QUALIFICATION FILE- Micro Credentials

Machine Learning Fundamentals

☒ Public ☐ Private

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

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

NCrF/NSQF Level: 3.5

Submitted By:

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

Table of Contents

Section 1: Basic Details 3
Section 2: Training Related 5
Section 3: Assessment Related 6
Section 4: Evidence of the Need for the Micro Credential 6
Section 5: Annexure Check List 7
Annexure I: Evidence of Level 8
Annexure II: Assessment Criteria 9
Annexure III: Assessment Strategy 10
Annexure IV: Tools and Equipment (Lab Set-Up) 11
Annexure V: Blended Learning 11
Annexure-VI: Acronym and Glossary 12

Section 1: Basic Details

<table>
<tr><td>1.</td><td>Micro Credential-Qualification Name</td><td colspan="2">Machine Learning Fundamentals</td></tr>
<tr><td>2.</td><td>Sector</td><td colspan="2">IT-ITeS</td></tr>
<tr><td>3.</td><td>National Qualification Register (NQR) Code & Version</td><td>NM-3.5-IT-03822-2025-V1-NIELIT</td><td>4. NCrF/NSQF Level: 3.5</td></tr>
<tr><td>5.</td><td>Brief Description of the Micro Credential</td><td colspan="2">The purpose of this qualification is to train the students in Machine Learning implementation using Python to upskill them and increase their employability in the field of IT/Computer Science. Purpose is to demystify machine learning and equip the future workforce with the confidence to learn and apply skills independently.</td></tr>
<tr><td>6.</td><td>Eligibility Criteria for Entry for a Student/Trainee/Learner/Employee</td><td colspan="2">a. Entry Qualification & Relevant Experience:
<table>
<tr><th>Academic/Skill Qualification (with Specialization - if applicable)</th><th>Required Experience (with Specialization - if applicable)</th></tr>
<tr><td>**10th with pursuing continuous schooling</td><td>No Experience required</td></tr>
<tr><td>**8th with 2 years of NTC in the field of IT Sector</td><td>No Experience required</td></tr>
<tr><td>**8th</td><td>3 Year of experience in relevant field of IT.</td></tr>
<tr><td>Previous relevant Qualification of NSQF Level 3</td><td>1.5-year relevant experience in IT</td></tr>
</table>
** Should have a basic understanding of coding.</td></tr>
<tr><td>7.</td><td>Credits Assigned to this Micro Credential-Qualification, Subject to Assessment (as per National Credit Framework (NCrF))</td><td>0.5 Credits</td><td>8. Common Cost Norm Category (I/II/III) (wherever applicable): Category-II</td></tr>
<tr><td>9.</td><td>Any Licensing Requirements/ Pre-requisites for Undertaking Training (wherever applicable)</td><td colspan="2">NA</td></tr>
</table>

<table>
<tr><td>10.</td><td>Expected Outcomes of the Micro Credential</td><td>Terminal learning outcomes are:

• Able to apply Python programming for developing ML models such as regression and classification.
• Able to explain core machine learning concepts, including supervised and unsupervised learning.
• Able to evaluate machine learning models using accuracy metrics and interpret model performance.
• Able to implement foundational ML algorithms such as decision trees, KNN, logistic regression, and clustering techniques.
• Able to apply ML techniques on real-world datasets for prediction and classification tasks.</td></tr>
<tr><td>11.</td><td>Training Duration by Modes of Training Delivery (Specify Total Duration as per selected training delivery modes and as per requirement of the qualification)</td><td>☒Offline ☐Online ☐Blended
<table><tr><th>Training Delivery Modes</th><th>Theory (Hours)</th><th>Practical (Hours)</th><th>Total (Hours)</th></tr><tr><td>Classroom (offline)</td><td>6</td><td>9</td><td>15</td></tr></table></td></tr>
<tr><td>12.</td><td>Assessment Criteria</td><td><table><tr><th>Theory (Marks)</th><th>Practical (Marks)</th><th>ES/Internal Assessment (Marks)</th><th>Project/OJT (Marks)</th><th>Total (Marks)</th><th>Passing %age</th></tr><tr><td>25</td><td>25</td><td>00</td><td>00</td><td>50</td><td>50%</td></tr></table>The centralized online assessment is conducted by the Examination Wing, NIELIT Headquarters.
*Assessment strategy shall be as per NIELIT Norms.</td></tr>
<tr><td>13.</td><td>Is the Qualification Amenable to Persons with Disability</td><td>☒ Yes ☐ No
a. Locomotor Disability: Leprosy Cured Person, Dwarfism, Muscular Dystrophy and Acid Attack Victims
b. Visual Impairment: Low Vision</td></tr>
<tr><td>14.</td><td>How participation of women will be encouraged?</td><td>Participation by women can be ensured through Government Schemes. Occasionally, exclusive batches for women would be run for the proposed courses.</td></tr>
</table>

