> <th>Total (Hours)</th> </tr> </thead> <tbody> <tr> <td>Classroom (offline)</td> <td>00:00</td> <td>240:00</td> <td>150:00</td> <td>00:00</td> <td>570:00</td> </tr> <tr> <td>Online</td> <td>180:00</td> <td>00:00</td> <td>00:00</td> <td>00:00</td> <td></td> </tr> </tbody> </table> <i>(Refer Blended Learning Annexure for details)</i> |                       |                         |                                         |  | Training Delivery Modes | Theory (Hours) | Practical (Hours) | OJT Mandatory (Hours) | OJT Recommended (Hours) | Total (Hours) | Classroom (offline) | 00:00 | 240:00 | 150:00 | 00:00 | 570:00 | Online | 180:00 | 00:00 | 00:00 | 00:00 |  |
| Training Delivery Modes | Theory (Hours)                                                                                                                                                                    | Practical (Hours)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | OJT Mandatory (Hours) | OJT Recommended (Hours) | Total (Hours)                           |  |                         |                |                   |                       |                         |               |                     |       |        |        |       |        |        |        |       |       |       |  |
| Classroom (offline)     | 00:00                                                                                                                                                                             | 240:00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 150:00                | 00:00                   | 570:00                                  |  |                         |                |                   |                       |                         |               |                     |       |        |        |       |        |        |        |       |       |       |  |
| Online                  | 180:00                                                                                                                                                                            | 00:00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 00:00                 | 00:00                   |                                         |  |                         |                |                   |                       |                         |               |                     |       |        |        |       |        |        |        |       |       |       |  |
| 14.                     | <b>Aligned to NCO/ISCO Code/s</b> <i>(if no code is available mention the same)</i>                                                                                               | NCO-2015/2512.0501                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |                         |                                         |  |                         |                |                   |                       |                         |               |                     |       |        |        |       |        |        |        |       |       |       |  |
| 15.                     | <b>Progression path after attaining the qualification</b> <i>(Please show Professional and Academic progression)</i>                                                              | Lead - IoT Analyst                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |                         |                                         |  |                         |                |                   |                       |                         |               |                     |       |        |        |       |        |        |        |       |       |       |  |
| 16.                     | <b>Other Indian languages in which the Qualification &amp; Model Curriculum are being submitted</b>                                                                               | Hindi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |                         |                                         |  |                         |                |                   |                       |                         |               |                     |       |        |        |       |        |        |        |       |       |       |  |
| 17.                     | <b>Is similar Qualification(s) available on NQR-if yes, justification for this qualification</b>                                                                                  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No URLs of similar Qualifications: N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                         |                                         |  |                         |                |                   |                       |                         |               |                     |       |        |        |       |        |        |        |       |       |       |  |
| 18.                     | <b>Is the Job Role Amenable to Persons with Disability</b>                                                                                                                        | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>If "Yes", specify applicable type of Disability:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                         |                                         |  |                         |                |                   |                       |                         |               |                     |       |        |        |       |        |        |        |       |       |       |  |
| 19.                     | <b>How Participation of Women will be Encouraged</b>                                                                                                                              | No gender sensitization                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                         |                                         |  |                         |                |                   |                       |                         |               |                     |       |        |        |       |        |        |        |       |       |       |  |
| 20.                     | <b>Are Greening/ Environment Sustainability Aspects Covered</b> <i>(Specify the NOS/Module which covers it)</i>                                                                   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No<br><b>Employability Skills (DGT/VSQ/N0102)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |                         |                                         |  |                         |                |                   |                       |                         |               |                     |       |        |        |       |        |        |        |       |       |       |  |
| 21.                     | <b>Is Qualification Suitable to be Offered in Schools/Colleges</b>                                                                                                                | Schools <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No    Colleges <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |                         |                                         |  |                         |                |                   |                       |                         |               |                     |       |        |        |       |        |        |        |       |       |       |  |
| 22.                     | <b>Name and Contact Details of Submitting / Awarding Body SPOC</b> <i>(In case of CS or MS, provide details of both Lead AB &amp; Supporting ABs)</i>                             | <b>Name:</b> Mr. Saleem Ahmed<br><b>Email:</b> ceo@essc-india.org<br><b>Contact No.:</b> 011 – 8447738501<br><b>Website:</b> <a href="https://www.essc-india.org/">https://www.essc-india.org/</a>                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |                         |                                         |  |                         |                |                   |                       |                         |               |                     |       |        |        |       |        |        |        |       |       |       |  |
| 23.                     | <b>Final Approval Date by NSQC:</b> 07.05.2025                                                                                                                                    | <b>24. Validity Duration:</b> 3 Years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |                         | <b>25. Next Review Date:</b> 30.04.2028 |  |                         |                |                   |                       |                         |               |                     |       |        |        |       |        |        |        |       |       |       |  |

