

QUALIFICATION FILE

<Computer Aided Tool & Die Design Engineer>

☒ Short Term Training (STT) ☐ Long Term Training (LTT) ☐ Apprenticeship

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

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

NCrF/NSQF Level: 6

Submitted By:

< Capital Goods and Strategic Skill Council >

< 39, 1st Floor, Samyak Tower, Pusa Road, New Delhi-110005 >

Section 1: Basic Details

1.	Qualification Name	Computer Aided Tool & Die Design Engineer																	
2.	Sector/s	Capital Goods and Manufacturing																	
3.	Type of Qualification: ☒ New ☐ Revised ☐ Has Electives/Options ☐ OEM	NQR Code & version of existing/previous qualification: <i>(change to previous, once approved)</i>		Qualification Name of existing/previous version:															
4.	a. OEM Name b. Qualification Name <i>(Wherever applicable)</i>																		
5.	National Qualification Register (NQR) Code &Version <i>(Will be issued after NSQC approval)</i>	QG-06-IT-04203-2025-V1-CGSC v1.0	6. NCrf/NSQF Level: 6																
7.	Award (Certificate/Diploma/Advance Diploma/ Any Other) <i>(Wherever applicable specify multiple entry/exits also & provide details in annexure)</i>	Certificate																	
8.	Brief Description of the Qualification	A Computer Aided Tool & Die Design Engineer is a professional who uses computer software to design tools and molds that are used in manufacturing processes.																	
9.	Eligibility Criteria for Entry for Student/Trainee/Learner/Employee	a. Entry Qualification & Relevant Experience: <table border="1"> <thead> <tr> <th>S. No.</th> <th>Academic/Skill Qualification (with Specialization - if applicable)</th> <th>Required Experience (with Specialization - if applicable)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4th year UG</td> <td>Not required</td> </tr> <tr> <td>2</td> <td>UG diploma</td> <td>3 years of relevant experience</td> </tr> <tr> <td>3</td> <td>Previous relevant qualification of NSQF level 5.5</td> <td>1.5 years of relevant experience</td> </tr> <tr> <td>4</td> <td>Previous relevant qualification of NSQF Level 5</td> <td>3 years of relevant experience</td> </tr> </tbody> </table>			S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)	1	4th year UG	Not required	2	UG diploma	3 years of relevant experience	3	Previous relevant qualification of NSQF level 5.5	1.5 years of relevant experience	4	Previous relevant qualification of NSQF Level 5	3 years of relevant experience
S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)																	
1	4th year UG	Not required																	
2	UG diploma	3 years of relevant experience																	
3	Previous relevant qualification of NSQF level 5.5	1.5 years of relevant experience																	
4	Previous relevant qualification of NSQF Level 5	3 years of relevant experience																	

		b. Age: N/A																							
10.	Credits Assigned to this Qualification, Subject to Assessment <i>(as per National Credit Framework (NCrF))</i>	22	11. Common Cost Norm Category (I/II/III) <i>(wherever applicable):</i> I																						
12.	Any Licensing requirements for Undertaking Training on This Qualification <i>(wherever applicable)</i>																								
13.	Training Duration by Modes of Training Delivery <i>(Specify Total Duration as per selected training delivery modes and as per requirement of the qualification)</i>	☒ Offline ☐ Online ☐ Blended <table border="1"> <thead> <tr> <th>Training Delivery Modes</th><th>Theory (Hours)</th><th>Practical (Hours)</th><th>OJT Mandatory (Hours)</th><th>Viva (Hours)</th><th>Total (Hours)</th></tr> </thead> <tbody> <tr> <td>Classroom (offline)</td><td>164</td><td>346</td><td>150</td><td>-</td><td>660</td></tr> <tr> <td>Online</td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> <i>(Refer Blended Learning Annexure for details)</i>						Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	Viva (Hours)	Total (Hours)	Classroom (offline)	164	346	150	-	660	Online					
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Classroom (offline)	164	346	150	-	660																				
Online																									
14.	Aligned to NCO/ISCO Code/s <i>(if no code is available mention the same)</i>	2512.0203																							
15.	Progression path after attaining the qualification <i>(Please show Professional and Academic progression)</i>	- CAD/CAM Specialist-Level-7 - Manufacturing Operations Manager-Level-6.5																							
16.	Other Indian languages in which the Qualification & Model Curriculum are being submitted																								
17.	Is similar Qualification(s) available on NQR-if yes, justification for this qualification	☐ Yes ☒ No URLs of similar Qualifications:																							
18.	Is the Job Role Amenable to Persons with Disability	☐ Yes ☒ No If "Yes", specify applicable type of Disability:																							
19.	How Participation of Women will be Encouraged	Yes via College or Industry engagement																							
20.	Are Greening/ Environment Sustainability Aspects Covered <i>(Specify the NOS/Module which covers it)</i>	☐ Yes ☒ No To be incorporated later																							
21.	Is Qualification Suitable to be Offered in Schools/Colleges	Schools ☐ Yes ☐ No Colleges ☒ Yes ☐ No																							