		Funding is available for women's participation under other schemes launched by the Government from time to time.	
15.	**Other Indian Languages in which the Micro Credential will be implemented.**	Qualification file is available in English and Hindi languages.	
16.	**Is similar Micro Credential Qualification(s) available on NQR-if yes, justification for this qualification**	**☐ Yes ☒No URLs of similar Qualifications:**	
17.	**Name and Contact Details Submitting / Awarding Body SPOC** *(In case of CS or MS, provide details of both Lead AB & Supporting ABs)*	**Name: Sh. Ankit Kumar** **Email: patna@nielit.gov.in** **Contact No.: 6287942666** **Website: https://www.nielit.gov.in**	
18.	**Final Approval Date by NSQC: 18.02.2025**	**19. Validity Duration: 3 Years**	**20. Next Review Date: 18.02.2028**

Section 2: Training Related

1.	**Trainer's Qualification and experience in the relevant sector (in years)** (as per requirement and NCVET guidelines)	A-Level/MCA/ B. Tech in CS/IT/EC/EE/ allied areas with 1 years of experience of training in relevant field.
2.	**Master Trainer's Qualification and experience in the relevant sector (in years)** (as per requirement and NCVET guidelines)	MCA/B-Level/B.Tech in CS/IT/EC/EE/ allied areas with an 2 years of experience/ 2 years of training in relevant field.
3.	**Tools and Equipment Required for Training**	☒Yes ☐No (*If "Yes", details to be provided in Annexure)*

Section 3: Assessment Related

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

Section 4: Evidence of the Need for the Micro Credential

Provide Annexure/Supporting documents name.

1.	Government /Industry initiatives/ requirement (Yes/No): Yes
2.	Number of Industry validation provided: The Micro credentials are offered through IndiaAi Labs for Empowering the youth by imparting training in Emerging AI Technologies under India AI Future Skills pillar of IndiaAI Mission.
3.	Estimated number of people to be trained: 500

Section 5: Annexure Check List

Specify Annexure Number and Name.

1.	**Annexure:** NCrF/NSQF level justification based on NCrF Level/NSQF descriptors *(Mandatory)*	Annexure I: Evidence of Level
2.	**Annexure:** Learning Outcomes and Assessment Criteria *(Mandatory)*	Annexure II: Assessment Criteria
3.	**Annexure:** Assessment Strategy *(Mandatory)*	Annexure III: Assessment Strategy
4.	**Annexure:** List of tools and equipment relevant for qualification *(Mandatory – Except in case of online course)*	Annexure IV: Tools & Equipment
5.	**Annexure:** Blended Learning *(Mandatory in case selected mode of delivery is "Blended Learning")*	Annexure V: Blended Learning
6.	**Annexure:** Acronym and Glossary *(Optional)*	Annexure VI: Acronym & Glossary