## 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                                 | Design, Develop, and Test an IoT-Based System | ELE/N1429 & V1.0                          | Core           | 5               | 5                   | 45                        | 75  | 30       | 0        | 150   | 40               | 40  | 0     | 20   | 100   | 30                            |
| 2                                 | Create GUI and Applications in a framework    | ELE/N1430 & V1.0                          | Core           | 5               | 6                   | 45                        | 75  | 60       | 0        | 180   | 40               | 50  | 0     | 10   | 100   | 30                            |
| 3                                 | Perform Firmware Testing and Troubleshooting  | ELE/N1431 & V1.0                          | Core           | 5               | 6                   | 66                        | 54  | 60       | 0        | 180   | 40               | 50  | 0     | 10   | 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                       | 240 | 150      | 00       | 570   | 140              | 170 | 00    | 40   | 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. | <b>Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)</b>        | Diploma/ ITI/ Degree in Electronics/Electrical/Computer Science with 2 years of experience in Semiconductor, Components Manufacturing and preferably 1 year as Trainer in Electronics & Semiconductor Domain.<br><br>Or<br><br>Certified in relevant CITS Trade  |
| 2. | <b>Master Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)</b> | Diploma/ ITI/ Degree in Electronics/Electrical/Computer Science with 3 years of experience in Semiconductor, Components Manufacturing and preferably 1 years as Trainer in Electronics & Semiconductor Domain.<br><br>Or<br><br>Certified in relevant CITS Trade |
| 3. | <b>Tools and Equipment Required for Training</b>                                                                 | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (If "Yes", details to be provided in Annexure)                                                                                                                                               |

|    |                                                                                         |    |
|----|-----------------------------------------------------------------------------------------|----|
| 4. | <b>In Case of Revised Qualification, Details of Any Upskilling Required for Trainer</b> | NA |
|----|-----------------------------------------------------------------------------------------|----|

## Section 4: Assessment Related

|    |                                                                                                                       |                                                                                                                                                                                                                                                                   |
|----|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | <b>Assessor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)</b>                | Diploma/ ITI/ Degree in Electronics/Electrical/Computer Science with 3 years of experience in Semiconductor, Components Manufacturing and preferably 1 years as Assessor in Electronics & Semiconductor Domain.<br><br>Or<br><br>Certified in relevant CITS Trade |
| 2. | <b>Proctor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)</b>                 | Diploma/ ITI/ Degree in Electronics/Electrical/Computer Science with 4 years of experience in Semiconductor, Components Manufacturing and preferably 1 years as Assessor in Electronics & Semiconductor Domain.<br><br>Or<br><br>Certified in relevant CITS Trade |
| 3. | <b>Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)</b> | Diploma/ ITI/ Degree in Electronics/Electrical/Computer Science with 4 years of experience in Semiconductor, Components Manufacturing and preferably 1 years as Assessor in Electronics & Semiconductor Domain.<br><br>Or<br><br>Certified in relevant CITS Trade |
| 4. | <b>Assessment Mode (Specify the assessment mode)</b>                                                                  | <b>Blended</b>                                                                                                                                                                                                                                                    |
| 5. | <b>Tools and Equipment Required for Assessment</b>                                                                    | <input checked="" type="checkbox"/> Same as for training <input type="checkbox"/> Yes <input type="checkbox"/> 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. | <b>Latest Skill Gap Study (not older than 2 years) (Yes/No):</b> Yes                             |
| 2. | <b>Latest Market Research Reports or any other source (not older than 2 years) (Yes/No):</b> Yes |
| 3. | <b>Government /Industry initiatives/ requirement (Yes/No):</b> Yes                               |
| 4. | <b>Number of Industry validation provided:</b> 18                                                |

|    |                                                                                                                      |
|----|----------------------------------------------------------------------------------------------------------------------|
| 5. | <b>Estimated nos. of persons to be trained and employed:</b> 500                                                     |
| 6. | <b>Evidence of Concurrence/Consultation with Line Ministry/State Departments:</b> <i>In Process</i><br>If “No”, why: |

## Section 6: Annexure &amp; Supporting Documents Check List

Specify Annexure Name / Supporting document file name

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

## 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 |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Professional Theoretical Knowledge/Process</b>                           | <ul style="list-style-type: none"> <li>• 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.</li> <li>• Requires well developed technical capability to understand the Design process and Work flow involved in each stage of design.</li> <li>• Requires capability to plan activity based on work-flow and deliverables. Capability to understand the Business and resulting Software Requirement Specification (SRS) for the project.</li> <li>• Develop the interface and functional requirements for the embedded software from System SRS.</li> <li>• Knowledge of Language, Libraries and architecture of device and should have experience of coding, developing test cases, testing, debugging the developed module as per SRS</li> <li>• Understand the software module requirement for the embedded system and constraints and finally understand circuit design, functionality, and logic involved in the system.</li> <li>• Design the software using language and application as per standard and get approval for design approach from superior design team.</li> </ul> | <p>Embedded Full Stack IoT Analyst individual on the job is responsible for own work and learning functions require clear choice of procedures and well-developed skills to place</p> <p>Hence Level 5</p>                               | 5               |
| <b>Professional and Technical Skills/ Expertise/ Professional Knowledge</b> | <ul style="list-style-type: none"> <li>• Principles and process for in the field of Electronics Design Programmable Devices,</li> <li>• Software Design, System design using Embedded Software and constraints.</li> <li>• To understand the software module requirement for the embedded system</li> <li>• Should understand circuit design, functionality, logic involved in the system and be aware of the software development process.</li> <li>• Should have knowledge of Development Tools, Test Tools, to develop the coding,</li> <li>• testing, debugging requirements from the SRS.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p>Embedded Full Stack IoT Analyst on the job is responsible for the basic facts, process and principle applied in trade of employment in verification reviews and rework the design to fix identified defects.</p> <p>Hence Level 5</p> | 5               |

