

**NSQF QUALIFICATION FILE**

**Approved in 20<sup>th</sup> NSQC Meeting – NCVET-Dated 30 June 2022**

**NCVET Code**

**2022/CCM/KSDC/05931**

**CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE**

**Karnataka Skill Development Corporation**

**Name and address of submitting body:**

**3rd Floor, Koushalya Bhavan, Dairy Circle, Bengaluru, Karnataka 560029**

**Name and contact details of individual dealing with the submission**

**Name: Shri Ashwin Danappa Gowda**

**Position in the organisation: Managing Director**

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**List of documents submitted in support of the Qualifications File**

**1. Curriculum**

**2. Industry validation form**

**Model Curriculum to be added which will include the following:**

- **Indicative list of tools/equipment to conduct the training**
- **Trainers qualification**
- **Lesson Plan**
- **Distribution of training duration into theory/practical/OJT component**

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<b>1</b>	<b>Qualification Title</b>	Advanced CNC Machining Technician (Rotary 4th Axis and 5th Axis Mill)
<b>2</b>	<b>Qualification Code, if any</b>	TBD
<b>3</b>	<b>NCO code and occupation</b>	7223.5001 - Machining Technician/CNC Operator 7223.5002 - CNC Operator – Machining Technician 7223.5003 - CNC Operator – Machinist 7223.5004 - CNC Operator - Vertical Machining Centre 7223.5005 - CNC Setter cum Operator – VMC 7223.6001 - CNC Setter-cum-Operator – Turning 7223.6002 - CNC Operator – Turning 7223.6003 - CNC Programmer 7223.0502 - Machine Shop Supervisor
<b>4</b>	<b>Nature and purpose of the qualification (Please specify whether qualification is short term or long term)</b>	<p>This course is designed to develop skills in operations &amp; programming of Advanced CNC 4th &amp; 5th Axis Milling Machines.</p> <p>It provides hands on experience on Basic and Advanced 4th &amp; 5th Axis Milling Machines irrespective of whether the 4<sup>th</sup> and 5<sup>th</sup> Axis are on the Machine Head or on Rotary and Tilting Table. It also acquaints them with various aspects such as feed, depth of cut, cutting speed, cutter selection, cutter radius compensation, Tool wear compensations, parametric programming, sister tool concept etc. After successfully completing the course and obtaining requisite certification, the students will become 'CNC Milling Operator / Programmer and would find job opportunities in manufacturing roles across machine tool manufacturing companies, automotive, defence, aerospace, locomotive, construction, consumer goods, etc. Industries</p>
<b>5</b>	<b>Body/bodies which will award the qualification</b>	Karnataka Skill Development Corporation
<b>6</b>	<b>Body which will accredit providers to offer courses leading to the qualification</b>	Karnataka Skill Development Corporation

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<b>7</b>	<b>Whether accreditation / affiliation norms are already in place or not, if applicable (if yes, attach a copy)</b>	NO
<b>8</b>	<b>Occupation(s) to which the qualification gives access</b>	Own start up and applicable to all the industries using CNC machines.  Machining Technician, CNC Operator - Vertical Machining Centre, CNC Programmer, Machine Shop Supervisor
<b>9</b>	<b>Job description of the occupation</b>	Candidate will be creating CNC Milling machine (Rotary 4th Axis and 5th Axis Mill) programs and operate the Vertical Milling Machines. The main duties of the CNC Operator / Technician are: <ul style="list-style-type: none"><li>● Create CNC Milling Part Program with the inputs of Engineering Drawing of the part including GD&amp;T as applicable</li><li>● Offset setting</li><li>● Perform TPM</li><li>● Create a part program (manual or using a cam software)/ Edit existing program</li><li>● Part Program Simulation</li><li>● Define cutting parameters</li><li>● Optimize cycle time</li><li>● Verify the tool path / Program.</li><li>● Prove out CNC Milling part program (single block/Dry run) &amp; modify it if required.</li><li>● And finally inspect the Job as per the specifications and correct the dimensions if required.</li></ul>
<b>10</b>	<b>Licensing requirements</b>	Not Applicable
<b>11</b>	<b>Statutory and Regulatory requirement of the relevant sector (documentary evidence to be provided)</b>	Not Applicable