22.	Name and Contact Details of Submitting / Awarding Body SPOC (In case of CS or MS, provide details of both Lead AB & Supporting ABs)	Name: Hitesh Email : technicaladvisors@cgssc.org Website: www.cgssc.org	Contact No.: +91-8882907092
23.	Final Approval Date by NSQC: 8th May 2025	24. Validity Duration: 3 Years	25. Next Review Date: 8th May 2028

Section 2: Module Summary

NOS/s of Qualifications

(In exceptional cases these could be described as components)

Mandatory NOS/s:

Specify the training duration and assessment criteria at NOS/ Module level. For further details refer curriculum document.

Th.-Theory Pr.-Practical OJT-On the Job Man.-Mandatory Training Rec.-Recommended Proj.-Project Vi-Viva

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/Non-Core	NCrF /NS QF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weight age (%) (if applicable)
1.	Bridge Module & Lead the Design Team on 3D models of tools, dies, and molds using CAD	CSC/N0471 : Version No. – 1.0	Core	6	3	30	60	-	-	90	40	40	-	20	100	25

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/Non-Core	NCrF /NS QF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weight age (%) (if applicable)
	/ CAM software as per Design Requirements.															
2.	Oversee the Development of tool Designs (using FEA) and dies by generating tool paths and machining instructions.	CSC/N0472 : Version No. – 1.0	Core	6	6	34	86	60	-	180	40	40	-	20	100	25
3.	Manage the Team to Operate CNC machines to fabricate tooling components and perform Inspection to ensure they meet design specifications and quality standards	CSC/N0473 : Version No. – 1.0	Core	6	7	36	84	90	-	210	40	40	-	20	100	25
4.	Employability Skills (60 hours)	DGT/VSQ/N 0102-NOS Version No. – 1.0	Non Core	6	2	24	36			60	40	40	-	20	100	5
5.	Collaboratively coordinate with the team.	CSC/N1339 , v1.0	Non-Core	6	3	30	60	-	-	90	40	40	-	20	100	10

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/Non-Core	NCrF /NS QF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
6.	Maintain Health, Safety and Environment at workplace.	CSC/N0505, v1.0	Non-Core	6	1	10	20	-	-	30	40	40	-	20	100	10
Duration (in Hours) / Total Marks					22	164	346	150		660	240	240	-	120	600	100

Elective NOS/s:

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/Non-Core	NCrF/NS QF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
1.																
2.																
Duration (in Hours) / Total Marks																

Optional NOS/s:

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/Non-Core	NCrF/NS QF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
1.																
2.																
Duration (in Hours) / Total Marks																

Assessment - Minimum Qualifying Percentage

Please specify **any one** of the following:

Minimum Pass Percentage – Aggregate at qualification level: 70 % (Every Trainee should score specified minimum aggregate passing percentage at qualification level to successfully clear the assessment.)

Minimum Pass Percentage – NOS/Module-wise: 70 % (Every Trainee should score specified minimum passing percentage in each mandatory and selected elective NOS/Module to successfully clear the assessment.)

Section 3: Training Related

1.	Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	B. Tech in Mechanical/ Electrical/Electronics/Mechatronics with 4 years of relevant experience with 1 year teaching experience. OR M. Tech in Mechanical/ Electrical/Electronics/Mechatronics with 3 years of relevant experience with 1 year teaching experience.
2.	Master Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	B. Tech in Mechanical/ Electrical/Electronics/Mechatronics with 6 years of relevant experience with 1 year teaching experience. OR M. Tech in Mechanical/ Electrical/Electronics/Mechatronics with 4 years of relevant experience with 1 year teaching experience.
3.	Tools and Equipment Required for Training	☒ Yes ☐ No (If "Yes", details to be provided in Annexure)
4.	In Case of Revised Qualification, Details of Any Upskilling Required for Trainer	