|                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                             |   |
|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|                                                                                             | <ul style="list-style-type: none"> <li>Access reusable components, code generation tools and unit testing tools from the company's database.</li> <li>Develop software modules to meet the requirement specification, develop unit test cases (UTC) as per specification and requirement.</li> <li>Conduct test to ensure that the software module meets the requirement specification.</li> <li>Assist in code reviews and rework the code to fix identified defects.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                             |   |
| <b>Employment Readiness &amp; Entrepreneurship Skills &amp; Mind-set/Professional Skill</b> | <ul style="list-style-type: none"> <li>Capability to understand Electronics, Software design process and understanding of the general design flow and activities involved in each stage of design.</li> <li>Planning capability to plan activity based on workflow and deliverables.</li> <li>Develop the coding, testing, debugging requirements from the SRS.</li> <li>Understand the software module requirement for the embedded system and constraints and finally understand circuit design, functionality, logic involved in the system.</li> <li>Access reusable components, code generation tools and unit testing tools from the company's database.</li> <li>Develop software modules to meet the requirement specification, develop unit test cases (UTC) as per specification and requirement.</li> <li>Conduct test to ensure that the software module meets the requirement specification.</li> <li>Assist in code reviews and rework the code to fix identified defects.</li> </ul> | Recall and demonstrate a range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information<br>Hence Level 5 | 5 |
| <b>Broad Learning Outcomes/Core Skill</b>                                                   | Requires knowledge of language, good communication skills and documentation skill for Interacting with superior briefing them on status of work completion and pending targets. Requires Planning capability to plan activity based on work-flow and deliverables in consultation with the lead engineer. To interact with project lead and design lead to understand the project specific embedded system mandate. Develop software design using standard language and application and get approval for design approach from superior design team. Maintain good peer group relation and capability of learning from their technical and behavioral experiences.                                                                                                                                                                                                                                                                                                                                   | Language to communicate written or oral, with required clarity, skill to basic arithmetic and algebraic principles, basic understanding of social political and natural environment.<br><br>Hence Level 5   | 5 |
| <b>Responsibility</b>                                                                       | In his routine activities of understanding System Design, Requirements of Embedded, Developing Software, Developing Test suites, interfacing with other system modules, interfacing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | The job holder is Responsible for own work and learning and has some responsibility for others' works and learning                                                                                          | 5 |

|  |                                                                                                                                                                                               |               |  |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--|
|  | with co-designers and systems he is not under any kind of supervision and is completing tasks on his own. With each step ahead and problem-solving exercise he is adding to his own learning. | Hence Level 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      | Chairs/Tables                                                                                                   | 30            | No.                               |
| 2      | Latest configuration computer with internet                                                                     | 7             | No.                               |
| 3      | LCD projector with screen                                                                                       | 1             | No.                               |
| 4      | Trainer chair and Table                                                                                         | 1             | No.                               |
| 5      | Demonstration table pin up boards                                                                               | 1             | No.                               |
| 6      | White board with marker                                                                                         | 1             | No.                               |
| 7      | Connecting screwdriver                                                                                          | 10            | No.                               |
| 8      | Neon tester 500 V.                                                                                              | 6             | No.                               |
| 9      | Screw driver set                                                                                                | 10            | No.                               |
| 10     | Insulated combination pliers                                                                                    | 6             | No.                               |
| 11     | Insulated side cutting pliers                                                                                   | 8             | No.                               |
| 12     | Digital Multimeter                                                                                              | 10            | No.                               |
| 13     | Soldering Iron Changeable bits                                                                                  | 6             | No.                               |
| 14     | Tweezers – Bend tip                                                                                             | 2             | No.                               |
| 15     | Crimping tool (pliers)                                                                                          | 4             | No.                               |
| 16     | Allen key set (Hexagonal -set of 9)                                                                             | 1             | No.                               |
| 17     | Analyzer                                                                                                        | 1             | No.                               |
| 18     | Digital IC Trainer                                                                                              | 1             | No.                               |
| 19     | IT Workbench for computer hardware and networking                                                               | 1             | No.                               |
| 20     | Electronic circuit simulation software                                                                          | 5             | No.                               |
| 21     | Different types of Analog electronic components, digital ICs, power electronic components, general purpose PCBs | 30            | Bundle                            |
| 22     | SMD Soldering & De soldering Station with necessary accessories                                                 | 1             | No.                               |
| 23     | SMD Technology Kit                                                                                              | 1             | No.                               |
| 24     | Microcontroller kits (8051) along with programming software                                                     | 1             | No.                               |
| 25     | Sensor Trainer Kit Containing required Sensors                                                                  | 2             | No.                               |
| 26     | Internet of Things Explorer                                                                                     | 1             | No.                               |