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12	<b>Level of the qualification in the NSQF</b>	Level 4
13	<b>Anticipated volume of training/learning required to complete the qualification</b>	390 Hours
14	<b>Indicative list of training tools required to deliver this qualification</b>	<ul style="list-style-type: none"> <li>• CNC Milling machine</li> <li>• Computer</li> <li>• CAM software.</li> <li>• CNC milling tools</li> <li>• Tool catalogues</li> <li>• Measuring instruments</li> </ul>
15	<b>Entry requirements and/or recommendations and minimum age</b>	<p>8th Class Pass + ITI (2 years experience in relevant field) OR 10th Class Pass + ITI (1 year experience in relevant field after Class 10th) OR 10th Class Pass + ITI (2 years after Class 10th) - No experience required OR 3 Year Diploma (After 10th) OR 12th Class Pass + 6 months experience in relevant field OR Previous relevant Qualification of NSQF Level 3 + 2 year experience in relevant field</p> <p>Minimum Age: 16 Years</p>
16	<b>Progression from the qualification (Please show Professional and academic progression)</b>	On successful completion of the tasks and gaining the required knowledge pertaining to industry, will be promoted to Operator, Operator cum programmer, Sr. programmer, Supervisor, Sr. Supervisor, Assistant Manager.

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		<p>In the academic field the carrier can be started as trainer promoting to Assistant Trainer, Trainer, Sr. Trainer, Supervisor - Training, Sr. Supervisor - Training, Assistant Manager- Training.</p>	
17	<b>International comparability where known (research evidence to be provided)</b>	Not Applicable	
18	<b>Date of planned review of the qualification</b>	3 years after approval of the Qualification	
19	<b>Formal structure of the qualification</b>		
	<b>Mandatory components</b>		
	<b>Title of component and identification code/NOSs/Learning outcomes</b>	<b>Estimated size (Learning hours)</b>	<b>Level</b>
	i. Comply with workshop health and safety guidelines	5	4
	ii. Understand and apply principles of Basics of Engineering Design, Mathematics, system of measurements, Measurements and Tools, Machining, various types of material used in industries.	20	4
	iii. Understand Manufacturing Drawings, GD&T, Manufacturing Processes. Importance of Quality in Manufacturing.	20	4
	iv. Optimizing cutting tool parameters and application of cutting fluid and machine lubrication.	20	4
	v. Operation of Rotary 4th Axis and 5th Axis milling centre.	20	4

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vi.	selection and maintenance of tool and measuring equipment.	35	4
vii.	Machine programming and simulation of machine tool path.	40	4
viii.	Selection of material, tools also support the operations, maintenance and safety.	40	4
ix.	Prove out CNC part program and inspection of machined components using measuring instruments.	40	4
x.	Assignments (Based on case studies and Industrial application)	60	4
xi.	Mini Project (Based on Industrial application)	90	4
	<b>Sub Total (A)</b>	<b>390</b>	<b>4</b>
<b>Optional Components</b>			
	<b>Title of component and identification code/NOSs/Learning outcomes</b>	<b>Estimated size (Learning hours)</b>	<b>Level</b>
	<b>Sub Total (B)</b>		
	<b><u>Total (A+B)</u></b>	<b>390</b>	<b>4</b>

**SECTION 1****ASSESSMENT**

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20	<b>Body/Bodies which will carry out assessment: Sector Aligned to</b>  Capital Goods Skill Sector Council
21	<b>How will RPL assessment be managed and who will carry it out?</b>  RPL Assessments are carried out according to the norms provided by the Capital Goods Skill Sector Council and managed by KSDC.
22	<b>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.</b>  Will follow the Assessment criteria set by Capital Goods Skill Sector Council and will ensure that assessment is always valid, reliable and fair and show that these are in line with the requirements of the NSQF.

Please attach most relevant and recent documents giving further information about assessment and/or RPL.

Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

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### ASSESSMENT EVIDENCE

Complete a grid for each component as listed in “Formal structure of the qualification” in the Summary.