Section 4: Assessment Related

1	Assessor's Qualification and experience in relevant sector (in years) <i>(as per NCVET guidelines)</i>	B. Tech in Mechanical/ Electrical/Electronics/Mechatronics with 4 years of relevant experience with 1 year teaching experience. OR M. Tech in Mechanical/ Electrical/Electronics/Mechatronics with 3 years of relevant experience with 1 year teaching experience.
2	Proctor's Qualification and experience in relevant sector (in years) <i>(as per NCVET guidelines)</i>	B. Tech in Mechanical/ Electrical/Electronics/Mechatronics with 4 years of relevant experience with 1 year teaching experience. OR M. Tech in Mechanical/ Electrical/Electronics/Mechatronics with 3 years of relevant experience with 1 year teaching experience.
3	Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years) <i>(as per NCVET guidelines)</i>	B. Tech in Mechanical/ Electrical/Electronics/Mechatronics with 6 years of relevant experience with 1 year teaching experience. OR M. Tech in Mechanical/ Electrical/Electronics/Mechatronics with 4 years of relevant experience with 1 year teaching experience.
4	Assessment Mode <i>(Specify the assessment mode)</i>	Formative, Summative & Skill Assessment
5	Tools and Equipment Required for Assessment	☒ Same as for training ☐ Yes ☐ No <i>(details to be provided in Annexure-if it is different for Assessment)</i>

Section 5: Evidence of the need for the Qualification

Provide Annexure/Supporting documents name.

1.	Latest Skill Gap Study (not older than 2 years) (Yes/No): No
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2.	Latest Market Research Reports or any other source (not older than 2 years) (Yes/No): No (Industry driven)
3.	Government /Industry initiatives/ requirement (Yes/No): Yes
4.	Number of Industry validation provided: 5
5.	Estimated nos. of persons to be trained and employed: 96
6.	Evidence of Concurrence/Consultation with Line Ministry/State Departments: Yes If “No”, why:

Section 6: 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)	Q File
2.	Annexure: List of tools and equipment relevant for qualification (Mandatory, except in case of online course)	Q File
3.	Annexure: Detailed Assessment Criteria (Mandatory)	Q File
4.	Annexure: Assessment Strategy (Mandatory)	Q File
5.	Annexure: Blended Learning (Mandatory, in case selected Mode of delivery is “Blended Learning”)	Yes Provided
6.	Annexure: Multiple Entry-Exit Details (Mandatory, in case qualification has multiple Entry-Exit)	Yes Provided
7.	Annexure: Acronym and Glossary (Optional)	Yes Provided
8.	Supporting Document: Model Curriculum (Mandatory – Public view)	Yes Provided
9.	Supporting Document: Career Progression (Mandatory - Public view)	Yes Provided
10.	Supporting Document: Occupational Map (Mandatory)	Yes Provided
11.	Supporting Document: Assessment SOP (Mandatory)	Yes Provided
12.	Any other document you wish to submit:	NA

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	Understanding of Tooling Principles Knowledge of different types of tools and dies and their applications in manufacturing processes. Comprehension of material properties and how they affect tooling design and production. Computer-Aided Design (CAD) Proficiency Proficiency in using CAD software to create detailed 2D and 3D models. Understanding of geometric dimensioning and tolerancing (GD&T) for precise tooling design. Computer-Aided Manufacturing (CAM) Skills Ability to use CAM software to generate CNC programs for machining tools and dies. Understanding of machining strategies and tool path optimization. Machining Knowledge Familiarity with CNC machines, conventional machining processes, and various cutting tools. Proficiency in setup, operation, and troubleshooting of machining equipment.	Understanding the principles of CAD (Computer-Aided Design) systems and their application in designing tools and dies. Knowledge of material properties and manufacturing processes relevant to tool and die making, including machining, injection molding, and die casting. Familiarity with design standards, regulations, and quality assurance protocols applicable to tooling. Hence NSQF level for this descriptor is 6.	6
Professional and Technical Skills/ Expertise/ Professional Knowledge	CAD/CAM Proficiency Ability to use CAD software (e.g., AutoCAD, SolidWorks) for designing tools and dies.	A Computer Aided Tool & Die Design Engineer at the NSQF level descriptor 6 would possess advanced technical skills in CAD/CAM, design and development,	6

	Proficiency in CAM software for programming CNC machines. Machining Skills Competence in operating CNC machines, lathes, milling machines, and other machining tools. Understanding of machining processes, including milling, turning, grinding, and EDM. Blueprint Reading and Interpretation Skill in reading and interpreting engineering drawings and specifications. Ability to create detailed schematics and diagrams for tooling and dies. Measurement and Inspection Techniques Knowledge of precision measuring tools (calipers, micrometers, CMM) for quality control. Ability to perform inspections and ensure that tools and dies meet specifications. Tool and Die Design Knowledge of designing molds, dies, jigs, and fixtures used in manufacturing. Familiarity with materials and their properties used in tool and die production.	simulation and analysis, and data management. They would also have expertise in problem-solving, communication, collaboration, creativity, and technical leadership. Additionally, they would have professional knowledge in manufacturing processes, materials science, tool and die design, engineering standards and regulations, and continuous improvement.	
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	Technical Proficiency Mastery of CAD/CAM software for design and programming. Knowledge of machining processes, tools, and equipment. Understanding of materials and their properties for tool and die making. Blueprint and Design Interpretation	The role of a Computer Aided Tool & Die Design Engineer aligns with NSQF Level 6 descriptors, emphasizing advanced technical skills, problem-solving abilities, project management, and professional development. The job also requires soft skills such as effective communication and teamwork, adaptability to new technologies, and	6