|    |                                                                      |   |     |
|----|----------------------------------------------------------------------|---|-----|
| 27 | Wireless Communication modules for interfacing with microcontrollers | 1 | No. |
| 28 | Embeddeds Planning Tools                                             | 1 | No. |
| 29 | Embedded Operating Systems                                           | 1 | No. |

## 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 RAJASTHAN PIN CODE NO - 332718 | 8432882688       | yaduvanshicollege2008@gmail.com |                                 |

|    |                                         |                      |                              |                                                                                      |            |                                       |  |
|----|-----------------------------------------|----------------------|------------------------------|--------------------------------------------------------------------------------------|------------|---------------------------------------|--|
| 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@sv colleges.edu.in |  |
| 8  | Origin SMT Systems Pvt. Ltd.            | Amit Saini           | Managing Director            | Plot No 579, Sector 37, Pace City II, Udyog Vihar Phase VI, Gurugrm, Haryana         | 9871964754 | amit@originsmt.com                    |  |
| 9  | Rastriya Khushali Sansthan              | Ramkaran Sinsinwar   | President                    | VOP Tajsar Fatehpur Rajasthan                                                        | 6350658040 | Rkstajsar1998@gmail.com               |  |
| 10 | Nexgen Exhibitions Pvt. Ltd.            | Saurabh Purwar       | Director                     | 1201/1206 Pragati Tower, 26 Rajendra Place, New Delhi-110008, India                  | 9457306691 | fbvidgo@gmail.com                     |  |
| 11 | Manav Shiksha                           |                      |                              | Vill+Post – OIE, Dis. Mathura                                                        | 7500000637 |                                       |  |
| 12 | Annur Indutrial Training Institute      | Shridevikr           | Director                     |                                                                                      | 9489675146 | skill@gmail.com                       |  |
| 13 | Involute Automation Pvt. Ltd            | Vijaya Chandra       | Operationa In Charge         | Plot No. 12 Tecgnocrats Industrial Estate Balanaga, Hyderabad, Telangna 500037 india |            | Vijaya.chandra@involut etraining.in   |  |
| 14 | Jnana Ganga Vidya Pith                  | Jagdish Parsad Yadav | Manager                      |                                                                                      | 9448467800 | jagdishprasadyadav@gmail.com          |  |
| 15 | Johnson Control India                   | Dr. Ashish           | Sr. Manager                  |                                                                                      | 9923200958 | Ashishkardam958@gmail.com             |  |
| 16 | Varujh Infotech Pvt. Ltd                | Gaurav Prakash       | M.D.                         | Kanpur Uttar Pradesh                                                                 | 8886634504 | Skill.akyone@gmail.com                |  |

|    |                                   |              |          |                   |            |                           |  |
|----|-----------------------------------|--------------|----------|-------------------|------------|---------------------------|--|
| 17 | Vedh Narayan Singh Sheva Sansthan | Manoj Kumar  | Director | Dholpur Rajasthan | 9216692269 | Msharmadholpur1@gmail.com |  |
| 18 | Vedham Academy Madurai            | Sundar Rajan | Admin    | Tamilnadu         | 9787551862 |                           |  |