*NOTE: this grid can be replaced by any part of the qualification documentation which shows the same information – i.e., Learning Outcomes to be assessed, assessment criteria and the means of assessment.*

#### 23. Assessment evidences

**Title of Component: Advanced CNC Machining Technician (Rotary 4th Axis and 5th Axis Mill)**

Outcomes to be assessed/NOSs to be assessed	Assessment criteria for the outcome
Comply with workshop health and safety guidelines.	<ul style="list-style-type: none"><li>• Demonstrate compliance with safety, health, security and environment related regulations/ guidelines as per organizational / manufacturer's policy.</li><li>• Demonstrate carrying out maintenance operations as per the manufacturer and workshop related health and safety guidelines / standard operating procedures (SOPs).</li><li>• Follows safety regulations and procedures with regard to service hazards and risks SOPs.</li><li>• Uses appropriate protective clothing / equipment for specific tasks and work conditions as per the service manual.</li><li>• Records and reports details related to operations, incidents or accidents, as applicable.</li></ul>
Understand and apply principles of Basics of Engineering Design, Mathematics, system of measurements, Measurements and Tools, Machining, various types of material used in industries.	<ul style="list-style-type: none"><li>• Fractions, Decimals, Cartesian Geometry and Order of Operations on Conversions from Metric to Imperial and vice versa, Reading Instruments like Vernier Calipers, Micrometer, Height Gauge, etc.</li><li>• Exercises on Drilling, Reaming, Tapping, Turning, facing, grooving, parting, Threading.</li><li>• Exercises on various types of material used in industries.</li></ul>
Understand Manufacturing Drawings, GD&T, Engineering	<ul style="list-style-type: none"><li>• Exercises on reading component drawings</li><li>• Exercises on GD&amp;T</li></ul>



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Materials, Manufacturing Processes. Importance of Quality in Manufacturing.	<ul style="list-style-type: none"><li>● Exercises on different Engineering Materials &amp; their properties.</li><li>● Exercise on product surface quality by selecting various tool radius &amp; federate.</li></ul>
Optimizing cutting tool parameters and application of cutting fluid and machine lubrication.	<ul style="list-style-type: none"><li>● Displays modifying cutting tool parameters like speed, feed, depth of cut etc. for optimization of cutting conditions.</li><li>● Is seen mixing water and coolant in the cutting fluid tank to maintain proper Cutting fluid concentration. Also, maintaining proper machine lubrication oil level.</li><li>● Understands different Material properties and their machining impacts.</li></ul>
Operation of Rotary 4th Axis and 5th Axis milling centre.	<ul style="list-style-type: none"><li>● Operation of Rotary 4th Axis and 5th Axis milling centre by applying knowledge of coordinate systems machine referencing and other machine features.</li><li>● Makes entries (in controller's registers) cutting tool parameters like tool length and diameter offsets and the ability to manipulate these to achieve proper machining conditions.</li><li>● Creation of programs, editing and executing them on Rotary 4th Axis and 5th Axis milling centre Controller.</li></ul>
Assist in selection and maintenance of tool and measuring equipment.	<ul style="list-style-type: none"><li>● Demonstrates proper selection of cutting tools and holders as defined in the CNC Sheet from Programming department.</li><li>● Proper operation of control panel keys and functions.</li><li>● Creation of programs, editing and executing them on Rotary 4th Axis and 5th Axis milling centre Controller.</li><li>● Identifies appropriate user settings.</li><li>● Assists in quality control process and handling of measuring instruments.</li></ul>
Assist in machine programming and simulation of machine tool path.	<ul style="list-style-type: none"><li>● Is able to convert very simple 2D / 3D / Drilling-Reaming-Boring product models to a CNC Program (G-Codes, M Codes format) by using Manual Part Programming techniques.</li></ul>

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	<ul style="list-style-type: none"><li>● Assists in execution of different modes of programme execution. (Single block, dry run, MDI &amp; Auto).</li><li>● Is able to create solid / surface 3D models in CAD/CAM software.</li><li>● Exhibits ability to create machining operations in CAM software, carry out material removal simulation and ability to analyse and take corrective actions for collisions, gouges and left-over material.</li><li>● Is able to generate from CAM software, 4 / 5 Axis CNC Machining Programs for the particular Controller on the machine.</li><li>● Assists in simulation and analysis for further optimization.</li><li>● Assists in creation of final program for milling operation with all defined parameters.</li></ul>
Selection of material, tools etc. and also support the operations, maintenance and safety.	<ul style="list-style-type: none"><li>● Selection of process parameters as per application of the product by using standard guidelines.</li><li>● Selection of tools as per the material, type of the operation and the output required, by using standard guidelines.</li><li>● Perform milling machine operations.</li><li>● Provides support in exploring optimum tool paths, improving process parameters, optimization of material removal rate etc.</li></ul>
Prove out CNC part program and inspection of machined components using measuring instruments.	<ul style="list-style-type: none"><li>● Exercise on run the NC program on CNC Milling machine &amp; prove the part.</li><li>● Exercise on measurement parts by using Vernier caliper &amp; micrometer.</li></ul>
<p><b>Means of assessment 1</b></p> <p>The assessment is carried out as below:</p> <p>On course Assessment carried out during the course period: By providing assignments and surprise tests.</p> <p>Theory Examination by means of MCQ and written test.</p> <p>Practical assessments, Role plays, Demonstrations, Skill tests.</p> <p>Project work carried out, Presentation of work done and VIVA Voce.</p>	

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### Means of assessment 2

The marks allotted for the assessments are as below:

In total, 100 marks are allotted for the Assessments.