	Ability to read and interpret technical drawings and schematics. Skills in creating detailed designs and specifications for tools and dies. Quality Control and Inspection Familiarity with measurement tools and inspection techniques. Ability to ensure that produced parts meet specified tolerances and quality standards. Creativity and Innovation Ability to think creatively to develop new tool designs and improve existing processes. Openness to learning new technologies and methods to stay competitive. Business Awareness Understanding of manufacturing business operations, including cost analysis and budgeting. Knowledge of supply chain management and procurement processes. Networking and Relationship Building Skills to build and maintain relationships with suppliers, clients, and other stakeholders. Ability to work collaboratively in teams to achieve common goals. Communication Skills Proficiency in clearly and effectively communicating technical information to diverse audiences. Ability to collaborate with engineers, production staff, and clients. Attention to Detail	the mindset for entrepreneurship, all crucial for success in a competitive engineering landscape. This comprehensive skill set prepares individuals for immediate employment and equips them with the entrepreneurial mindset needed to innovate within the industry.	
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	Strong attention to detail in design and manufacturing processes to minimize errors. Commitment to maintaining high standards of quality and precision. Teamwork and Collaboration Skills in working collaboratively with cross-functional teams. Ability to support and mentor less experienced team members.		
Broad Learning Outcomes/Core Skill	Technical Proficiency in CAD/CAM Ability to use advanced CAD and CAM software for designing and manufacturing tools and dies. Understanding of 3D modeling techniques and their application in tool and die making. Manufacturing Process Knowledge Comprehensive knowledge of machining processes, including CNC machining, grinding, and wire EDM. Understanding of material properties and selection for tooling applications. Design Principles Ability to apply engineering principles to tool and die design, including concepts such as tolerance, fit, and finish. Development of design specifications that meet production requirements. Problem-Solving and Critical Thinking Capability to troubleshoot manufacturing and design issues effectively. Application of analytical skills to optimize tooling designs for efficiency and cost-effectiveness.	The NSQF level 6 for a Computer Aided Tool & Die Design Engineer involves the application of advanced knowledge and skills in Computer Aided Engineering (CAE) to design and develop complex tooling and die components, and to collaborate with cross-functional teams to develop design solutions that meet customer requirements and manufacturing constraints.	6

Responsibility	Design and Prototyping: Use CAD software to create detailed designs for tools, dies, and fixtures. Collaborate with engineers and production teams to develop prototypes and resolve design issues. Machining and Fabrication: Operate CNC machines, lathes, and other machining tools to fabricate components. Measure and adjust machine settings to ensure precise dimensions and tolerances. Quality Control and Inspection: Perform inspections using measurement instruments to verify the accuracy of completed tools and dies. Implement quality control procedures to ensure compliance with specifications.	Collaborating with production teams to ensure that designed tools and dies meet production requirements, including developing and implementing production-ready designs. Troubleshooting and resolving complex design issues, including identifying and implementing design modifications to resolve issues Hence NSQF level for this descriptor is 6.	6
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Annexure: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment

Batch Size: 20-25 Nos

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1	Chairs/Tables	Standard	25
2	Computer with internet	Standard	25
3	LCD projector with screen	Standard	1

4	Trainer chair and Table	Standard	1
5	Demonstration table pin up boards	Standard	1
6	White board with marker	Standard	1
7	Computer-Aided Design (CAD) Software	AutoCAD SolidWorks CATIA Siemens NX	1
8	Computer-Aided Manufacturing (CAM) Software	Mastercam GibbsCAM Fusion 360	1
9	3D Modeling Software	Rhino Inventor	1
10	CNC Machines	CNC Milling Machines CNC Lathes CNC Wire EDM (Electrical Discharge Machining)	1
11	Conventional Machines	Drill Press Band Saw Surface Grinder Tool and Cutter Grinder	1
12	Fire Extinguisher	Standard	1
13	Safety Gloves(Rubber)	Standard	25
14	Ear Plugs	Standard	25
15	Safety Shoes & Helmet	Standard	25
16	Goggles	Standard	25
17	First-Aid Kit	Standard	2

Classroom Aids

The aids required to conduct sessions in the classroom are:

1. Computer / Laptop
2. Whiteboard and marker
3. Projector

Annexure: Industry Validations Summary

Provide the summary information of all the industry validations in table. This is not required for OEM qualifications.