## Annexure: Training &amp; Employment Details

## Training and Employment Projections:

| Year    | Total Candidates           | Women                      | People with Disability   |
|---------|----------------------------|----------------------------|--------------------------|
|         | Estimated Training # Total | Estimated Training # Women | Estimated Training # PwD |
| 2025-26 | 150                        | NA                         | NA                       |
| 2026-27 | 150                        | NA                         | NA                       |
| 2027-28 | 200                        | 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 | 0                | 0        | 0         | NA     | NA      | NA       | NA        | NA     | NA                     | NA       | NA        | NA     |
| 3.0                   | 2023-24 | 111              | 72       | 72        | NA     | NA      | NA       | NA        | NA     | NA                     | NA       | NA        | NA     |
| 3.0                   | 2024-25 | 359              | 221      | 212       | 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      | <input checked="" type="checkbox"/> Theory/ Lectures - Imparting theoretical and conceptual knowledge                    | <ul style="list-style-type: none"> <li>• Books/ e-books</li> <li>• Presentations</li> <li>• Reference Material</li> <li>• Audio / Video Modules</li> </ul>   | 30:70                  |
| 2      | <input checked="" type="checkbox"/> Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners | <ul style="list-style-type: none"> <li>• Self-Learning Videos</li> <li>• Broadcasts</li> <li>• Mobile Learning</li> <li>• Curated Digital content</li> </ul> | 30:70                  |
| 3      | <input checked="" type="checkbox"/> Showing Practical Demonstrations to the learners                                     | <ul style="list-style-type: none"> <li>• Video Content</li> <li>• E-Resource library</li> <li>• AR/ VR/ XR</li> </ul>                                        | 30:70                  |
| 4      | <input checked="" type="checkbox"/> Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training         | <ul style="list-style-type: none"> <li>• Training tools (tools list attached)</li> <li>• Video Play</li> <li>• Presentations</li> </ul>                      | 30:70                  |
| 5      | <input checked="" type="checkbox"/> Tutorials/ Assignments/ Drill/ Practice                                              | <ul style="list-style-type: none"> <li>• Online Question Bank</li> <li>• Mobile Quick test app</li> <li>• MCQ based tests</li> </ul>                         | 30:70                  |
| 6      | <input checked="" type="checkbox"/> Proctored Monitoring/ Assessment/ Evaluation/ Examinations                           | <ul style="list-style-type: none"> <li>• Assessment engine for Essays</li> <li>• Up-loadable file examinations</li> <li>• Mock test sessions</li> </ul>      | 30:70                  |
| 7      | <input checked="" type="checkbox"/> On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training          | <ul style="list-style-type: none"> <li>• Online tests</li> <li>• Offline assessments</li> </ul>                                                              | 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 |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------|---------------|------------|
| <b>ELE/N1429: Design, Develop, and Test an IoT-Based System</b> | <i>Understand the Role of IOT &amp; its Security</i>                                                                                                                                                                                                           | <b>8</b>     | <b>8</b>        | <b>0</b>      | <b>0</b>   |
|                                                                 | PC1.Understand IoT Ecosystem and Components                                                                                                                                                                                                                    | 1            | 1               |               |            |
|                                                                 | PC2.Analyze IoT System Architecture                                                                                                                                                                                                                            | 1            | 1               |               |            |
|                                                                 | PC3.Implement IoT Communication Protocols                                                                                                                                                                                                                      | 1            | 1               |               |            |
|                                                                 | PC4.Develop IoT Data Processing Capabilities                                                                                                                                                                                                                   | 1            | 1               |               |            |
|                                                                 | PC5.Ensure IoT Device Security                                                                                                                                                                                                                                 | 1            | 1               |               |            |
|                                                                 | PC6.Design and Deploy IoT Applications                                                                                                                                                                                                                         | 1            | 1               |               |            |
|                                                                 | PC7.Debug and Troubleshoot Embedded IoT Systems                                                                                                                                                                                                                | 1            | 1               |               |            |
|                                                                 | PC8.Understand Emerging Trends in IoT                                                                                                                                                                                                                          | 1            | 1               |               |            |
|                                                                 | <i>Prepare the design for IoT based system</i>                                                                                                                                                                                                                 | <b>16</b>    | <b>16</b>       | <b>-</b>      | <b>10</b>  |
|                                                                 | <b>PC9.</b> collate the design and connectivity requirements to establish the inter-operability between various components of the system as per its needs                                                                                                      | 1            | 1               |               | 1          |
|                                                                 | <b>PC10.</b> review the specific needs of the stakeholders of an IoT system and convert them to a requirement specification document                                                                                                                           | 1            | 1               |               | 1          |
|                                                                 | <b>PC11.</b> confirm that the software and firmware required are as per the given product specifications and system architecture                                                                                                                               | 1            | 1               |               | 1          |
|                                                                 | <b>PC12.</b> monitor feasibility analysis of the proposed embedded product design by evaluating the required parameters such as compatibility of hardware & software, cost, space, technology, safety, functional requirements, performance requirements, etc. | 1            | 1               |               | 1          |
|                                                                 | <b>PC13.</b> review list handshake protocols between the connected devices in the IoT system                                                                                                                                                                   | 1            | 1               |               | 1          |
|                                                                 | <b>PC14.</b> check all the Machine to Machine (M2M) information in a flow chart or a connected diagram that shows all inputs and outputs of the system                                                                                                         | 1            | 1               |               | 1          |
|                                                                 | <b>PC15.</b> check embedded OS, development machines like virtual machines, tools (cross compiler, device drivers), embedded language and GUI language required to develop the new product design                                                              | 1            | 1               |               | 1          |