SL. No.	Description	Marks allotted (100)
(a)	On course assessment (Assignments)	15
(b)	Theory Examination	20
(c)	Practical Assessment	40
(d)	Project work, Presentation, Viva Voce	25
Total		100

### Pass/Fail Criteria:

Minimum passing marks for the Assessment is 60%. Also, the candidate is declared pass subject to having minimum 80% attendance during the course.

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### SECTION 2

#### 24. EVIDENCE OF LEVEL

##### OPTION A

Title/Name of qualification/component: <b>Advanced CNC Machining Technician (Rotary 4th Axis and 5th Axis Mill)</b>			Level: 4
NSQF Domain	Outcomes of the Qualification / Component	How the outcomes relate to the NSQF level descriptors	NSQF Level
Process	Machine operator is expected to assist to find out the customer needs, Operate Rotary 4th Axis and 5th Axis milling machine, application of tool, jigs and fixture, program and simulation and perform minor repair. Maintain the work area, tools and instruments and ensure good working condition of required tools.	Rotary 4th Axis and 5th Axis milling machine operator operates the machine, knows how to clamp and set the part using jigs, fixtures and other tools, applies his knowledge of customer needs to program and simulate and carry out minor repairs. He also maintains tools and instruments in good working condition.	4
Professional knowledge	Machine operator is expected to have basic knowledge of the different machining operations performed on Rotary 4th Axis and 5th Axis milling centre, identifying customer needs and creating program and simulation. Basic Knowledge of Material, machining process, machining tools, measuring instruments, techniques and methods to ensure the product quality is a must. Generic knowledge of Common Engineering standards, symbols, GD & T to read the Industrial drawing, is also a	Machine Operator has basic knowledge of machining operations such as face milling, end milling, drilling, reaming, boring etc. which are performed on a Rotary 4th Axis and 5th Axis milling centre. He/she has basic knowledge of different types of cutting tools and their material (HSS/Carbide/Cobalt etc.), work piece material (Cast Iron/MS/Work Hardening steels) and their machining parameters, various measuring instrument, engineering drawings – first angle/third angle projections, symbols, GD&T. The designer must assist the product designer in new creation & upgradation of existing product design.	4

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	<p>requirement. Considering the basic professional knowledge, the operator must assist the product designer and developer in new creation &amp; upgradation of existing product.</p>		
Professional skill	<p>Machine operator must assist in new creation &amp; modification in existing machined component as per the customer requirements &amp; engineering standards.</p> <p>Operates the Rotary 4th Axis and 5th Axis milling centre, working on Rotary 4th Axis and 5th Axis milling centre simulation software &amp; also basic repair and maintenance as per the manual.</p> <p>Thus, the operator is able to develop the component for new creation or to upgrade the existing component.</p>	<p>Rotary 4th Axis and 5th Axis milling machine operator knows how to manipulate the tool length and diameter offsets for a 3/4/5 Axis programs to obtain desired results, How to take a dry run of the CNC program, how to rough out unexpected excess raw material, how to use scaling, translation and mirror imaging techniques on the same CNC Program (to produce opposite hand finished parts).</p>	4
Core skill	<p>Machine operator is expected to identify the customer needs, create the machining program, simulate the created program, create machined component as per industry standard, optimize the machining process by further analysing simulation, operate Rotary 4th Axis and 5th Axis milling centre, &amp; ensure the product quality with the help of measuring instruments.</p> <p>If any support is needed follow superior's</p>	<p>The machine operator should be able to communicate with the part designer/programmer/process designer via the media of engineering drawings. He must be able to communicate clearly with his supervisor if he foresees errors in quality of the finished part. He must also appreciate the requirement of finish machining the part within the stipulated hours and the repercussions from top management in case of delays. He must be work with his supervisor as one team and not try to show him down.</p>	4

