सूक्ष्म, लघु एवं मध्यम उद्यम मंत्रालय
DEVELOPMENT COMMISSIONER
MINISTRY OF MICRO, SMALL & MEDIUM ENTERPRISES

MSME TECHNOLOGY CENTRE

Please referGuidelines for STT/LTT/Apprenticeship /OEM Qualification File

QUALIFICATION FILE

SENIOR TOOL DESIGNER – CAD/CAM

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

☐ Up skilling Dual/Flexi Qualification ☐For ToT ☐For ToA

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

NCrF/NSQF Level: 6.5

Submitted By:

MSME TECHNOLOGY CENTRE

O/o DC MSME, Ministry of Micro, Small and Medium Enterprises

Govt. of India

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Table of Contents

Section 1: Basic Details

1.	**Qualification Name**	**SENIOR TOOL DESIGNER – CAD/CAM**
2.	**Sector/s**	**CAPITAL GOODS**

3.	**Type of Qualification:☐New ☒Revised☐Has Electives/Options☐OEM**	**NQR Code & version of existing/previous qualification:** *(change to previous, once approved)* **MSME/PGDTD/**	**Qualification Name of existing/previous version:** **POST GRADUATE DIPLOMA IN TOOL DESIGN AND CAD/CAM**
4.	**a. OEM Name** **b. Qualification Name** (*Wherever applicable)*	**NA** **SENIOR TOOL DESIGNER – CAD/CAM**	
5.	**National Qualification Register (NQR) Code & Version** (*Will be issued after NSQC approval)*		**6. NCrF/NSQF Level: 6.5**
7.	**Award (Certificate/Diploma/Advance Diploma/Any Other)** *(Wherever applicable specify multiple entry/exits also & provide details in annexure)*	**Certificate**	
8.	**Brief Description of the Qualification**	They are Responsible for developing tool design and tool manufacturing. They will be able to generate CAD models and product design and validate the same using CAE software. And able to do the process planning and manufacturing of the product. Also, with the application of knowledge and skill of Tool and die technology and CAD/CAM/CAE, the participants can develop their own enterprises.	
9.	**Eligibility Criteria for Entry for Student/Trainee/Learner/Employee**	a. Entry Qualification & Relevant Experience: B.E / B. TECH in Mechanical, Production or Equivalent	

S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)
1	• Completed UG degree (4 year) OR Equivalent	NIL
2	• Previous relevant Qualification of NSQF Level5.5	1.5 year relevant experience

		• Previous relevant Qualification of NSQF Level 5 — 3 year relevant experience **b. Age:** 18-35 Years
10.	**Credits Assigned to this Qualification, Subject to Assessment** *(as per National Credit Framework (NCrF))*	**60** — **11. Common Cost Norm Category (I/II/III)** *(wherever applicable)* **: I**
12.	**Any Licensing requirements for Undertaking Training on This Qualification***(wherever applicable)*	NA
13.	**Training Duration by Modes of Training Delivery** *(Specify **Total Duration** as per selected training delivery modes and as per requirement of the qualification)*	☒**Offline** ☐**Online** ☐**Blended** **Classroom (offline):** Theory 420 (Hours), Practical 780 (Hours), OJT Mandatory 600 (Hours), OJT Recommended - (Hours), Total 1800 (Hours) **Online:** Theory -, Practical -, OJT Mandatory -, OJT Recommended -, Total - *(Refer Blended Learning Annexure for details)*
14.	**Aligned to NCO/ISCO Code/s***(if no code is available mention the same)*	2144.0101 (Process Design Engineer)
15.	**Progression path after attaining the qualification** *(Please show Professional and Academic progression)*	***Professional/Career Progress:*** SR. Manager TOOL DESIGNER CAD/CAM➔ Head -TOOL DESIGNER CAD/CAM➔ CEO -TOOL DESIGNER CAD/CAM **Academic *Progress:*** NA
16.	**Other Indian languages in which the Qualification & Model Curriculum are being submitted**	**Hindi**
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**	Seats are reserved as per government Norms.	
20.	**Are Greening/ Environment Sustainability Aspects Covered** *(Specify the NOS/Module which covers it)*	☒**Yes** ☐**No**	
21.	**Is Qualification Suitable to be Offered in Schools/Colleges**	**Schools:** ☐**Yes** ☒**No** **Colleges:** ☒**Yes** ☐**No** Subject to availability of resources.	
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: Sh. Vijay Mahipatrao Bankar** **Contact No. +0755 3501078** **Email-msmetcab@gmail.com**	
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:

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

S. No	NOS/Module Name	NOS/ Module Code & Version *(if applicable)*	Core/ Non-Core	NCrF/NSQF 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)*
First Semester																
1	Product Manufacturing with CNC Programming And Machining	MSME/PGDTD/01	**Core**	**6.5**	3	-	**90**	-	-	**90**	-	**100**	-	-	**100**	
2	Engineering Drafting And Modelling Using CAD Software	MSME/ PGDTD/02	**Core**	**6.5**	4	-	**120**	-	-	**120**	-	**100**	-	-	**100**	
3	Advance Manufacturing Practices Using Cam Software	MSME/ PGDTD/03	**Core**	**6.5**	2	-	**60**	-	-	**60**	-	**100**	-	-	**100**	
4	Design of Work holding Devices And Gauges	MSME/ PGDTD/04	**Core**	**6.5**	3	**30**	**60**	-	-	**90**	**100**	**100**	-	-	**200**	
5	Stamping Die Design	MSME/ PGDTD/05	**Core**	**6.5**	**4**	**30**	**90**	-	-	**120**	**100**	**100**	-	-	**200**	
6	Design of Tools with Advance Cad Software Module I	MSME/ PGDTD/05	**Core**	**6.5**	4	-	**120**	-	-	**120**	-	**100**			**100**	