|                                                                                                                                                                                                |   |   |   |   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|
| PC16. plan to deduce security aspects to be provided in the design at all its stages and comply with globally accepted regulatory standards for technical specifications                       | 1 | 1 |   | 1 |
| PC17. monitor proper coding requirements and use licensed software (or open source) as per the requirements                                                                                    | 1 | 1 |   | 1 |
| PC18. check requirements for continuous integration/continuous development platform and automation test case                                                                                   | 1 | 1 |   | 1 |
| PC19. test the functional specifications of each component as well as of the system                                                                                                            | 1 | 1 |   |   |
| PC20. verify technical evaluation and deployment of the overall IoT solution after discussing with experts and the internal team                                                               | 1 | 1 |   |   |
| PC21. ensure the IoT based system as per quality, industry and compliance standards as well as performance and budget requirements                                                             | 1 | 1 |   |   |
| PC22. supervise the personnel involved work and develop a work plan with agreed scheduled timelines                                                                                            | 1 | 1 |   |   |
| PC23. test both high-level design document and the detailed low-level design document                                                                                                          | 1 | 1 |   |   |
| PC24. monitor specifications of the requirements, variables to be recorded, need for specific connectivity at each interface, security requirements, etc. and confirm the same with the client | 1 | 1 |   |   |
| <i>Use appropriate techniques to develop embedded design</i>                                                                                                                                   | 7 | 7 | - | 7 |
| PC25. monitor device drivers for sensors, timers, data communication ports, analog-to-digital and digital-to- analog converters and other embedded product peripherals                         | 1 | 1 |   | 1 |
| PC26. check microprocessor/microcontroller software to comply with a specified function and its operating parameters                                                                           | 1 | 1 |   | 1 |
| PC27. monitor applications that perform signal processing, data acquisition, event processing, data management and communication functions                                                     | 1 | 1 |   | 1 |
| PC28. verify that systems are using real-time embedded operating systems (OS) such as VxWorks and QNX                                                                                          | 1 | 1 |   | 1 |

|                                                              |                                                                                                                                                                   |           |           |          |           |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|----------|-----------|
|                                                              | PC29. ensure proper use of Opensource by understanding General Public License (GPL) detail to use re-usable components in collaboration with legal/IP team        | 1         | 1         |          | 1         |
|                                                              | PC30. guide intellectual property from unauthorized use by maintaining IP confidentiality rights                                                                  | 1         | 1         |          | 1         |
|                                                              | PC31. check reusable software components, best practices and design standards                                                                                     | 1         | 1         |          | 1         |
|                                                              | <i>Test and debug the embedded system for proper functionality</i>                                                                                                | 9         | 9         | -        | 3         |
|                                                              | PC32. check the Unit Test Cases (UTCs) by white box testing method                                                                                                | 1         | 1         |          | 1         |
|                                                              | PC33. plan to use proper testing methodologies to check that prototype devices are built as per specifications                                                    | 1         | 1         |          | 1         |
|                                                              | PC34. verify the microprocessor/microcontroller on the board and also all associated peripherals systematically                                                   | 1         | 1         |          | 1         |
|                                                              | PC35. test the performance of the prototype devices/components against product specifications and regulatory requirements                                         | 1         | 1         |          |           |
|                                                              | PC36. review codes and UTCs from appropriate people to identify defects                                                                                           | 1         | 1         |          |           |
|                                                              | PC37. check inputs from concerned people to decide design corrections                                                                                             | 1         | 1         |          |           |
|                                                              | PC38. monitor bug tracking system to report problems or issues in accordance with the policy and procedure and seek guidance from the team on how to resolve them | 1         | 1         |          |           |
|                                                              | PC39. verify corrective actions taken for identified defects in the design to submit corrected code to concerned person for approval                              | 2         | 2         |          |           |
|                                                              | <b>NOS Total</b>                                                                                                                                                  | <b>40</b> | <b>40</b> | <b>-</b> | <b>20</b> |
|                                                              | <i>Develop application for IoT system</i>                                                                                                                         | <b>20</b> | <b>24</b> | <b>-</b> | <b>5</b>  |
| <b>ELE/N1430: Create GUI and Applications in a framework</b> | PC1. check wireless sensor networks for IoT and select the right platform for development for example arduino, raspberry pi                                       | 2         | 3         |          | 1         |
|                                                              | PC2. review IoT application development using embedded OS for example Cotiki OS, mbedOS etc.                                                                      | 2         | 3         |          | 1         |
|                                                              | PC3. verify user flow diagram and design map for the interface                                                                                                    | 2         | 3         |          | 1         |
|                                                              | PC4. monitor the style of interface and validate the same design of the application to identify wireframe and mockup                                              | 2         | 3         |          | 1         |

