NCVET Code

2022/EHW/NIELIT/05324

NSQF QUALIFICATION FILE
Approved in 16th NSQC meeting – NCVET- Dated: 24th February, 2022

QUALIFICATION FILE - CONTACT DETAILS OF THE SUBMITTING BODY
Name and address of submitting body:

NATIONAL INSTITUTE OF ELECTRONICS AND INFORMATION TECHNOLOGY

NIELIT Bhawan, Plot No. 3, PSP Pocket, Sector-8,

Dwarka, New Delhi-110077

Name and contact details of individual dealing with the submission

Name	**:**	Alok Tripathi
Position in the organization	**:**	Additional Director
Address if different from above	**:**	NATIONAL INSTITUTE OF ELECTRONICS AND INFORMATION TECHNOLOGY (NIELIT), Patna Adjacent to IIT Patna Amhara, Bihta, Patna– 801106
Tel number(s)	**:**	9431011532
E-mail address	**:**	dir-patna@nielit.gov.in

List of documents submitted in support of the Qualifications File

Annexure 1: Detailed Syllabus and lesson plan of the course
Annexure 2: Evidence of Course requirement in the industry
Annexure 3: Evidence of Job requirement from the industry
Annexure 4: Evidence of validation from industries

Model Curriculum to be added which will include the following:

- Indicative list of tools/equipment to conduct the training

Attached in Annexure 5

- Trainers qualification

Attached in Annexure 6

NSQF QUALIFICATION FILE
Approved in 16th NSQC meeting – NCVET- Dated: 24th February, 2022

SUMMARY

1	**Qualification Title**	Foundation course in Artificial Intelligence Applications
2	**Qualification Code, if any**	Will be given by NCVET post-approval Sector: ITES
3	**NCO code and occupation**	2514.9900(Computer Programmers, Other)
4	**Nature and purpose of the qualification (Please specify whether qualification is short term or long term)**	**Nature:** ❖ This Certificate Course is targeted for creating qualified professional in the field of Artificial Intelligence and Data Science domain, which will help in employment and Entrepreneur development of the qualifier ❖ This Qualification is aligned to Level 5 **Purpose:** • The purpose of this qualification is to train the students in Artificial Intelligence applications and to upskill them and increase their employability in the field of IT/Computer Science • To upgrade the skills of people already in work in Data Science and other allied areas of this technology • Entrepreneurship development.
5	**Body/bodies which will award the qualification**	National Institute of Electronics and Information Technology NIELIT Bhawan, Plot No. 3, PSP Pocket, Sector-8, Dwarka, New Delhi-110077
6	**Body which will accredit providers to offer courses leading to the qualification**	National Institute of Electronics and Information Technology NIELIT Bhawan, Plot No. 3, PSP Pocket, Sector-8, Dwarka, New Delhi-110077

7	**Whether accreditation/affiliation norms are already in place or not, if applicable (if yes, attach a copy)**	NA
8	**Occupation(s) to which the qualification gives access**	AI Engineers, AI Application Developer, AI Analyst, AI Specialist, Software Engineer
9	**Job description of the occupation**	• **AI Engineer:** Artificial intelligence engineers are responsible for developing, programming and training the complex networks of algorithms that make up AI so that they can function like a human brain. This role requires combined expertise in software development, programming, data science and data engineering • **AI Specialist:** One role for an AI specialist is to program computers to test hypotheses in relation to how the human mind works, through cognitive simulation • **Software Engineer:** AI Engineers build, test, and deploy AI models, as well as maintain the underlying AI infrastructure. They are problem-solvers who can navigate between traditional software development and machine learning implementations.
10	**Licensing requirements**	NA

