QUALIFICATION FILE – Micro Credentials

Basics of 3D Printing

☒ Public ☐ Private

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

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

NCrF/NSQF Level: 2.5

Submitted By:

Automotive Skills Development Council
E-113, Okhla Industrial Area, Phase – III,
New Delhi – 110020

Table of Contents

Section 1: Basic Details

<table>
<tr><td>1.</td><td>Micro Credential-Qualification Name</td><td colspan="2">Basics of 3D Printing</td></tr>
<tr><td>2.</td><td>Sector/s</td><td colspan="2">Automotive</td></tr>
<tr><td>3.</td><td>National Qualification Register (NQR) Code & Version (Will be issued after NSQC approval.)</td><td>NM-2.5-AU-03832-2025-V1-ASDC</td><td>4. NCrF/NSQF Level: 2.5</td></tr>
<tr><td>5.</td><td>Brief Description of the Micro Credential</td><td colspan="2">This micro credential offers an introduction about reverse engineering for product modification, designing of new models by using appropriate computer graphic techniques and 3D printing of designed model for developing the protype of product.</td></tr>
<tr><td>6.</td><td>Eligibility Criteria for Entry for Students/Trainee/Learner/Employee</td><td colspan="2">a. Entry Qualification & Relevant Experience
<table>
<tr><th>S. No.</th><th>Academic/Skill Qualification (with Specialization - if applicable)</th><th>Required Experience (with Specialization - if applicable)</th></tr>
<tr><td>1</td><td>Pursuing 9th Class</td><td></td></tr>
</table>
b. Age: No Minimum age restriction for school education perusing learners.</td></tr>
<tr><td>7.</td><td>Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))</td><td>1</td><td>8. Common Cost Norm Category (I/II/III) (wherever applicable): I</td></tr>
<tr><td>9.</td><td>Any Licensing Requirements/ Pre-requisites for Undertaking Training (wherever applicable)</td><td colspan="2">No Minimum age restriction for school education perusing learners. No pervious certification required.</td></tr>
<tr><td>10.</td><td>Expected Outcomes of the Micro Credential</td><td colspan="2">Terminal learning outcomes are:
• Understand about 3D printing and its applications
• Discuss about reverse engineering and its importance in product development
• Demonstrate process of 3D Printing
• Demonstrate use of 3D printer and scanner</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 colspan="2">☒ Offline Only ☐ Online Only ☐ Blended
<table>
<tr><th>Training Delivery Mode</th><th>Theory (Hours)</th><th>Practical (Hours)</th><th>Total (Hours)</th></tr>
<tr><td>Classroom (offline)</td><td>15</td><td>15</td><td>30</td></tr>
<tr><td>Online</td><td>0</td><td>0</td><td>0</td></tr>
</table>
(Refer Blended Learning Annexure for Details)</td></tr>
</table>

12.	**Assessment Criteria**	<table><tr><th>Theory (Marks)</th><th>Practical (Marks)</th><th>Project (Marks)</th><th>Viva (Marks)</th><th>Total (Marks)</th><th>Passing %age</th></tr><tr><td>15</td><td>25</td><td>10</td><td>0</td><td>50</td><td>70</td></tr></table>
13.	**Is the Qualification Amenable to Persons with Disability**	☐ **Yes** ☒ **No If *"Yes", specify applicable type of Disability:*** NA
14.	**How participation of women will be encouraged?**	Equal employment opportunity is being given in the industry.
15.	**Other Indian Languages in which the Micro Credential will be implemented.**	NA
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:** Mr. Arindam Lahiri **Email:** ceo@asdc.org.in **Contact No.:** 011-42599800 **Website:** https://www.asdc.org.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 relevant sector (in years)** *(as per requirement and NCVET guidelines)*	BE/B.Tech (Mechanical/ Automobile) with 3 years of industry experience and 1 year of training experience in 3D printing
2.	**Master Trainer's Qualification and experience in relevant sector (in years)** *(as per requirement and NCVET guidelines)*	BE/B.Tech (Mechanical/ Automobile) with 5 years of industry experience and 2 years of training experience in 3D printing
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)*	BE/B.Tech (Mechanical/ Automobile) with 4 years of industry experience and 1 year of training experience in 3D printing
2.	**Proctor's Qualification and experience in relevant sector (in years)** *(as per requirement and NCVET guidelines)*	NA
3.	**Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years)** *(as per requirement and NCVET guidelines)*	NA
4.	**Assessment Mode** *(Specify the assessment mode)*	**Mode: ☐ Online Only ☒ Offline Only ☐ Blended**
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 Need of the Micro Credential