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile (if available)
1	Broadline Computer Systems	Prabhakaran	Manager R&D	No7, 2 nd Floor Khader Nawaz Khan Road, Nungambakkam, Chennai	044 28333083	contact@broadline.co.in	
2	TANSAM	Sukhpreet Singh	CEO	6 th Floor Tidel Park, Chennai	9779777057	sukhpreet@tansam.org	
3	Jain Laboratory Instruments	Ravi Jain	Director	449, HSIIDC, Industrial Area Saha, Haryana	8569909696	sales@jlabexport.com	
4	Marathwada Autocluster	Sudarshan Dhavurkar	Center In charge	P-174, MIDC Waluj	8237272802	macluster@gmail.com	
5	Mindbridge Innovations	Aruna Anchal	General Manager	New Delhi			

Annexure: Training & Employment Details

Training and Employment Projections:

Year	Total Candidates		Women		People with Disability	
	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities
2025-26	96	86	62	43	6	4
2026-27	96	87	68	48	7	5
2027-28	96	82	75	53	8	5

Data to be provided year-wise for next 3 years

Training, Assessment, Certification, and Placement Data for previous versions of qualifications: NA

Qualification Version	Year	Total Candidates				Women				People with Disability			
		Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed

Applicable for revised qualifications only, data to be provided year-wise for past 3 years.

List Schemes in which the previous version of Qualification was implemented: NA

- 1.
- 2.

Content availability for previous versions of qualifications: NA

☐ Participant Handbook ☐ Facilitator Guide ☐ Digital Content ☐ Qualification Handbook ☐ Any Other:

Languages in which Content is available:

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>

Annexure: Detailed Assessment Criteria

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

CSC/N0471: Lead the Design Team on 3D models of tools, dies, and molds using CAD / CAM software as per Design Requirements.

Assessment Criteria for Outcomes	TheoryMarks	Practical Marks	ProjectMarks	Viva Marks
<i>Interpretation of design requirements to develop accurate 2D and 3D models of tools, dies, and molds using CAD software</i>	10	10	-	6
PC1. Accurately interpret design specifications provided by engineers or clients for tooling, dies, and molds	3	2	-	2
PC2. Demonstrate mastery of CAD software tools to create precise 2D sketches and detailed 3D models.	3	4	-	2

PC3. Ensure models adhere to specified dimensions, tolerances, and geometric features with meticulous precision.	4	4	-	2
<i>Precision drafting and detailing of models to meet specifications, ensuring compatibility with manufacturing processes and engineering standards.</i>	15	15	-	10
PC4. Apply GD&T principles effectively to convey design intent accurately in models.	5	5	-	3
PC5. Engage in clear and concise communication with stakeholders to clarify requirements and address feedback	5	5	-	3
PC6. Implement rigorous quality control measures to validate model accuracy and integrity	5	5	-	4
<i>Collaboration with design teams and stakeholders to refine designs iteratively, optimizing functionality and efficiency in tooling and mold production</i>	15	15	-	4

PC7 Maintain detailed documentation of the model creation process, revisions, and design decisions.	6	5	-	2
PC8. Pursue ongoing learning and skill development to enhance proficiency and stay updated with CAD software advancements	5	5	-	1
PC9. Ensure models comply with industry standards and best practices for tooling, dies, and mold design	4	5	-	1
NOS Total	40	40	-	20

CSC/N0472: Developing designs for tools and dies by generating tool paths and machining instructions.

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Optimization for tool functionality, ensuring precision and efficiency in manufacturing processes</i>	10	10	-	6
PC1. Create precise and detailed designs for tools and dies that meet engineering	3	2	-	2

specifications and requirements				
PC2. Demonstrate mastery of CAD/CAM software to efficiently generate tool paths and machining instructions	3	4	-	2
PC3. Employ optimization methods to minimize machining time, reduce material waste, and maximize tool efficiency.	4	4	-	2
<i>Generation of tool paths using CAD/CAM software, maximizing material utilization and minimizing waste</i>	15	15	-	10
PC4. Ensure generated tool paths result in parts with accurate dimensions and tolerances as per design specifications.	5	5	-	3
PC5. Apply understanding of material properties to select appropriate cutting parameters and machining strategies.	5	5	-	3
PC6. Implement quality control measures to validate the accuracy and integrity of generated tool paths and machining instructions..	5	5	-	4

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Creation of precise machining instructions, facilitating seamless production of complex parts with minimal errors</i>	15	15	-	4
PC7. Adhere to safety standards and protocols throughout the design and machining process to maintain a safe work environment.	6	5	-	2
PC8. Effectively communicate with stakeholders, including engineers and machinists, to clarify requirements and address any design or machining challenges.	4	5		1
PC9. Maintain thorough documentation of the design process, tool paths, machining instructions, and any revisions made	5	5	-	1
NOS Total	40	40	-	20

CSC/N0473: Oversee the Development of tool Designs (using FEA) and dies by generating tool paths and machining instructions.