Second Semester																
7	Mold Design for Plastic Parts	MSME/ PGDTD/06	**Core**	**6.5**	**4**	**30**	**90**	-	-	**120**	**100**	**100**	-	-	**200**	
8	Design of Metal Die Casting	MSME/ PGDTD/07	**Core**	**6.5**	**2**	**30**	**30**	-	-	**60**	**100**	**100**			**200**	
9	Mechanical Measurements and Total Quality Management	MSME/ PGDTD/08	**Core**	**6.5**	**2**	**60**	-	-	-	**60**	**100**	**100**			**200**	
10	Manufacturing Process Planning and Heat Treatment	MSME/ PGDTD/10	**Core**	**6.5**	**1**	**30**	-	-	-	**30**	**100**	-			**100**	
11	Design of Tools with Advance CAD Software Module II (Creoparametric)	MSME/ PGDTD/11	**Core**	**6.5**	2	-	**60**	-	-	**60**	-	**100**			**100**	
12	FEA using CAE Software	MSME/ PGDTD/12	**Core**	**6.5**	2	-	**60**	-	-	**60**	-	**100**			**100**	
13	Additive Manufacturing	MSME/ PGDTD/13	**Core**	**6.5**	**1**	**30**	-	-	-	**30**	**100**	-			**100**	
14	Innovative Design Techniques and Research Methodology	MSME/ PGDTD/14	**Core**	**6.5**	**2**	**60**				**60**	**100**	-			**100**	
15	Employability Skills / Entrepreneurship	MSME/ES/02	**Non-Core**	**6.5**	**4**	**120**	-	-	-	**120**	**100**	-	-	-	**100**	

Third Semester															
16	OJT Design / Manufacturing of Jigs / Fixtures / Press Tools or All	MSME/ PGDTD/15	**Core**	**6.5**	**10**	-	-	**300**	-	**300**	-	-	100	-	**100**	
18	OJT Design / Manufacturing of Moulds / DCD or Both	MSME/ PGDTD/15	**Core**	**6.5**	**10**	-	-	**300**		**300**	-	-	100		**100**	
Duration (in Hours) / Total Credit / Marks					**60**	**420**	**780**	**600**	-	**1800**	**900**	**1100**	**200**	-	**2200**	

Elective NOS/s:

S. No	**NOS/Module Name**	**NOS/ Module Code & Version** *(if applicable)*	**Core/ Non-Core**	**NCrF/NSQF 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)*

Optional NOS/s:

S. No	NOS/Module Name	NOS/ Module Code & Version *(if applicable)*	Core/ Non-Core	NCrF/NSQF 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)*

Assessment - Minimum Qualifying Percentage:

Specify any one of the following:

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

Minimum Marks to pass Theory Exam: *40%*

Minimum Marks to pass Practical Exam: *60%*

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

Minimum Marks to pass Theory Exam: *40%*

Minimum Marks to pass Practical Exam: *60%*

Section 3: Training Related

1.	**Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	Diploma/Degree in Mechanical/Production/Automobile or Equivalent with Practical skills and knowledge required in the relevant job role at least one level higher i.e level 6.0 and above in related field and minimum 2 years of experience in Tool Room/Technology Centre of MSME or any reputed industry will become a trainer, or in accordance with the ToT guideline of NCVET.
2.	**Master Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	Degree in Mechanical/Production/Automobile or equivalent with 3 to 5 years of experience in Development/Training/ Department from Tool Room/Technology Centre/Mechanical sector of MSME or any reputed industry will become as a Master Trainer, or in accordance with the ToT guideline of NCVET.
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**	Yes

Section 4: Assessment Related

1.	**Assessor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Diploma/Degree in Mechanical/Production/Automobile or equivalent with 3 years of experience Department from Tool Room/Technology Centre of MSME or any reputed industry. Only (ToA) certified assessors will be able to conduct the assessments.
2.	**Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Degree in Mechanical/Production/Automobile or equivalent with 5 years of experience in Design/Production Department from Tool Room/Technology Centre of MSME or any reputed industry.
3.	**Lead Assessor's/Proctor's Qualification and experience in**	Post Graduate in the relevant discipline with minimum 5 years of experience in Design/Production Department from Mechanical industry / Tool Room/Technology Centre of MSME or any reputed industry.