As per the NCVET Guidelines for evidence of need, provide the required Annexure/Supporting documents.

1.	Government /Industry initiatives/ requirement (Yes/No): Yes
2.	Number of Industry validation provided: 8
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)*	Attached
2.	**Annexure:** Learning Outcomes and Assessment Criteria *(Mandatory)*	Attached
3.	**Annexure:** Assessment Strategy *(Mandatory)*	Attached
4.	**Annexure:** List of tools and equipment relevant for qualification *(Mandatory – Except in case of online course)*	Attached
5.	**Annexure:** Blended Learning *(Mandatory in case selected mode of delivery is "Blended Learning")*	Attached
6.	**Annexure:** Acronym and Glossary *(Optional)*	Attached

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
Professional Theoretical Knowledge/Process	The individual on the job needs to scan and print the object, carry out reverse engineering for product modification, designing of new models by using appropriate computer graphic techniques.	The individual on the job is responsible for own work and learning. Work in additive manufacturing environment.	2.5
Professional and Technical Skills/ Expertise/ Professional Knowledge	The individual on the job needs to have factual knowledge of: ● Reverse engineering processes. ● 3D Scanning and printing ● Product modification and designing. ● How to read drawing and the output as defined in the drawing.	Factual knowledge of 3D Scanning and printing and use of different designing software.	2.5
Employment Readiness & Entrepreneurship	Recall and demonstrate practical skill to routine and repetitive applications:	Recall and demonstrate practical skill, routine and repetitive in wide range of	2.5

Skills & Mind-set/Professional Skill	• Reverse engineering processes. • 3D Scanning and printing. • Validity checks of product design • Recognise a workplace problem or a potential problem and take action.	application, using appropriate rule and tool, using quality concepts.	
Broad Learning Outcomes/Core Skill	The user individual on the job needs to have written and oral communication skills like: • Read and interpret symbols given in software. • Read engineering drawings, sketches.	Language to communicate written or oral, with required clarity, skill to basic arithmetic and algebraic principles, basic understanding of social political and natural environment.	2.5
Responsibility	The individual on the job needs to know their own responsibility of scan and print the object, carry out reverse engineering for product modification.	The individual on the job is responsible for own work and fully responsible for other's work and learning.	2.5

Annexure: Learning Outcomes and Assessment Criteria

Detailed learning outcomes and assessment criteria for the qualification are as follows:

S. No.	Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
1	Discuss about course and automobile industry.	3	0	0	1
2	Understand about 3D printing and reverse engineering.	3	6	0	2
3	Understand about various 3D printing technologies.	4	7	0	3
4	Demonstrate process of 3D printing and scanning.	5	12	0	4
Total Marks		**15**	**25**	**0**	**10**

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.

Assessment will be based on the concept of Independent Assessors empaneled with Assessment Agencies, identified, selected, trained and certified on Assessment techniques. These assessors would be aligned to assess as per the laid down criteria.

Assessment Agency would conduct assessment only at the training centres of Training Partner or designated testing centers authorized by ASDC.

Ideally, the assessment will be a continuous process comprising of three distinct steps:

A. Mid- term assessment

B. Term / Final Assessment

Each National Occupational Standard (NOS) in the respective QPs will be assigned weightage. Therein each Performance Criteria in the NOS will be assigned marks for theory and / or practical based on relative importance and criticality of function.

This will facilitate preparation of question bank / paper sets for each of the QPs. Each of these papers sets / question bank so created by the Assessment Agency will be validated by the industry subject matter experts through ASDC, especially with regard to the practical test and the defined tolerances, finish, accuracy etc.