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	<p>Instructions in the matter. The person is expected to be good in communication skills. Jobholder is expected to conduct himself/herself in ways, which show a basic understanding of the social and professional environment of working at workshops.</p>		
Responsibility	<p>The jobholder is responsible to:</p> <ul style="list-style-type: none"> <li>● Assist to identify the customer needs.</li> <li>● Assist to conduct the market survey.</li> <li>● Assist to create the program and simulations using software.</li> <li>● Assist to create cutting tool parameters for milling job operations</li> <li>● Assist to optimize tool path using software.</li> <li>● Assist in selection of cutting tools and its holders</li> <li>● Assist to operate milling machine operations as per Standard operating procedure &amp; safety guidelines.</li> <li>● Assist in calculation of machine and operator efficiency with help of cycle time</li> <li>● Maintain tools and work area as per safety guidelines of machine maintenance.</li> </ul>	<p>Rotary 4th Axis and 5th Axis milling machine operator must take responsibility for his work. Any mistakes or errors committed by him must be immediately brought to the notice of his supervisor with suggestions on how the machined part can be rectified and rectification action must be taken up by him immediately.</p> <p>The person must continuously strive to further his knowledge by learning routine machine maintenance tasks, generating 4/5 Axis CNC programs using directional cosines or using angles A/B/C, suggesting changes in the Process Sheet to reduce machining time etc.</p>	4

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	<p>He has the limited responsibility for own work and majorly function in close supervision.</p> <p>In his routine activity he is responsible for his own work.</p>		
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### SECTION 3

#### EVIDENCE OF NEED

25	<b>What evidence is there that the qualification is needed? What is the estimated uptake of this qualification and what is the basis of this estimate?</b>	
	<b>Basis</b>	<b>In case of other Awarding Bodies (Institutes under Central Ministries and states departments)</b>
	<b>Need of the qualification</b>	<p>In industry today, 4 / 5 Axis CNC machinist operators, especially those with programming skills and knowledge of advanced machining, are in very high demand.</p> <p>With government's emphasis on "Make in India", Industry 4.0 and increasing globalization, India is fast becoming a global manufacturing hub, next only to China. Through these market trends, competitive landscape, and changing machinist demography, 4 / 5-axis machining is becoming increasingly important in maintaining productivity, profitability, accuracy and competitiveness of machine shops in automotive, aerospace, defence and manufacturing industries.</p> <p>With the skilled labour shortage on the rise, it is vital to attract the younger generation into the machining and manufacturing industry. As a new generation of machinists starts to enter the workforce, it is crucial to understand what they are looking for when it comes to job satisfaction. With industry 4.0, 4 / 5 Axis machining is increasingly leaning towards programming and digitalization, allowing for young machinists to use the technological skills that they have their interest in. 5-axis is becoming increasingly more prominent in training schools, with a nationwide search for 5-axis skilled operators. All these efforts have begun to shift the attitude towards multi-axis machining from being old-fashioned to high tech and cutting edge.</p> <p>Add to this the widening gap between academics and industry. A school/college pass out today has the educational qualifications but no skills and is either of very limited use in the industry or the industry must make a huge investment in upskilling the person.</p> <p>What does that mean exactly? There is more demand, in this area, for 4 / 5 axis milling operators, i.e., there are</p>



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		<p>more jobs than there is a supply of trained and qualified operators.</p> <p>The proposed curriculum is designed in such a way that the candidates will be made ready to suit the requirements of the 4 / 5 Axis machining industry. They will be imparted adequate knowledge to understand engineering drawings and standards, 4 / 5 Axis Machine operation including various controllers, CNC programming techniques, use of CAD/CAM software and latest and best practices used in machining industry.</p>
	<b>Industry Relevance</b>	<p>According to the latest research report from Technavio, the 5-axis CNC machining centres market worldwide is expected to grow by USD 627.30 million at a CAGR of 5.75% from 2021 to 2025. The rise in need for technologically advanced 5-axis CNC machines will also drive the 5-axis CNC machinists market growth during the next few years. The 5-Axis CNC Machining Centres market was valued at USD 3777.4 million in 2020 and is projected to reach USD 5679.8 million by 2027, at a CAGR of 6.0% during the 2021-2027.</p> <p>The machine tool market in India will grow by USD 1.9 billion during 2020-2024, progressing at a CAGR of nearly 13% during the above mentioned period. The machine tool market size in India has the potential to grow by USD 1.9 billion during 2020-2024, according to Technavio.</p> <p>So, we can judge from above market surveys that 5 Axis machining sector has a huge market potential and it will have predictable growth and progress over several years. In coming years, there will be continuous demand for such skills in the industry. This course under discussion will provide assistance to generate such kind of skilled labour for industry.</p> <p>The candidates undergoing this course will acquire adequate knowledge to suit the requirement of the industry. Hence, its relevance to industry is justified.</p>
	<b>Usage of the qualification</b>	<p>This qualification is intended to make the learner a good asset for the industry. The learner will be skilled to such a level that he/she can work in the industry with a minimum supervision. He / She will be trained in such a manner</p>