	relevant sector (in years) *(as per NCVET guidelines)*	
4.	**Assessment Mode** *(Specify the assessment mode)*	**Offline**
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 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): Yes,** India Skills Report 2023, "Roadmap to India's Skills and talent Economy 2030"➔ "IT Sector"
2.	**Latest Market Research Reports or any other source (not older than 2years) (Yes/No):** No
3.	**Government/Industry initiatives/requirement (Yes/No):** Yes
4.	**Number of Industry validation provided:** 30
5.	**Estimated nos. of persons to be trained and employed:** Approx. 100 per year
6.	**Evidence of Concurrence/Consultation with Line Ministry/State Departments:** NA 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)*	*Annexure-I*
2.	**Annexure:** List of tools and equipment relevant for qualification *(Mandatory, except in case of online course)*	*Annexure-II*
3.	**Annexure:** Industry Validations Summary	*Annexure-III*
4.	**Annexure:** Training & Employment Details	*Annexure-IV*
5.	**Annexure:** Blended Learning *(Mandatory, in case selected Mode of delivery is "Blended Learning")*	*Annexure-V*
6.	**Annexure:** Detailed Assessment Criteria *(Mandatory)*	*Annexure-VI*
7.	**Annexure:** Assessment Strategy *(Mandatory)*	*Annexure-VII*
8.	**Annexure:** Acronym and Glossary *(Optional)*	*Annexure- VIII*
9.	**Annexure:** Multiple Entry-Exit Details *(Mandatory, in case qualification has multiple Entry-Exit)*	*NA*
10.	**Supporting Document:** Model Curriculum *(Mandatory – Public view)*	*Annexure- IX*
11.	**Supporting Document:** Career Progression *(Mandatory - Public view)*	*This aspect mentioned in point no. 15*

12.	**Supporting Document:** Occupational Map *(Mandatory)*	*Annexure-X*
13.	**Supporting Document:** Assessment SOP *(Mandatory)*	*Annexure- XI*
14.	Any other document you wish to submit:	*NA*

Annexure I: Evidence of Level

NCrF/NSQF Level Descriptors	Key requirements of the job role/outcome of the qualification	How the job role/outcomes relate to the NCrF/NSQF level descriptor	NCrF/NSQF Level
Professional Theoretical Knowledge/Process	Identification of different types of mould, press tools and jigs & fixtures Analyze and optimize the CAD Design using CAE Software Create tool path using CAM Software Create CNC programming Using Simulator and CNC Machine Execute manufacturing operation of moulds and press tools using CNC machines, generate process planning sheets	As Senior tool designer should be able to deal with design and development of tooling which is to be used for mass production of the product, it is required that job holder should possess overall (Comprehensive) theoretical knowledge in the field of tool design and development like press tools, jigs & fixture, Mold and Die Casting Die. Senior tool designer shall use tool design procedure like press tool design, Mold design, Jigs and fixture design, Die casting die design etc. Senior tool designer shall use best manufacturing process & process capabilities, manufacturing process in sheet metalworking, Moulding and die casting die, machine consideration, Computer aided manufacturing process, CAM programming, man machine relation etc.	6.5

	Expertise extends to material science, GD&T, and project management, allowing them to lead cross-functional teams, estimate project costs, and manage timelines effectively. Deep understanding of mechanical engineering principles Able to implement Production Planning and Control Principles. Solve problems effectively using a step-by-step process concerning with ISO System as a part of the Total Quality Management. Undertakes self-study for advancement in skills; demonstrates intellectual independence, analytical rigor and good communication. Conceptualize Innovative Ideas and execute Research orient activities in the field of Tool design and CAD CAM	Through Cognitive knowledge job holder shall judge the best conceptual design for Press Tool Design, Mould Design, Die Casting Die Design and Jigs & Fixture design with appropriate reasoning like best economy, quality requirement etc. Through competitive knowledge of Quality, Quality Control, Total Quality Management, and Statistical quality control with the help of QMS 9000, Senior tool designer should be able to Solve problems effectively using a step-by-step process Senior tool designer shall be able to use the best methods of conceptualization of innovative ideas and perform Research orient activities Hence the qualification is kept at level 6.5 as per the process is Concerned.	
Professional and Technical Skills/ Expertise/ Professional Knowledge	• Identify customer's requirement and create conceptual design. • Develop plan for Tool design process • Create and evaluate Tool design options • Design and Development of Jigs and Fixtures, Press Tools, Mould& Die casting Dies. • Develop tool design using CAD software • Develop and execute CNC Machining programme using CAM software • Develop creative solution to the predictable and unpredictable problems In tool design using CAE and	Senior tool designer shall carry out the design and development of tool through following professional skill: gather accurate information on the requirements of the customer, create conceptual design, confirm the customer's objectives for the engineering products or processes, using standard unit system as customer's requirement, plan for Tool design process and develop a schedule for the design process e.g. works order date, plan date, actual completion date, Obtain and review existing information with reference to the specified design requirement like 2D drawing and 3D model, existing sample, etc. Senior tool designer shall design and develop press tool, Mould, Die Casting Die and Jigs and Fixture by using various CAD software like AutoCAD, Creo, CATIA, UG, Solid works, etc.	6.5

	reverse engineering and rapid prototyping technologies • Develop mathematical/Analytical skills • Develop quality consciousness concept • Prepare costing of Tooling • Troubleshoot the problems in Tool validation • Has the cognitive and technical skills required for generating original ideas, conceptualizing, designing, and implementing innovative solutions. • Leadership and effective decision making skills with social Intelligence. • Is able to develop innovative evidence based practical solutions to complex and unpredictable situations and problems.	Senior tool designer shall execute CNC Machining programme using CAM software like MasterCAM, and UG CAM etc. In the qualification Senior tool designer shall provide Creative solutions the abstract problems which arises during the design and development of tool such as: problem of spring back, cutting clearance, burr, sheet metal thinning, and loss of flatness after sheet metal forming, placement of draw beads for proper material flow, sequence of stages in terms of progressive tool. Mould: material flow during operation, location of gate points, flash on the final component etc. DCD: problem of heat checks, weld line, air entrapments, blow holes, draft, problems during ejection. Senior tool designer shall solve above problems by undertaking self-study and providing creative solution by using Engineering research methodology where Senior tool designer shall undertake experimentation on the problem and can generate feasible solution wherever applicable. Senior tool designer may use Additive Manufacturing to address the issue like conformal cooling in moulds. Senior tool designer shall use CAE tool wherever applicable to provide creative solution to abstract problems related to thermal analysis of mould or DCD and its Manufacturing Processes. Senior tool designer shall demonstrate rigorous mathematical / analytical skill while design and development of tools through calculate the cutting clearance, cutting Force, Stripping Force, clamping force, sizes of bottom plate, top plate, die plate, punch holder plate, bending force etc. and its Manufacturing processes. Senior tool designer shall Undertake self-study to solve the problems encountered during the project through data collection, identification of problem, defining the problem, by identifying parameters affecting on the performance and by using different Engineering Research Methodologies while doing so job holder shall demonstrates intellectual independence to guide the team members.	

Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	• Highest levels of soft-skills and competencies including Social intelligence, Cognitive load management, Cross cultural competency. • Specialized higher order skills including creative and persuasive communication, critical thinking and problem solving skills. Understands and appreciates full constitutional, humanistic, ethical, and moral values in workplace/ personal life, global and local citizenship, Leadership skills to motivate people for achieving, personal and organizational goals for growth.	Senior tool designer can Develop communication competence, report writing skills & preparation of Resumes or Curriculum Vitae, Learner can be able to Interact effectively with co-workers and can apply the Engineering Ethics and Human Values at workplace. Senior tool designer can understand the basic process of becoming an entrepreneur & start up and can get benefits from various government schemes applicable. Senior tool designer should have strong understanding of tool design and manufacturing concepts to seamlessly guide the team of tool and die makers for development of tool and dies. Excellent skills in CAD/CAM in order to tackle completed 3d designs and fulfill customer's requirement within timeline.	6.5
Broad Learning Outcomes/Core Skill	• Demonstrates comprehensive, cognitive, theoretical knowledge and practical skills to develop creative and viable solutions to practical problems. • Critical understanding of the subject, demonstrating mastery and innovation, completion of substantial research and dissertation (where applicable). • Skills to evaluate the evidence; identify logical flaws and risks in the arguments of others; analyze and synthesize data from a variety of sources; draw conclusions and support them with evidence and examples, while addressing/ accommodating opposing viewpoints; make judgements and take appropriate decisions	Senior tool designer shall use protective equipment while working on computers and during working on shop floor, wear helmet, state the name and location of people responsible for health and safety in the workplace, state the names and location of documents that refer to health and safety in the workplace, identify job-site hazardous work and state possible causes of risk or accident. Senior tool designer shall work on project where he/she shall gather accurate information on project concept and requirements, Confirm the project objectives, preparation of conceptual plan, selection of CAD software based on capabilities of modelling, use Presentation skills, utilize CAD & CAM Software, communicate clearly about the project requirement to the group members through written /verbal/e mail etc. Identify sources of information and support for problem solving, seek assistance and support from other sources to solve problems, Identify effective resolution techniques e.g. CAE software, Engineering research methodology etc.	6.5

Responsibility	• Highly skilled in tool design, CAD/CAM and CNC programming • Demonstrates comprehensive, cognitive, theoretical knowledge and practical skills to develop creative and viable solutions to practical problems • Responsible for achieving tangible outcomes, managing change, building teams, and mentoring the Co-workers and subordinates & implementing quality tools & Configuration management • Takes decisions across functions requiring the exercise of responsibility to find solutions to specific problems work/ vocation, or professional practice. • Work independently and guide team members with full responsibility of output of group and development	Senior tool designer shall work independently during analyzing requirements of the component, concept generation of tool design and finalizing the requirements with the customer. After receiving confirm order from the customer job holder shall prepare design and development plan with timeline and with job responsibilities of team members like preparation of bill of material, preparation of mould base/ die set drawing, inserts and other elements drawing, verification and release of final drawings, tool trial and rectification along with tool validation and will have full responsibility of output of group. Senior tool designer shall encourage team members for continues learning and development by time to time discussing with them various issues of project like tool / die suitability to specified machine, new development in machines, selection of material, new development in the materials and manufacturing processes. Senior tool designer shall follow work standard, specific norms and procedures laid down by the organization. Senior tool designer shall develop moral, values and ethical practices in business operation. Understanding the need to take initiative and manage self-work and group tasks to improve efficiency and effectiveness.	6.5

Annexure II: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment for Batch Size: 20

S. No.	Tools / Equipment Name	Specification	Quantity for specified Batch size
1	Conventional Milling	Industry Standard	4
2	Conventional Turning		4
3	Conventional Grinding		4
4	CNC Milling (Multi Axis)		2
5	CNC Turning		2
6	W-EDM		1
7	EDM		1
8	Computers	I 7 processor, 8GB ram	20 systems
9	CAD-AUTOCAD	Industry Standard	20
10	CAD-SOLIDWORKS		20
11	CAD-CATIA		20
12	CAD-NX		20

13	CAM-MASTERCAM		20
14	CAM-NX CAM		20
15	CAE- ANSYS		20
16	CNC Simulators		20
17	Cutting tools		20
18	All standard measuring instruments		10 sets
19	Raw material for project work		4 set of materials

Classroom Aids

The aids required to conduct sessions in the classroom are:

1. *Simulator*
2. *Smart Board*
3. *Practice Exercise*
4. *Projector etc.*

Annexure III: 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							

2							

Annexure IV: 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
2023-24	60	55	5	5	0	0
2024-25	80	72	5	5	0	0
2025-26	100	92	5	5	0	0

Data to be provided year-wise for next 3 years

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

Qualification Version	Year	Total Candidates				Women				People with Disability			
		Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed
1.0	**2020-21**	**160**	**155**	**148**	**129**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**0**
1.0	**2021-22**	**30**	**22**	**18**	**16**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**0**
1.0	**2022-23**	**86**	**75**	**67**	**58**	**2**	**2**	**2**	**2**	**0**	**0**	**0**	**0**

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:

1. Nil

Content availability for previous versions of qualifications:

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

Languages in which Content are available:

English and Hindi

Annexure V: 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/wp-content/uploads/2023/01/Guidelines-for-Blended-Learning-for-Vocational-Education-Training-Skilling.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 with 2D and 3D animation Self-Learning Videos /Broadcasts/Mobile Learning/Curated Digital content	100:0
2	☐ Imparting Soft Skills, Life Skills, and Employability Skills/Mentorship to Learners	Self-Learning Videos, Broadcasts, Mobile Learning, Curated Digital content	100:0
3	☐ Showing Practical Demonstrations to the learners	Video Content, E-Resource library	40:60

4	☐Imparting Practical Hands-on Skills/Lab Work/Workshop/Shop floor training	Soldering Kit	100:0
5	☐Tutorials/Assignments/Practice	Online Question Bank, Mobile Quick test app, MCQ based tests, Practical Test on Equipment	100:0
6	☐Proctored Monitoring/Assessment/Evaluation/Examinations	Assessment engine for Essays, Up-loadable file examinations, Mock test sessions	40:60
7	☐On the Job Training (OJT)		NA

Annexure VI: Detailed Assessment Criteria

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

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
NOS/Module: **MSME/PGDTD/01** Product Manufacturing with CNC Programming And Machining	PC.1 Accurately interpret complex technical drawings and blueprints for CNC machining tasks, ensuring specifications are understood and met. PC.2 Develop, input, and optimize advanced CNC programs, ensuring efficient tool paths, minimal waste, and precise machining outcomes. PC.3 Oversee and perform the setup, calibration, and alignment of CNC machines for a variety of materials and components, ensuring high accuracy and quality. PC.4 Select appropriate tools and cutting parameters for specific machining tasks, ensuring optimal performance and tool longevity, analyze and evaluate the selection criteria		100	-	-

	PC.5 Implement advanced quality control techniques, inspecting machined parts for accuracy, and adjusting processes to meet tight tolerances. PC.6 Provide guidance and training to junior machinists and operators, ensuring adherence to safety protocols and quality standards. PC.7 Diagnose and resolve complex CNC programming or machining issues, ensuring minimal downtime and maintaining productivity. PC.8 Identify opportunities for process improvement and implement changes to optimize production efficiency and reduce costs. PC.9 Ensure adherence to workplace safety standards and CNC machine operating procedures, complying with all relevant regulations and guidelines. PC.10 Collaborate with engineering, production, and quality assurance teams to ensure that all machining processes meet project goals and timelines.				
NOS/Module: **MSME/PGDTD/02** Engineering Drafting and Modelling Using CAD Software	PC.1 Accurately interpret detailed design briefs, technical specifications, and client requirements, ensuring that all project objectives are clearly understood. PC.2 Develop complex 2D and 3D CAD models using AutoCAD, and SolidWorks, ensuring precision in design and adherence to industry standards. PC.3 Utilize parametric design and simulation features within SolidWorks to analyze and test design feasibility, functionality, and performance. PC.4 Perform design optimization to improve functionality, material usage, and cost-effectiveness, while maintaining design integrity and meeting project constraints.		100	-	-

	PC.5 Coordinate design and drafting activities across multidisciplinary teams, ensuring efficient communication and timely delivery of design outputs. PC.6 Ensure all designs meet relevant industry standards, compliance regulations, and project-specific requirements, conducting thorough reviews and validations. PC.7 Manage and organize design files effectively in collaborative environments, ensuring seamless sharing and version control using tools like AutoCAD and Solidworks PC.8 Identify and troubleshoot design-related issues during the development phase, offering quick and effective solutions to maintain project timelines. PC.9 Provide guidance and mentorship to junior CAD technicians and drafters, ensuring adherence to best practices in design and drafting. PC.10 Prepare comprehensive design reports, technical documentation, and drawings for submission to clients or engineering teams, ensuring clarity and accuracy. PC.11 identify and use key features of solid modeling software package to produce models Key features: extrude, extrude cut, solid model, mirror, revolve, wireframe, radius/chamfer, hide, rib, rectangular pattern, fillet, cut/remove, circular pattern, shell, development view, motion analysis, animation, defining material property, exploded views PC.12 perform and analyze drawing for solid modeling PC.13 extract physical properties as per job requirement, including volume, mass and center of gravity PC.14 take into account the following factors, as appropriate to the model being produced Factors: function, cost, physical space, quality, lifetime of the product, operating environment, manufacturing method, tolerances,				