Annexure I: Evidence of Level

NCrF/NSQF Level Descriptors	Key requirements of the job role/ outcome of the qualification	How the job role/ outcomes relate to the NCrF/NSQF level descriptor	NCrF/NSQF Level
Professional Theoretical Knowledge/Process	● Using python libraries for ML development ● Students will learn the concept of Machine learning and will be able to train ML models as per the requirement	● Possesses specialized operational knowledge and understanding of the work. Have complete knowledge of the concept of time required for delivery, and Quality for a range of issues	3.5
Professional and Technical Skills/ Expertise/ Professional Knowledge	● The candidates will be able to understand the concepts of ML ● The students will be able to develop various kinds of models.	● Possesses specialized professional and technical skills; displays clarity of professional knowledge and technical skills in a broad range of activities/ tasks ● Have knowledge of collecting and interpreting the available information, drawing conclusions & communicating the same	3.5
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	● Career Development & Goal Setting ● Communication Skills ● Essential Digital Skills Getting Ready for Apprenticeship & Jobs	● Can explain Entrepreneurial Mindset and describe the importance of it in the context of opportunity curation for future jobs ● Can comfortably use most of the basic software with proficiency ● Have the ability to relate to the 5 pillars of Social Emotional Skills and describe the similarities between SES and Emotional Intelligence	3.5
Broad Learning Outcomes/Core Skill	● Machine learning models	● Students can use, create, and design AI based innovative solutions ● Have knowledge of AI Application development and apply the understanding of deep learning models in improving solution	3.5
Responsibility	● Development of AI solutions ● Solving use cases ● Realization of Projects in AI domains	Takes complete responsibility for delivery and quality of own work and output as also the subordinates.	3.5

Annexure II: Assessment Criteria

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

Assessment Criteria for Performance Criteria	Learning Outcomes	Theory Marks	Practical Marks
Understanding Machine Learning Concepts	Fundamentals of ML, supervised vs unsupervised learning, ML workflow	25	25
Implementing ML Algorithms Using Python	Linear & polynomial regression, classification algorithms (Decision Trees, KNN, Logistic Regression), clustering techniques		
Developing and Evaluating ML Models	Applying ML algorithms on real datasets and interpreting performance using accuracy metrics		
	Total Marks	**25**	**25**
	Grand Total	**50**	

Annexure III: Assessment Strategy

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

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

The underlying principle of assessment is fairness and transparency. The evidence of the outcomes and assessment criteria. competence acquired by the candidate can be obtained by conducting Theory (Online) examination.

About Examination Pattern:

1. The question papers for the theory exams are set by the Examination wing (assessor) of NIELIT HQS.
2. The assessor assigns roll number.
3. The assessor carries out theory online assessments. Theory examination would be conducted online and the paper comprise of MCQ
4. Pass percentage would be 50% marks.
5. The examination will be conducted in English language only.

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

Annexure IV: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment

Batch Size: 30

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1	Classroom	1 (30 Sq.m)	30
2	Student Chair	30	30
3	Student Table	30	30
4	Desktop computer with accessories	• 12th Generation Intel® Core™ i5-12500T with Intel vPro® Enterprise • 8 GB DDR4-3200 MHz RAM (1 x 8 GB) • 512 GB PCIe® NVMe™ M.2 SSD • Intel® UHD Graphics 770 • Windows 11 Professional Installed with: Anaconda, Spyder, NumPy, Pandas, Matplotlib, Seaborn , Scikit-Learn, SciPy	30
5	Desk jet printer	1 Nos.	A4

Classroom Aids

The aids required to conduct sessions in the classroom are:
1. LCD Projector
2. Pin-up Board
3. White Board

Annexure V: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools: NA

Annexure-VI: Acronym and Glossary

Acronym

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

Glossary

Term	Description
National Occupational Standards (NOS)	NOS define the measurable performance outcomes required from an individual engaged in a particular task. They list down what an individual performing that task should know and also do.
Qualification	A formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards
Qualification File	A Qualification File is a template designed to capture necessary information of a Qualification from the perspective of NSQF compliance. The Qualification File will be normally submitted by the awarding body for the qualification.
Sector	A grouping of professional activities on the basis of their main economic function, product, service or technology.