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Executing CNC operations to fabricate tooling components with precision and speed, enhancing manufacturing efficiency</i>	10	10	-	7
PC1. Prepare design specifications, selecting materials, and setting up the CNC machine.	3	3	-	2
PC2. Programming and load CNC programs and verifying their correctness	3	3	-	2
PC3. Operate constant monitoring and adjustment of machine settings for optimal performance	4	4	-	3
<i>conducting thorough inspections to validate adherence to design specifications and maintain quality standards</i>	15	15	-	9
PC4. Ensure components meet specifications	5	5	-	3
PC5. Ensures machine reliability through routine upkeep and timely troubleshooting	5	5	-	3
PC6. Meet exact dimensional tolerances.	5	5	-	3

<i>Employing advanced machining techniques to achieve intricate geometries and surface finishes, ensuring optimal performance of tooling components</i>	15	15	-	4
PC7. Efficiency is critical, with timely completion of tasks and minimal material wastage	8	7	-	2
PC8. Maintain a secure work environment, preventing accidents and injuries.	7	8	-	2
NOS Total	40	40	-	20

DGT/VSQ/N0102: Employability Skills (60 Hours)

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Introduction to Employability Skills</i>	1	1	-	-
PC1. identify employability skills required for jobs in various industries	-	-	-	-
PC2. identify and explore learning and employability portals	-	-	-	-

<i>Constitutional values – Citizenship</i>	1	1	-	-
PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
PC4. follow environmentally sustainable practices	-	-	-	-
<i>Becoming a Professional in the 21st Century</i>	2	4	-	-
PC5. recognize the significance of 21st Century Skills for employment	-	-	-	-
PC6. practice the 21st Century Skills such as Self- Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
<i>Basic English Skills</i>	2	3	-	-
PC7. use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-

PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
PC9. write short messages, notes, letters, e-mails etc. in English	-	-	-	-
<i>Career Development & Goal Setting</i>	1	2	-	-
PC10. understand the difference between job and career	-	-	-	-
PC11. prepare a career development plan with short- and long-term goals, based on aptitude	-	-	-	-
<i>Communication Skills</i>	2	2	-	-
PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-	-	-	-
PC13. work collaboratively with others in a team	-	-	-	-
<i>Diversity & Inclusion</i>	1	2	-	-
PC14. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC15. escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-

<i>Financial and Legal Literacy</i>	2	3	-	-
PC16. select financial institutions, products and services as per requirement	-	-	-	-
PC17. carry out offline and online financial transactions, safely and securely	-	-	-	-
PC18. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
<i>Essential Digital Skills</i>	3	4	-	-
PC20. operate digital devices and carry out basic internet operations securely and safely	-	-	-	-
PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively	-	-	-	-
PC22. use basic features of word processor, spreadsheets, and presentations	-	-	-	-
Entrepreneurship	2	3	-	-

PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
PC25. identify sources of funding, anticipate, and mitigate any financial/legal hurdles for the potential business opportunity	-	-	-	-
Customer Service	1	2	-	-
PC26. identify different types of customers	-	-	-	-
PC27. identify and respond to customer requests and needs in a professional manner.	-	-	-	-
PC28. follow appropriate hygiene and grooming standards	-	-	-	-
Getting ready for apprenticeship & Jobs	2	3	-	-
PC29. create a professional Curriculum vitae (Résumé)	-	-	-	-

PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
PC31. apply to identified job openings using offline /online methods as per requirement	-	-	-	-
PC32. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
NOS Total	20	30	-	-

CSC/N1339 : Collaboratively coordinate with the team

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Communicate effectively at the workplace</i>	7	20	-	-

PC1. exchange information and instruction with colleagues, and seek clarifications and feedback	-	-	-	-
PC2. assist colleagues where required	-	-	-	-
PC3. follow business communication etiquette in all interactions and communicative formats (online, digital, and in-person)	-	-	-	-
PC4. document and share all relevant information with stakeholders in agreed formats and as per agreed timelines	-	-	-	-
<i>Work effectively</i>	7	20	-	-
PC5. identify and obtain clarity regarding organisational, team and own goals and targets	-	-	-	-
PC6. prioritise and plan work in order to achieve goals and targets	-	-	-	-
PC7. monitor own and team performance as per agreed plan	-	-	-	-
PC8. complete duties accurately, systematically and within required timeframes	-	-	-	-
PC9. express emotions appropriately at the workplace and manage own response to heightened emotions	-	-	-	-

