QUALIFICATION FILE – Micro Credentials

Fundamentals of R Programming

☐ **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:

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Section 1: Basic Details

1.	**Micro Credential-Qualification Name**	**Fundamentals of R Programming**	
2.	**Sector/s**	**IT-ITeS**	
3.	**National Qualification Register (NQR) Code & Version** *(Will be issued after NSQC approval.)*	**NM-3.5-IT-03827-2025-V1-NIELIT**	**4. NCrF/NSQF Level: 3.5**
5.	**Brief Description of the Micro Credentials**	The course *Foundational in R Programming* provides a comprehensive introduction to R, focusing on building a solid understanding of its programming basics and environment. Participants will learn to navigate R Studio, execute fundamental commands, and work hands-on with R. Key topics include data handling techniques, such as importing datasets, sampling, and manipulating data efficiently. Through practical sessions, the course equips learners with essential skills to confidently analyze and manage data using R.	

6.	**Eligibility Criteria for Entry for a Student/Trainee/Learner/Employee**	**Entry Qualification & Relevant Experience:**	

		Academic/Skill Qualification (with Specialization - if applicable)	**Required Experience (with Specialization - if applicable)**
		**10th with pursuing continuous schooling	No Experience required
		**8th with 2 years of NTC in the field of IT Sector	No Experience required
		**8th	3 Year of experience in relevant field of IT.
		Previous relevant Qualification of NSQF Level 3	1.5-year relevant experience in IT

** Should have a basic understanding of coding.

7.	**Credits Assigned to this Qualification, Subject to Assessment** *(as per National Credit Framework (NCrF))*	**1 Credit**	**8. Common Cost Norm Category (I/II/III)** *(wherever applicable)*: **Category-II**
9.	**Any Licensing Requirements/Pre-requisites for Undertaking Training** *(wherever applicable)*	No	

10.	**Expected Outcomes of the Micro Credential**	**Terminal learning outcomes are:** After completion of the module, the students shall be able to: ● Understand the fundamentals of R programming and navigate the R Studio environment effectively. ● Gain expertise in executing basic R commands and perform essential operations within the R environment. ● Gain expertise in Handling data in R, including importing, cleaning, and organizing datasets for analysis.
11.	**Training Duration by Modes of Training Delivery** *(Specify **Total Duration** as per selected training delivery modes and as per requirement of the qualification)*	☒**Offline Only** ☐**Online Only** ☐**Blended**

Training Delivery Modes	Theory (Hours)	Practical (Hours)	Total (Hours)
Classroom (offline)	10	20	30

12.	**Assessment Criteria**						

Theory (Marks)	Practical (Marks)	Project (Marks)	Viva (Marks)	Total (Marks)	Passing %age
25	25	00	00	50	50%

The centralised online assessment is conducted by the Examination Wing, NIELIT Headquarters.

*Assessment strategy shall be as per NIELIT Norms prevailing at times.

13.	**Is the Qualification Amenable to Persons with Disability**	☒ **Yes** ☐ **No If "Yes", specify applicable type of Disability:** a. Locomotor Disability: Leprosy Cured Person, Dwarfism, Muscular Dystrophy and Acid Attack Victims b. Visual Impairment: Low Vision
14.	**How participation of women will be encouraged?**	Participation by women can be ensured through Government Schemes. Occasionally, exclusive batches for women would be run for the proposed courses. Funding is available for women's participation under other schemes launched by the Government from time to time.
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	Name: Shri Binoy Das Email: erbinoy@nielit.gov.in Contact No.: 9436585656 Website: https://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 in 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 2 years of experience/ 2 years of training in relevant field.
3.	Tools and Equipment Required for the 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 & Supporting Documents Check List

Specify Annexure Name / Supporting document file 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	This qualification prepares individuals for data science roles with expertise in Python/R programming, data preprocessing, and machine learning techniques. Graduates will gain hands-on experience through real-world case studies, mastering tools like Pandas, Matplotlib, and Jupyter while solving industry-specific problems. Emphasis on ethical practices and data privacy ensures readiness for roles like Data Analyst.	The job role and outcomes align with NCrF/NSQF Level 4 or 5, emphasizing advanced theoretical knowledge and practical skills in data science and analytics. Learners are equipped to independently handle complex datasets, solve real-world problems, and apply machine learning techniques while adhering to ethical standards. These competencies reflect the level descriptors' focus on specialized knowledge, analytical skills, and professional accountability across diverse industries.	3.5
Professional and Technical Skills/ Expertise/ Professional Knowledge	The qualification equips individuals with professional and technical expertise in programming languages like Python and R, alongside data manipulation and analysis using tools such as NumPy, Pandas, and Jupyter Notebook. Graduates gain proficiency in data preprocessing techniques, statistical analysis, data visualization with Matplotlib and Seaborn, and machine learning algorithms like regression, clustering, and hyperparameter tuning. Advanced knowledge includes exploratory data analysis (EDA), model validation, natural language processing (NLP), and time series analysis. Additionally, learners develop domain-specific skills for applications in finance, healthcare, and e-commerce, while emphasizing ethical data handling and privacy practices to ensure responsible and secure professional practice.	Factual knowledge of field of knowledge or study.	3.5

Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	This qualification prepares learners for employment readiness by equipping them with in-demand skills in programming, data analysis, and machine learning, enabling them to take on roles like Data Analyst. Through hands-on projects and case studies, they develop problem-solving abilities, innovation, and effective communication, ensuring they can independently manage real-world data challenges. Additionally, the program fosters an entrepreneurial mindset, encouraging learners to identify opportunities for data-driven innovation while emphasizing ethical practices and collaboration in professional environments.	Recall and demonstrate practical skill, routine and repetitive in narrow range of application, using appropriate rule and tool, using quality concepts	3.5
Broad Learning Outcomes/Core Skill	They will be able to handle alone as well as in /with the team in the area as per the curriculum	Language to communicate written or oral, with required clarity, skill to basic arithmetic and algebraic principles, basic understanding of social political and natural environment.	3.5
Responsibility	Graduates of this qualification are equipped to take on significant responsibilities, including independently managing data science projects from data acquisition and preprocessing to model development and deployment. They are responsible for ensuring data quality, performing in-depth analyses, and deriving actionable insights while adhering to ethical standards and data privacy regulations. Additionally, they are expected to effectively communicate findings, collaborate with interdisciplinary teams, and contribute to decision-making processes in organizational or entrepreneurial settings, showcasing accountability and professional integrity in their roles.	Responsibility for own work and learning.	3.5

Annexure-II: Assessment Criteria

Detailed PC-wise assessment criteria and assessment marks for the NOS are as follows:

Performance Criteria	Assessment Criteria for Performance Criteria	Theory Marks	Practical Marks
PC 1.	Understand foundational data science concepts, differentiate core data-related fields, describe the stages of the data science process, and gain hands-on experience with data loading and inspection using Python or R.		
PC 2.	Develop programming skills in Python/R for data analysis, utilize libraries for data manipulation and analysis, apply preprocessing techniques to datasets, and gain proficiency in data analytics tools for structured data manipulation.		
PC 3.	Perform exploratory data analysis (EDA) on real-world datasets, create insightful data visualizations, understand statistical analysis and probability, build and evaluate foundational machine learning models, and gain proficiency in data analytics tools for structured data manipulation.	25	25
PC 4.	Implement various machine learning algorithms for prediction and analysis, apply feature engineering and selection techniques, perform model validation and optimization, gain hands-on experience with NLP and time series analysis for specialized applications, and achieve proficiency in data analytics tools for structured data manipulation.		
PC 5.	Analyze real-world data science applications, identify ethical considerations and best practices in data handling, engage in team-based case study analysis, practice data-driven decision-making, and gain proficiency in data analytics tools for structured data manipulation.		
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: 20

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1	Classroom	1 (30 Sq.m)	20
2	Student Chair	30	20
3	Student Table	30	20
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	20
5	Desk jet printer	1 No.	A4

Classroom Aids

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

Annexure-V: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools**:**

S. No.	Select the Components of the NOS	List Recommended Tools – for all Selected Components	Offline: Online Ratio
1	☒Theory/ Lectures - Imparting theoretical and conceptual knowledge	Online interaction platforms like JitSi Meet, Bharat VC, Google Meet, MS Teams, etc.	60:40
2	☐Imparting Soft Skills, Life Skills and Employability Skills /Mentorship to Learners	NA	NA
3	☒Showing Practical Demonstrations to the learners	Online interaction platforms like JitSi Meet, Bharat VC, Google Meet, MS Teams, etc.	60:40
4	☒Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training	PCs/Laptops	100:0
5	☒Tutorials/ Assignments/ Drill/ Practice	Online interaction platforms like JitSi Meet, Bharat VC, Google Meet, MS Teams, etc.	50:50
6	☒Proctored Monitoring/ Assessment/ Evaluation/ Examinations	NIELIT Online Examination	Online: 100% Theory; Offline 100% Practical
7	☐On the Job Training (OJT)/ Project Work Internship/ Candidate Training	NA	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.