|                                                                |                                                                                                                                                                                                     |           |           |          |           |
|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|----------|-----------|
|                                                                | PC5. ensure lightweight framework, responsive design, event handling, interactivity etc. in GUI designing                                                                                           | 2         | 3         |          | 1         |
|                                                                | PC6. test the correct syntax when developing code                                                                                                                                                   | 2         | 3         |          |           |
|                                                                | PC7. monitor programming languages such as Python, C#, C/C++, Java etc. to build programs to communicate to cloud server using various application protocols such as HTTP/CoAP/ MQTT/AMQP           | 2         | 3         |          |           |
|                                                                | PC8. observe a complete IoT application by using appropriate programming language, by interfacing with sensors and actuators using GPIO pins and also interfacing with the camera                   | 2         | 2         |          |           |
|                                                                | PC9. plan to select, install and troubleshoot various modules/devices for real applications for smart traffic system, smart parking system, healthcare, wearables, smart lighting, smart homes etc. | 4         | 1         |          |           |
|                                                                | <i>Develop the appropriate GUI/web UI for the entire IoT system</i>                                                                                                                                 | 20        | 26        | -        | 5         |
|                                                                | PC10. verify proper graphical user interface, programming languages and hardware for compatibility between GUI and IoT system to use for the IoT system                                             | 3         | 4         |          | 1         |
|                                                                | PC11. check the wireframe design while developing the GUI                                                                                                                                           | 3         | 4         |          | 1         |
|                                                                | PC12. verify the front end as per the design configuration and execute functionality to the components on front end                                                                                 | 3         | 4         |          | 1         |
|                                                                | PC13. check the program to test the functionality of the GUI                                                                                                                                        | 3         | 4         |          | 1         |
|                                                                | PC14. review the syntaxes to remove the faults in the program                                                                                                                                       | 3         | 4         |          | 1         |
|                                                                | PC15. verify UI/UX design done up front to ensure ease of use and simplicity of the GUI program                                                                                                     | 3         | 4         |          |           |
|                                                                | PC16. monitor the security aspects for IoT applications and comply with them to publish performance metrics of the application in real time                                                         | 2         | 2         |          |           |
|                                                                | <b>NOS Total</b>                                                                                                                                                                                    | <b>40</b> | <b>50</b> | <b>-</b> | <b>10</b> |
| <b>ELE/N1431: Perform Firmware Testing and Troubleshooting</b> | <i>Test the software solutions for embedded IoT products</i>                                                                                                                                        | <b>16</b> | <b>24</b> | <b>-</b> | <b>5</b>  |
|                                                                | PC1. verify testing procedures to analyse code                                                                                                                                                      | 2         | 6         |          | 1         |
|                                                                | PC2. manage the key features of the programming language used to develop and test solutions.                                                                                                        | 2         | 4         |          | 1         |
|                                                                | PC3. check the embedded code to determine root cause of defects and implement corrective action                                                                                                     | 2         | 4         |          | 1         |

|                                                                                                                                                                                                |           |           |          |           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|----------|-----------|
| PC4. check problems and bugs in code by applying debugging techniques such as Break-points, to ensure specifications are met                                                                   | 2         | 2         |          | 1         |
| PC5. test the compiled code into the memory of the embedded product                                                                                                                            | 2         | 2         |          | 1         |
| PC6. check the embedded product to see if it is working as per the functional and performance requirements                                                                                     | 2         | 2         |          |           |
| PC7. verify program using debug tools such as JTAG, GDB etc.                                                                                                                                   | 2         | 2         |          |           |
| PC8. test the functional correctness for industry standard interfaces using protocol analyzers.                                                                                                | 2         | 2         |          |           |
| <i>Testing and rectify malfunctions in the IoT prototype</i>                                                                                                                                   | 14        | 16        | -        | 3         |
| PC9. monitor the malfunctions in constructed prototype devices/components using appropriate software, hardware and testing methods                                                             | 2         | 2         |          | 1         |
| PC10. verify the bugs in tracking systems and automat test plans                                                                                                                               | 2         | 3         |          | 1         |
| PC11. ensure unit failures and develop corrective actions to verify interoperability testing with other elements in the IoT network                                                            | 2         | 3         |          | 1         |
| PC12. verify the test/QA team to fix identified problems and compliance with quality standards                                                                                                 | 2         | 2         |          |           |
| PC13. suggest correct techniques to rectify malfunctions as per standard operating system to the specifications or to the final design                                                         | 2         | 2         |          |           |
| PC14. test the prototype devices/components using approved procedures and ensure that operational requirements are met                                                                         | 2         | 2         |          |           |
| PC15. monitor the completed new product design work appropriately and submit to relevant authority/person for approval                                                                         | 2         | 2         |          |           |
| <i>Validate and configure the entire embedded IoT system</i>                                                                                                                                   | 10        | 10        | -        | 2         |
| PC16. review and interpret test results against specifications and check for compliance                                                                                                        | 4         | 4         |          | 1         |
| PC17. review root cause analysis to identify the cause of the problem, if test results are in disagreement with specifications, then check, troubleshoot and correct any defects in the design | 4         | 4         |          | 1         |
| PC18. test the system to various intended applications by selecting the different combinations possible                                                                                        | 2         | 2         |          |           |
| <b>NOS Total</b>                                                                                                                                                                               | <b>40</b> | <b>50</b> | <b>-</b> | <b>10</b> |