PC10. maintain orderliness and cleanliness in the work area Maintain and enhance professional competence	-	-	-	-
PC11. identify own strengths and weaknesses in relation to goals and targets	-	-	-	-
PC12. adapt self, service, or product to meet success criteria	-	-	-	-
PC13. seek and select opportunities for continuous professional development	-	-	-	-
PC14. formulate a professional development plan to enhance capabilities	-	-	-	-
PC15. build or contribute to the organizational knowledge base of cases, clients, issues, solutions, and innovations	-	-	-	-
PC16. examine developments and trends in field of work and their potential impact on work	-	-	-	-
PC17. take feedback from peers, supervisors and clients to improve own performance and practices	-	-	-	-
Work in a disciplined and ethical manner	8	20	-	-

PC18. perform tasks as per workplace standards, organizational policies and legislative requirements	-	-	-	-
PC19. display appropriate professional appearance at the workplace and adhere to the organizational dress code	-	-	-	-
PC20. demonstrate responsible and disciplined behavior at the workplace such as punctuality; completing tasks as per given time and standards; demonstrating professional behavior at all times, adopting environment- friendly practices, etc.	-	-	-	-
PC21. identify the cause of conflict and options for resolution with peers or escalate grievances and problems to appropriate authority as per procedure for conflict resolution	-	-	-	-
PC22. protect the rights of the client and organization when delivering services	-	-	-	-
PC23. ensure services are delivered equally to all clients regardless of personal and cultural beliefs	-	-	-	-
PC24. operate within an agreed ethical code of practice and report unethical conduct to the appropriate authorities	-	-	-	-

PC25. follow organizational guidelines and legal requirements on disclosure and confidentiality	-	-	-	-
Uphold social diversity at the workplace	8	10	-	-
PC26. recognize and evaluate biased practices against underrepresented groups like women and persons with disabilities, in workplace systems and processes	-	-	-	-
PC27. identify and report discrimination and harassment based on gender, disability, or cultural difference at the workplace	-	-	-	-
PC28. use inclusive or neutral language and gestures in all interactions	-	-	-	-
PC29. respect the personal and professional space of others	-	-	-	-
PC30. access grievance redressal mechanisms as per legislations	-	-	-	-
NOS Total	30	70	-	-

CSC/N0505: Maintain Health, Safety and Environment at workplace

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Adhere to standard safety procedures of the organisation</i>	7	10	-	-
PC1. comply with general safety procedures and those for handling equipment, tools, chemicals, and hazardous material, as prescribed and followed in the organisation	-	-	-	-
PC2. remove finger rings or any other metal objects likely to interfere with the work	-	-	-	-
PC3. ensure that identification badge or any other object worn around the neck or on the clothing does not get caught in any rotating machine, or otherwise interfere with the work	-	-	-	-
PC4. use appropriate safety devices such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, helmets etc. recommended for the work being performed	-	-	-	-
PC5. inform, escalate, or raise alarm about any suspicions, unaccounted hazardous material, devices, or other objects found in the premises	-	-	-	-

PC6. inform, escalate, or raise alarm about any breach of safety or security procedure in the organisation	-	-	-	-
PC7. help achieve zero accidents goals at work	-	-	-	-
PC8. avoid damage to sensitive electronic components due to negligence of ESD procedures	-	-	-	-
PC9. participate regularly in fire drills or other safety related workshops organised by the organisation	-	-	-	-
PC10. follow strictly all access control and perimeter safety procedures in designated factory areas such as robotic work stations, automated production lines, automated material movement and other potentially risky operations	-	-	-	-
PC11. ensure that other people follow all access control and perimeter safety procedures in designated factory areas and help avoid accidents	-	-	-	-
PC12. use emergency switches or other mechanisms of stopping a machine immediately in case any emergency situation has developed or about to happen	-	-	-	-

PC13. ensure that electrical equipment are properly grounded	-	-	-	-
PC14. follow Cyber Security guidelines and be vigilant at workplace	-	-	-	-
PC15. proceed to designated safe assembly area immediately on hearing fire alarm	-	-	-	-
Follow healthy practices and posture	8	10	-	-
PC16. wash hands and use sanitizers as recommended to prevent spread of diseases	-	-	-	-