The following tools are proposed to be used for final assessment:

a) **Written Test**: This will comprise of
   I. True / False Statements
   II. Multiple Choice Questions
   III. Matching Type Questions. Online system for this will be preferred.

b) **Practical Test:** This will comprise a test job to be prepared as per project briefing following appropriate working steps, using necessary tools, equipment and instruments. Through observation it will be possible to ascertain candidate's aptitude, attention to details, quality consciousness etc. The end product will be measured against the pre-decided MCQ filled by the Assessor to gauge the level of his skill achievements.

c) **Structured Interview:** This tool will be used to assess the conceptual understanding and the behavioral aspects as regards the job role and the

specific task at hand.

Annexure: Tools and Equipment

List of Tools and Equipment

Batch Size: 30

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1	CAD/ CAM Software's (CATIA, Auto-CAD, Unigraphics)	As per requirement	15 License
2	MS-Office	As per requirement	15 License
3	3D Printer and Scanner	As per requirement	1
4	Power Backup	As per requirement	1
5	Measuring tools	As per requirement	10 Sets
6	Drawing tools	As per requirement	10 Sets
7	Fire Extinguisher	As per requirement	2
8	Safety Gloves (Rubber)	As per requirement	30
9	Ear Plugs	As per requirement	30
10	Safety Shoes	As per requirement	30

Classroom Aids:

The aids required to conduct sessions in the classroom are:

1. Whiteboard and marker
2. Projector
3. Laptop
4. Internet

Annexure: Industry Validations Summary

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile *(if available)*
1	Celica Automotive Pvt Ltd.	Archa Halder	Technical Manager	cet@citroen-celica.com			
2	Frostees India Pvt. Ltd.	Sauvik Bera	Director	bera.sauvik@frostees.in			
3	Hind Hydrolics and Engineers	Amit	Head HR	hr@hindhydrolicspvtltd.com			
4	Khokan Motors Works Pvt Ltd.	Amiya Sindhu Sarkar	Service Manager	amiyas14@gmail.com			
5	Premier Car Works Pvt. Ltd.	Sibdas Roy	In House Trainer	iht@premiergroup.in			
6	MEGA CORPSOL LLP	Dhairyasheel Desai	Director	info@megacorpsol.com			
7	Victoria Industries	Saroj Kumar	Training Head	Training@victoraindustries.com			
8	VIBRANT MOTORS PVT LTD	Subir Dutta	Service Manager	duttasubir666@gmail.com			

Annexure: Training Details

Training Projections:

Year	Estimated Training # of Total Candidates	Estimated training # of Women	Estimated training # of People with Disability
2024-25	500	200	50
2025-26	1000	400	100
2026-27	1500	600	150

Data to be provided year-wise for next 3 years.

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	☒ Theory/ Lectures - Imparting theoretical and conceptual knowledge	• Books/ e-books • Presentations • Reference Material • Audio / Video Modules	
2	☒ Imparting Soft Skills, Life Skills and Employability Skills /Mentorship to Learners	• Self-Learning Videos • Broadcasts • Mobile Learning • Curated Digital content	
3	☒ Showing Practical Demonstrations to the learners	• Video Content • E-Resource library • AR/VR/XR	
4	☒ Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training	• Training tools (tools list attached) • Video Play • Presentations	
5	☒ Tutorials/ Assignments/ Drill/ Practice	• Online Question Bank • Mobile Quick test app • MCQ based tests	
6	☒ Proctored Monitoring/ Assessment/ Evaluation/ Examinations	• Assessment engine for Essays • Up-loadable file examinations • Mock test sessions	
7	☒ On the Job Training (OJT)/ Project Work Internship	• Online tests • Offline assessments	

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
NQR	National Qualification Register
NSQF	National Skills Qualifications Framework
OJT	On the Job Training
CAD/CAM	Computer-aided design and computer-aided manufacturing
CAE	Computer-aided engineering

Glossary

Term	Description
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 based on their main economic function, product, service or technology.