**DGT/VSQ/N0102:  
Employability Skills  
(60 Hours)**

|                                                                                                                                                                                                                                                                                                                   |          |          |   |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|---|---|
| <i>Introduction to Employability Skills</i>                                                                                                                                                                                                                                                                       | <b>1</b> | <b>1</b> | - | - |
| <b>PC1.</b> identify employability skills required for jobs in various industries                                                                                                                                                                                                                                 | -        | -        | - | - |
| <b>PC2.</b> identify and explore learning and employability portals                                                                                                                                                                                                                                               | -        | -        | - | - |
| <i>Constitutional values – Citizenship</i>                                                                                                                                                                                                                                                                        | <b>1</b> | <b>1</b> | - | - |
| <b>PC3.</b> 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.                                                                | -        | -        | - | - |
| <b>PC4.</b> follow environmentally sustainable practices                                                                                                                                                                                                                                                          | -        | -        | - | - |
| <i>Becoming a Professional in the 21st Century</i>                                                                                                                                                                                                                                                                | <b>2</b> | <b>4</b> | - | - |
| <b>PC5.</b> recognize the significance of 21st Century Skills for employment                                                                                                                                                                                                                                      | -        | -        | - | - |
| <b>PC6.</b> 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 | -        | -        | - | - |
| <i>Basic English Skills</i>                                                                                                                                                                                                                                                                                       | <b>2</b> | <b>3</b> | - | - |
| <b>PC7.</b> use basic English for everyday conversation in different contexts, in person and over the telephone                                                                                                                                                                                                   | -        | -        | - | - |
| <b>PC8.</b> read and understand routine information, notes, instructions, mails, letters etc. written in English                                                                                                                                                                                                  | -        | -        | - | - |
| <b>PC9.</b> write short messages, notes, letters, e-mails etc. in English                                                                                                                                                                                                                                         | -        | -        | - | - |
| <i>Career Development &amp; Goal Setting</i>                                                                                                                                                                                                                                                                      | <b>1</b> | <b>2</b> | - | - |
| <b>PC10.</b> understand the difference between job and career                                                                                                                                                                                                                                                     | -        | -        | - | - |
| <b>PC11.</b> prepare a career development plan with short- and long-term goals, based on aptitude                                                                                                                                                                                                                 | -        | -        | - | - |
| <i>Communication Skills</i>                                                                                                                                                                                                                                                                                       | <b>2</b> | <b>2</b> | - | - |
| <b>PC12.</b> follow verbal and non-verbal communication etiquette and active listening techniques in various settings                                                                                                                                                                                             | -        | -        | - | - |
| <b>PC13.</b> work collaboratively with others in a team                                                                                                                                                                                                                                                           | -        | -        | - | - |
| <i>Diversity &amp; Inclusion</i>                                                                                                                                                                                                                                                                                  | <b>1</b> | <b>2</b> | - | - |
| <b>PC14.</b> communicate and behave appropriately with all genders and PwD                                                                                                                                                                                                                                        | -        | -        | - | - |

|                                                                                                                                     |   |   |   |   |
|-------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|
| PC15. escalate any issues related to sexual harassment at workplace according to POSH Act                                           | - | - | - | - |
| <i>Financial and Legal Literacy</i>                                                                                                 | 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                                      | - | - | - | - |
| <i>Essential Digital Skills</i>                                                                                                     | 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                                                         | - | - | - | - |
| <i>Entrepreneurship</i>                                                                                                             | 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     | - | - | - | - |
| <i>Customer Service</i>                                                                                                             | 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                                                                             | - | - | - | - |
| <i>Getting ready for apprenticeship &amp; Jobs</i>                                                                                  | 2 | 3 | - | - |
| PC29. create a professional Curriculum vitae (Résumé)                                                                               | - | - | - | - |

|                    |                                                                                                                                                                                  |            |            |   |           |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|---|-----------|
|                    | <b>PC30.</b> search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively | -          | -          | - | -         |
|                    | <b>PC31.</b> apply to identified job openings using offline                                                                                                                      | -          | -          | - | -         |
|                    | /online methods as per requirement                                                                                                                                               |            |            |   |           |
|                    | <b>PC32.</b> answer questions politely, with clarity and confidence, during recruitment and selection                                                                            | -          | -          | - | -         |
|                    | <b>PC33.</b> identify apprenticeship opportunities and register for it as per guidelines and requirements                                                                        | -          | -          | - | -         |
|                    | <b>NOS Total</b>                                                                                                                                                                 | <b>20</b>  | <b>30</b>  | - | -         |
| <b>Grand Total</b> |                                                                                                                                                                                  | <b>140</b> | <b>170</b> | - | <b>40</b> |

## 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.*

## &lt;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 Full Stack IoT Analyst) 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:
  - To understand the design of IoT based system

- Develop the applications of IOT systems
- Test and troubleshoot the Firmware
- Work Effectively at work place

NSQC Approved

## 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                                                                                                                                                                                                                            |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>National Occupational Standards (NOS)</b> | 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.                                              |
| <b>Qualification</b>                         | 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                                                       |
| <b>Qualification File</b>                    | 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. |
| <b>Sector</b>                                | A grouping of professional activities on the basis of their main economic function, product, service or technology.                                                                                                                    |
| <b>Long Term Training</b>                    | Long-term skilling means any vocational training program undertaken for a year and above.<br><a href="https://ncvet.gov.in/sites/default/files/NCVET.pdf">https://ncvet.gov.in/sites/default/files/NCVET.pdf</a>                       |