PC17. follow common personal hygiene practices	-	-	-	-
PC18. maintain appropriate posture, especially in long hours of sitting or standing position and in handling heavy materials	-	-	-	-
PC19. participate in company organised health sessions such as exercises, games, yoga, physiotherapy, and other activities	-	-	-	-
PC20. handle heavy and hazardous materials with care, while maintaining appropriate posture, using suitable tools, and handling equipment such as trolleys, jacks, and ladders	-	-	-	-
PC21. learn and apply first aid devices available in the workplace	-	-	-	-

PC22. learn and apply safety and handling procedures for electrical shock and electrocution	-	-	-	-
PC23. learn and apply emergency medical help services	-	-	-	-
PC24. follow workplace decorum and avoid emotional outbursts or inappropriate language	-	-	-	-
PC25. prevent any harassment at workplace	-	-	-	-
Practice waste management and recycling	-	-	-	-

PC26. identify recyclable, non-recyclable, and hazardous waste generated in the workplace and comply with their disposal procedures	-	-	-	-
PC27. dispose non-recyclable waste and hazardous waste following recommended processes	-	-	-	-
PC28. deposit recyclable and reusable material at identified locations	-	-	-	-
PC29. support education and compliance of waste management processes	-	-	-	-
Conserve material and resources	-	-	-	-

PC30. identify ways to optimize usage of material and resources such as water, electricity, energy in various tasks, activities, and processes	-	-	-	-
PC31. check for spills and leakages of material in various tasks, activities, and processes and plug them	-	-	-	-
PC32. escalate the leakage issue to appropriate authority if needed	-	-	-	-
PC33. carry out routine cleaning of tools, machines, and equipment and maintain them in good working condition to optimize efficiency and wastage	-	-	-	-
PC34. check if the equipment is functioning normally before commencing work and rectify or report any malfunctioning to the responsible agency	-	-	-	-

PC35. check for any odour, sparks, fumes, emission, unusual vibration, noise, or any other objectionable presence in the environment and take immediate corrective action followed by report to responsible agency	-	-	-	-
PC36. ensure electrical equipment are properly connected for use and are switched off when not in use	-	-	-	-
PC37. support education and compliance of resource conservation processes	-	-	-	-
NOS Total	15	20	-	-

Assessment Parameters:

Assessment Plan:

1. Components of Assessment:

- Each subject will be assessed in three components: Theory (40% weightage), Practical (40% weightage), and On-job Training (OJT, 20% weightage).

2. Passing Parameters:

- To pass the semester, students must meet both the assessment parameters given below.

Parameter 1 - Weighted Semester Score:

- Students must achieve a minimum of 60% in the weighted average score across all three components (Theory, Practical, and OJT) for each subject.

Parameter 2 - Individual Component Score:

- Students need to score at least 40% in each individual component (Theory, Practical, and OJT) of every subject.

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.

<1. Assessment System Overview:

- Batches assigned to the assessment agencies for conducting the assessment on SIP or email
- Assessment agencies send the assessment confirmation to VTP/TC looping SSC
- Assessment agency deploys the ToA certified Assessor for executing the assessment
- SSC monitors the assessment process & records

2. Testing Environment:

- Check the Assessment location, date and time
- If the batch size is more than 30, then there should be 2 Assessors.
- Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.

3. Assessment Quality Assurance levels/Framework:

- Question bank is created by the Subject Matter Experts (SME) are verified by the other SME
- Questions are mapped to the specified assessment criteria
- Assessor must be ToA certified & trainer must be ToT Certified

4. Types of evidence or evidence-gathering protocol:

- Time-stamped & geotagged reporting of the assessor from assessment location
- Centre photographs with signboards and scheme specific branding

5. Method of verification or validation:

- Surprise visit to the assessment location

6. Method for assessment documentation, archiving, and access

- Hard copies of the documents are stored

On the Job:

1. Each module (which covers the job profile of Computer Aided Tool and die design engineer) will be assessed separately.
2. The candidate must score 60% in each module to successfully complete the OJT.
3. Tools of Assessment that will be used for assessing whether the candidate is having desired skills and etiquette of dealing with customers, understanding needs & requirements, assessing the customer and perform Soft Skills effectively:
 - Videos of Trainees during OJT
 -
4. Assessment of each Module will ensure that the candidate is able to:
 - Effective engagement with the customers
 - Understand the working of various tools and equipment
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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
NOS	National Occupational Standard(s)
NQR	National Qualification Register

NSQF	National Skills Qualifications Framework
OJT	On the Job Training

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.
Long Term Training	Long-term skilling means any vocational training program undertaken for a year and above. https://ncvet.gov.in/sites/default/files/NCVET.pdf