11	**Statutory and Regulatory requirement of the relevant sector (documentary evidence to be provided)**	NA
12	**Level of the qualification in the NSQF**	Level 4
13	**Anticipated volume of training/learning required to complete the qualification**	90 Hours
14	**Indicative list of training tools required to deliver this qualification**	Attached in Annexure 5
15	**Entry requirements and/or recommendations and minimum age**	Pursuing Final Year Polytechnic Diploma in Computer Science/ IT **or** 2nd Year B.E/B.Tech in any discipline **or** NSQF Aligned L4(AI/ML/Data Science/Data Analytics) **or** PGDCA **or** 3rd semester MCA/MSC(CS/IT) **or** Pursuing NIELIT A Level(IT)
16	**Progression from the qualification (Please show Professional and academic progression)**	**Professional:** AI Application Developer (AI)->Senior AI Application Developer (AI)->Tech Lead AI Application Developer (AI). **Academic**: i) Horizontal: Courses in the area of machine learning, python programming, data science ii)Vertical: Post graduate diploma in Data Science, M. Tech in Data Science

17	**Arrangements for the Recognition of Prior learning (RPL)**	Presently only candidates who undergo training shall be assessed. It will be incorporated once RPL strategy is finalized
18	**International comparability Where known (research evidence to be provided)**	NA
19	**Date of planned review of the Qualification.**	After Every 5 years
20	**Formal structure of qualification**	

Module Code	Module Name	Mandatory/ Optional	Estimated Size (Learning Hours)	Level
1	Primer Concepts	Mandatory	2 Hours	Level 4
2	Getting Started	Mandatory	3 Hours	Level 4
3	Natural language Processing	Mandatory	5 Hour	Level 4
4	NLTK Package	Mandatory	7 Hour	Level 4
5	Time Series Data	Mandatory	6 Hour	Level 4
6	Speech Recognition	Mandatory	5 Hour	Level 4
7	Heuristic Search	Mandatory	5 Hour	Level 4
8	Gaming	Mandatory	6 Hour	Level 4
10	Reinforcement learning	Mandatory	10 Hour	Level 4
11	Genetic Algorithms	Mandatory	5 Hour	Level 4
12	Computer Vision	Mandatory	12 Hour	Level 4
13	Deep Learning	Mandatory	24 Hour	Level 4

SECTION 1

ASSESSMENT

21	**Body/Bodies which will carry out assessment:** The Examination Wing National Institute of Electronics and Information Technology NIELIT Bhawan, Plot No. 3, PSP Pocket, Sector-8, Dwarka, New Delhi-110077

22	**How will RPL assessment be managed and who will carry it out?** RPL Policy will be described as and when available**.**
23	**Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, reliable and fair and show that these are in line with the requirements of the NSQF.** ASSESSMENT GUIDELINE: The candidate shall be assessed for his learnings about Fundamental of AI, Components of AI, Applications of AI in various fields • Criteria for assessment based on each learning outcome, will be assigned marks proportionately to its importance. • Assessment comprises the following components: o Exercises carried out in labs o Theory and practical exam Attendance and punctuality

24. ASSESSMENT EVIDENCE

Title of Unit/Component:

Outcomes to be assessed	**Assessment Criteria for the outcome**	**Means of Assessment**		
		Total Marks	**Written**	**Practical**
Time Series Data	Pandas, Analyzing Time Series Data, HMM	**20**	**15**	**5**
Natural Language Processing and Speech Recognition	NLP, NLTK Package, Visualizing and extracting features from Audio Signals	**30**	**20**	**10**
AI Implementation	Gaming Algorithms and Reinforcement Learning	15	10	5
	Implementing Solutions using	15	10	5

	Genetic Algorithms			
	Total	**30**	**20**	**10**
Computer Vision	Implementing algorithms, and analyzing the results for a computer vision problem	30	15	15
	Total	**30**	**15**	**15**
Deep Learning	ANN and CNN	25	15	10
	Deep Learning Applications	25	15	10
	Total	**50**	**30**	**20**
Internal Assessment		**20**	**0**	**20**
Assignment		**20**	**0**	**20**
Total Marks		**200**	**100**	**100**

Means of assessment

S. No	Examination Pattern	Modules Covered	Duration in Minutes	Maximum Marks
1	Theory	3-13	60	60
3	Practical	3-13	120	90
4	Internal Assessment	3-13	-	20
5	Assignment	3-13	-	30

Total	**200**

Note:

1. Pass percentage would be 50% marks in each component, with aggregate pass percentage of 50% and above.
2. Grading will be as under:

Grade	**S**	**A**	**B**	**C**	**D**
Marks Range (in %)	>85%	75%-84%	65%-74%	55%-64%	50%-54%

3. Theory examination would be conducted online and the paper comprise of MCQ and each question will carry 1 mark.
4. Practical examination/Internal Assessment/Assignment would be evaluated internally.
5. Candidate may apply for re-examination within the validity of registration.
6. The examinations would be conducted in English Language only.