	interfaces, ergonomics, clearance, safety, materials, aesthetics, apply rendering techniques PC 15. Effectively handle and team of designers using CAD software as well as able to create, analyze and evaluate CAD models and drafting				
NOS/Module: **MSME/PGDTD/03** Advance Manufacturing Practices using Cam Software	PC.1 Accurately interpret detailed technical drawings and specifications to ensure precise translation into CAM programs using MasterCAM and Unigraphics NX CAM. PC.2 Develop complex tool paths and machining strategies in MasterCAM and Unigraphics NX CAM, optimizing for efficiency, precision, and material conservation. PC.3 Optimize tool paths to reduce machining time, tool wear, and material wastage while maintaining the highest quality standards in production. PC.4 Set up CNC machines and run simulations in CAM software to validate tool paths and machining processes before actual production. PC.5 Utilize advanced features such as 4-axis and 5-axis machining in CAM software to create complex parts, ensuring high precision and efficient machining. PC.6 Generate accurate and optimized G-code for various CNC machines, ensuring smooth operation and high-quality production outputs. PC.7 Design and simulate fixtures and work holding setups within CAM software to ensure secure, accurate, and efficient machining. PC.8 Select appropriate tools and cutting parameters for specific materials and machining operations, taking into account tool life, material characteristics, and surface finish requirements. PC.9 Use CAM software to simulate machining processes, identifying potential issues such as collisions or tool deflections before actual production begins.	-	100	-	-

	PC.10 Ensure the CAM programs produce parts that meet tight tolerances and quality standards, performing regular inspections and adjustments as needed. PC.11 Streamline the production workflow by optimizing machine utilization, minimizing setup times, and reducing lead times. PC.12 Diagnose and resolve machining problems, such as tool breakage or surface finish issues, by adjusting CAM programs and machining parameters. PC.13 Work closely with design and engineering teams to ensure that CAM programs are aligned with product design intent and manufacturing capabilities. PC.14 Oversee the coordination of CAM programming and machining activities, ensuring projects are completed on time and within budget while maintaining high-quality standards. PC.15 Train and supervise junior CAM programmers and machinists, ensuring they follow best practices in CAM programming and CNC operation.				
NOS/Module: **MSME/PGDTD/04** Design of Work holding Devices And Gauges	PC.1 Accurately interpret complex engineering drawings and specifications to design jigs and fixtures that meet precise functional requirements. PC.2 Create advanced jig and fixture designs that ensure accuracy, repeatability, and ease of use in manufacturing processes, using CAD tools and design principles. PC.3 Select appropriate materials for jigs and fixtures based on strength, durability, and cost-effectiveness, while also considering the specific requirements of the machining or assembly process.	100	100	-	-

	PC.4 Design custom jigs and fixtures tailored to specific production needs, focusing on improving speed, accuracy, and overall manufacturing efficiency. PC.5 Use simulation tools to validate jig and fixture designs before production, ensuring they meet performance standards and eliminate potential design flaws. PC.6 Incorporate ergonomic considerations and safety features into jig and fixture designs to enhance operator comfort and minimize the risk of injury during usage. PC.7 Optimize the design and development process to minimize costs and reduce manufacturing lead time without compromising on quality or functionality. PC.8 Ensure that jigs and fixtures are compatible with existing machines, tools, and production processes, facilitating seamless integration and minimizing downtime. PC.9 Work closely with production, machining, and engineering teams to ensure that jigs and fixtures align with overall production goals and improve workflow efficiency. PC.10 Identify design or performance issues with jigs and fixtures during production, making necessary modifications and continuously seeking opportunities for process optimization. PC.11 Design procedure for different gauges PC.12 Develop, analyze and evaluate various jigs and fixture designs				
NOS/Module: **MSME/PGDTD/05** Stamping Die Design	PC.1 Analyze and interpret complex technical specifications and design requirements for press tools, ensuring accurate and effective design solutions.	100	100	-	-

	PC.2 Design advanced press tools, including dies, punches, and other components, using CAD software and adhering to industry standards for functionality and precision. PC.3 Select and utilize appropriate materials for tool components based on factors like durability, wear resistance, and cost, ensuring optimal performance. PC.4 Integrate various tooling components into a cohesive press tool design, ensuring compatibility with existing machinery and production processes. PC.5 Apply principles of Design for Manufacturing to ensure that press tools are easy to produce, assemble, and maintain, while minimizing production costs and complexity. PC.6 Use simulation software to model and test press tool designs, validating performance and identifying potential issues before physical prototyping and production. PC.7 Optimize press tool designs to enhance manufacturing efficiency, reduce cycle times, and minimize material waste, improving overall production performance. PC.8 Design press tools with consideration for ease of maintenance and longevity, incorporating features that extend tool life and reduce downtime. PC.9 Ensure that press tools meet stringent quality standards and compliance regulations, conducting thorough inspections and testing throughout the design process. PC.10 Design press tools with a focus on cost efficiency, balancing material and production costs with performance requirements to achieve economical solutions.				