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		that the person can take up the jobs in a number of domains. Some of the areas the trained candidates will be absorbed in are, automotive, aerospace, healthcare, agricultural equipment manufacturing, heavy machinery, oil and gas, locomotive, construction machinery, manufacturing etc. In these industries they will be equipped to occupy various positions such as machine operator, machine and tool setter, 3 to 5 Axis CNC Programmer, Supervisor etc.
	<b>Estimated uptake</b>	This is a relatively new skill. In India, 4 /5 Axis machining started in the early 1990s. Hence this trade is less than 30 years old. With the Covid-19 situation fading away, the demand for this skill will be very high. Hence, the intake will be very encouraging.

<b>26</b>	<b>Recommendation from the concerned Line Ministry of the Government/Regulatory Body. To be supported by documentary evidences Directorate General of Training</b>
<b>27</b>	<b>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</b>  <b>The AA will ensure the qualifications does not duplicate already existing or planned qualifications in the NSQF.</b>
<b>28</b>	<b>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</b>  <b>AA will have a robust monitoring mechanism to ensure a standard quality &amp; reliable along with the periodic evaluation system</b>

Please attach most relevant and recent documents giving further information about any of the topics above.

Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

**SECTION 4**

**EVIDENCE OF PROGRESSION**

**29** 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?

**Inputs :**

Before designing this course, we gathered inputs from various sources

- Study of various reports pertaining to latest trends in technologies
- Current and future skill needs of Industries
- Manpower requirement
- Interactions and meeting with various industry experts
- Feedbacks from Industries

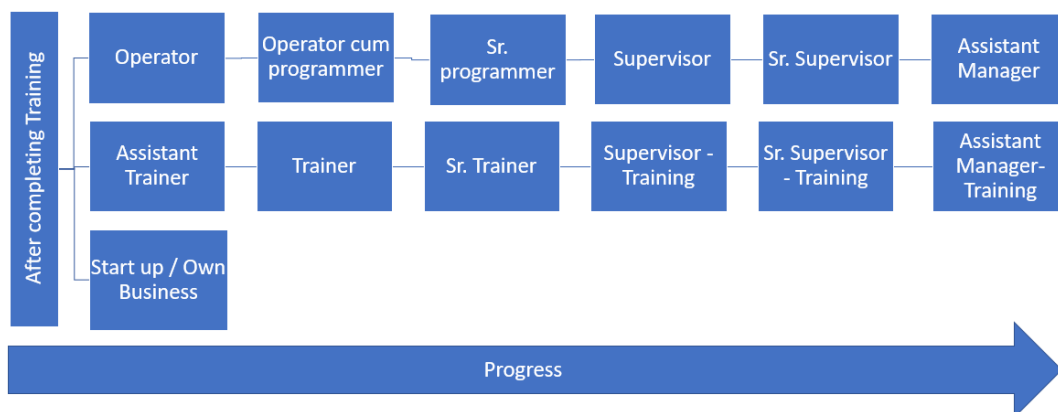
**Analysis :**

These inputs were analyzed thoroughly by the team of internal experts & need gap was identified.

**Outcome :**

The topics were selected based on need gap analysis & subsequently syllabus was formulated in prescribed structure. Timings were assigned to various topics to align proposed course with NSQF Level 3.

On successful completion of the tasks and gaining the required knowledge pertaining to industry, will be promoted to Operator, Operator cum programmer, Sr. programmer, Supervisor, Sr. Supervisor, Assistant Manager.



In the academic field the carrier can be started as trainer promoting to Assistant Trainer, Trainer, Sr. Trainer, Supervisor - Training, Sr. Supervisor - Training, Assistant Manager- Training .

Please attach most relevant and recent documents giving further information about any of the topics above.

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