SECTION 2

25. EVIDENCE OF LEVEL

Title : Foundation course in Artificial Intelligence Applications- Level 4			**Level : 4**
NSQF Domain	**Outcomes of the Qualification/Component**	**How the job role relates to the NSQF Level Descriptors**	**NSQF Level**
Process required	Apply AI in different Fields like Machine Learning, Natural Language Processing, Computer Vision, Speech Recognition, Time Series Analysis, Gaming, Supervised Learning, Unsupervised learning, Deep Learning using Python	The job holder is expected to perform his/her work with well-developed skill in Applying AI and its components in different fields using Python	4
Professional knowledge	Apply and analyze the different packages available in Python for AI and it applications in different fields.	The job holder is expected to know the different packages and libraries available in Python for Applying AI and its components in different	4

		fields like Machine Learning, Natural Language Processing, Compute Vision, Speech Recognition, Time Series Analysis, Gaming, Supervised Learning, Unsupervised learning, Deep Learning.	
Professional skill	Selection of Appropriate library and packages available in Python for Applying AI and its components in different fields like Machine Learning, Natural Language Processing, Compute Vision, Speech Recognition, Time Series Analysis, Gaming, Supervised Learning, Unsupervised learning, Deep Learning and resolving errors during compile time and run time while applying these libraries and packages.	The job holder is expected to have cognitive and practical skill in Python and various libraries and packages available in Python for Application of AI and its components.	4
Core skill	Building AI applications and Models using Python.	The job holder is expected to have full knowledge of Libraries and packages which are available in Python to completely apply AI and its components in various fields like Machine Learning, Natural Language Processing, Compute Vision, Speech Recognition, Time Series Analysis, Gaming, Supervised learning,	4

		Unsupervised learning, Deep Learning	
Responsibility	Apply the different libraries and packages available in python for building right applications and models of AI and its components in Machine Learning, Natural Language Processing, Compute Vision, Speech Recognition, Time Series analysis, Gaming, Supervised Learning, unsupervised learning, Deep Learning etc.,	The job holder is expected to complete assigned tasks and IPR of organization & customers. He/she is expected to undertake on-the-job learning and participate in training and development, interventions and assessments Hence the individual working in this job role has complete responsibility for delivering quality of his own work & some responsibility for others works too and can be placed at level 5 And contribute in achieving the industry's profit margin.	4

NSQF QUALIFICATION FILE

SECTION 3

EVIDENCE OF NEED

26	**What evidence is there that the qualification is needed?** Attached in Annexure 2
27	**What is the estimated uptake of this qualification and what is the basis of this estimate?** Estimated uptake is 30 students per Batch with 4 Batches per Year and on the basis of Facilities and Infrastructure in respective NIELIT Centre.
28	**What steps were taken to ensure that the qualification(s) does (do) not duplicate already existing or planned qualifications in the NSQF? Give justification for presenting a duplicate qualification** The qualification is originally designed by curriculum head, industrial expert, and academic professional experts. The work group under the guidance of curriculum development committee already conducted desk search as well as refers the qualification packs for as a supporting document for the mapping of curriculum. As per the search it is found that, no duplicate Certificate course in Artificial Intelligence Analyst is existing in the NQR as on date
29	**What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated? Specify the review process here** Based on feedback by participants, employers and based on market survey the qualification will be reviewed in every 5 years.

SECTION 4

EVIDENCE OF PROGRESSION

30	**What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?** This qualification has been designed in consultation with industry and domain expert keeping in mind today's need. Qualification file is finalized after discussion and modification through internal committees of NIELIT. Evaluation criteria have been added to ensure progression to related path ways identified as per career path