	PC.11 Incorporate ergonomic and safety considerations into press tool designs to ensure safe operation and ease of use for operators. PC.12 Ensure that press tool designs are compatible with and enhance existing production processes, facilitating smooth integration and efficient workflow. PC.13 Identify and resolve design or performance issues with press tools during development and production, implementing effective solutions to address problems. PC.14 Manage and coordinate press tool design and development projects, ensuring adherence to timelines, budgets, and project goals while maintaining high-quality standards. PC.15 Provide training and mentorship to junior engineers and designers, sharing knowledge and best practices in press tool design and process optimization.				
NOS/Module: **MSME/PGDTD/06** Design of Tools with Advance CAD Software Module I	PC.1 Demonstrate the ability to create advanced tool designs using Unigraphics and CATIA. PC.2 Apply knowledge of tool design principles (moulds, dies, jigs, fixtures) in the development of efficient tools. PC.3 Ensure that the design meets the functional, dimensional, and quality requirements of the tool. PC.4 Develop 3D models of tools with a high degree of accuracy using Unigraphics and CATIA. PC.5 Implement advanced simulation techniques (e.g., finite element analysis, motion simulation) to test tool performance under different conditions.	-	100	-	-

	PC.6 Validate tool designs through simulation and make necessary modifications for optimization. PC.7 Validate tool designs through simulation and make necessary modifications for optimization. PC.8 Utilize surface and solid modeling techniques to create complex geometries. PC.9 Create detailed assembly designs, ensuring all components of the tool fit and function together without interference. PC.10 Simulate tool assemblies to detect potential issues related to tolerance, clearances, and movements. PC.11 Employ parametric modeling to allow flexibility and scalability in tool design. PC.12 Modify and optimize tool designs efficiently using parametric constraints and design variables. PC.13 Implement design iterations quickly using Unigraphics and CATIA's parametric capabilities. PC.14 Perform tool design optimization considering material selection, tool life, manufacturability, and cost-efficiency. PC.15 Use Unigraphics and CATIA's built-in optimization tools to analyze design alternatives. PC.16 Implement modifications to improve the overall efficiency and performance of the tool based on analytical feedback. PC.17 Apply GD&T principles to ensure precision and accuracy in tool design. PC.18 Interpret and apply appropriate tolerance and fit requirements to the tool design to ensure manufacturability. PC.19 Use Unigraphics and CATIA tools to verify tolerances and ensure that the designed tool meets stringent tolerance specifications.				

	PC.20 Analyze different material properties using software tools to select the most appropriate materials for tool design. PC.21 Perform material cost-benefit analysis to ensure efficient tool performance while minimizing production costs. PC.22 Use CATIA's material library and analysis tools to predict the behavior of materials under stress. PC.23 Ensure that the designed tools are manufacturable with the available processes. PC.24 Develop process plans using the manufacturing modules in Unigraphics or CATIA to simulate machining, tooling setup, and production workflows. PC.25 Analyze and mitigate potential manufacturing issues early in the design phase. PC.26 Generate 2D drawings with all necessary dimensions, notes, and tolerances to aid in tool manufacturing. PC.27 Produce detailed design documentation, including exploded views, BOM (Bill of Materials), and step-by-step assembly instructions. PC.28 Use Unigraphics and CATIA to ensure that the documentation is updated and accurate throughout the tool development process. PC.29 Implement custom design features and automation in Unigraphics and CATIA to improve efficiency. PC.30 Use scripting tools and design automation techniques to streamline repetitive tasks and complex calculations. PC.31 Customize tool templates and parametric constraints to suit specific tool design requirements. PC.32 Identify and resolve design issues using diagnostic tools available in Unigraphics and CATIA.				

	PC.33 Perform root-cause analysis of tool design problems and iterate quickly to implement solutions. PC.34 Simulate tool behavior under various operational conditions to preempt potential failures. PC.35 Interface tool design with CAM (Computer-Aided Manufacturing) for seamless transition to production. PC.36 Ensure tool designs are compatible with CNC programming and advanced manufacturing techniques. PC.37 Use the manufacturing modules in Unigraphics or CATIA to simulate machining operations and tool paths. PC.38 Explore new design techniques and leverage the latest features in Unigraphics and CATIA for innovative tool designs. PC.39 Continuously improve design processes by incorporating feedback from manufacturing and operations teams. PC.40 Implement design improvements based on performance data and analysis. PC.41 take into account the following factors, as appropriate to the model being produced Factors: function, cost, physical space, quality, lifetime of the product, operating environment, manufacturing method, tolerances, interfaces, ergonomics, clearance, safety, materials, aesthetics, apply rendering techniques				
NOS/Module: **MSME/PGDTD/07** Mold Design for Plastic Parts	PC.1 Demonstrate the ability to design complex moulds using advanced CAD software. PC.2 Apply principles of mould design to optimize the functionality and efficiency of the mould. PC.3 Integrate considerations for material flow, cooling, and ejection systems into the design process.	100	100	-	-

	PC.4 Develop and implement prototype moulds, ensuring they meet design specifications and performance standards. PC.5 Utilize advanced manufacturing techniques such as additive manufacturing or precision machining for mould fabrication. PC.6 Conduct rigorous testing and validation of the moulds to ensure they perform as expected. PC.7 Analyze and optimize moulding processes to enhance productivity and reduce waste. PC.8 Implement process improvements based on data analysis and performance metrics. PC.9 Utilize statistical process control (SPC) and other analytical tools to monitor and improve process efficiency. PC.10 Select appropriate materials for mould construction based on their properties and the requirements of the moulding process. PC.11 Manage and oversee the material handling and preparation to ensure quality and consistency. PC.12 Identify and resolve complex issues related to mould design and manufacturing processes. PC.13 Apply advanced problem-solving techniques to address challenges and improve overall mould performance. PC.14 Effectively communicate design and process changes to team members and stakeholders. PC.15 Collaborate with cross-functional teams to ensure alignment and successful implementation of mould design and process optimization strategies. PC.16 Ensure that all mould design and development activities comply with industry standards and safety regulations. PC.17 Implement safety protocols to protect personnel and equipment during the moulding process.				

	PC.18 Stay abreast of the latest technological advancements in mould design and manufacturing. PC.19 Encourage and implement innovative approaches to improve mould design and process efficiency. PC.20 Maintain detailed documentation of design processes, material specifications, and process optimizations. PC.21. Prepare comprehensive reports and presentations to communicate findings and recommendations to stakeholders. PC.22 Implement design changes and process adjustments to prevent common casting defects such as porosity, cracks, and misruns. PC.23 Use quality control tools and techniques such as FMEA (Failure Mode and Effect Analysis) to predict and mitigate potential issues in the die casting process. PC.24 Perform root cause analysis of defects and introduce corrective actions to improve casting quality.				
NOS/Module: **MSME/PGDTD/08** Design of Metal Die Casting	PC.1 Design complex die casting components using advanced CAD software, considering the intricacies of die design. PC.2 Develop designs that meet dimensional, functional, and quality standards required in die casting. PC.3 Incorporate critical factors such as material shrinkage, draft angles, and wall thickness in the design. PC.4 Use advanced simulation tools to analyze the casting process for potential defects like air entrapment, porosity, and warping. PC.5 Validate the die design by simulating material flow, thermal behavior, and cooling cycle to optimize part quality. PC.6 Implement feedback from simulation results to refine and optimize the die design.	100	100	-	-

	PC.7 Select appropriate alloys and materials for die casting based on mechanical properties, heat resistance, and casting performance. PC.8 Conduct thermal and stress analysis to predict the behavior of selected materials during casting. PC.9 Optimize material use to balance part strength, manufacturability, and cost-effectiveness. PC.10 Optimize die design for efficient production, considering factors such as cycle time, cooling rates, and part ejection. PC.11 Minimize defects and improve casting quality through design changes that optimize gating, runner, and venting systems. PC.12 Incorporate modular designs or interchangeable components to enhance production flexibility and reduce downtime. PC.13 Design and implement efficient cooling systems within the die to regulate temperatures and reduce casting defects. PC.14 Analyze cooling rates using simulation tools to optimize the thermal performance of the die. PC.15 Ensure uniform cooling of cast parts to avoid warping, residual stress, or shrinkage. PC.16 Design dies with wear-resistant materials and coatings to extend the life of the tool. PC.17 Analyze the die for stress concentration points and potential areas of failure due to high-temperature exposure. PC.18 Incorporate features in the die that allow easy maintenance and replacement of high-wear components. PC.19 Analyze and optimize the entire die casting process to improve productivity and reduce cycle times.				

	PC.20 Use statistical process control (SPC) and data analysis to monitor and control critical process parameters (e.g., temperature, pressure, and injection speed). PC.21 Integrate advanced manufacturing techniques like CNC machining, additive manufacturing (for prototypes), and EDM (electrical discharge machining) in the die development process. PC.22 Evaluate the manufacturability of the die design to ensure it can be efficiently produced with available resources. PC.23 Collaborate with toolmakers and manufacturers to incorporate the best practices for die production and assembly. PC.24 Implement design changes and process adjustments to prevent common casting defects such as porosity, cracks, and misruns. PC.25 Use quality control tools and techniques such as FMEA (Failure Mode and Effect Analysis) to predict and mitigate potential issues in the die casting process. PC.26 Perform root cause analysis of defects and introduce corrective actions to improve casting quality. PC.27 Optimize the die casting process to reduce energy consumption, including furnace management and efficient use of molten metal. PC.28 Prepare detailed reports outlining the results of process optimization efforts and key performance metrics. PC.29 Collaborate effectively with cross-functional teams, including designers, toolmakers, and production engineers, to ensure alignment in die casting design and optimization efforts. PC.30 Communicate design concepts, simulation results, and optimization strategies clearly to stakeholders through presentations and design reviews.				

	PC.31 Perform cost analysis of die casting projects, including tooling, material, and process costs. PC.32 Present feasibility reports based on analysis of production efficiency, expected life of the die, and return on investment. PC.33 Ensure that all die casting designs comply with relevant safety regulations and industry standards. PC.34 Maintain compliance with quality management systems (such as ISO standards) throughout the die design, development, and casting processes.				
NOS/Module: **MSME/PGDTD/09** Mechanical Measurement and Total Quality Management	PC.1 Describe significance of measurement and types of measurements. PC.2 Explain how to do standardization of the measuring instruments. PC.3 List the Principles of measurements PC.4. Types of inspection PC.5. Inspection the measurement by using various Instrument like Vernier caliper, Micrometer, Gauges etc. PC.6. List various features to Inspections. PC.7. List various features to Inspections. PC.8. Describe Inspection Straightness & Flatness of various surface PC.8. Explain Types of QC and SQC PC.9. Explain TQM PC.10. Describe various types of Quality Control Chart PC.11. Describe Quality Circle and elements of Quality Circle PC.12. List and Explain 3 types of Quality Philosophy .	100	100	-	-
NOS/Module: **MSME/PGDTD/10** Manufacturing Process Planning and Heat Treatment	PC.1 Define and identify various manufacturing processes PC.2 Discuss process capabilities PC.3 Identify and explain manufacturing process in sheet metalworking, Moulding and die casting die PC.4 Summaries and define man machine consideration PC.5 Explain man machine information exchange	100	-	-	-

	PC.6 Implement and describe JIT, KANBAN. Describe quality function development PC.7 Explain and streamline creation of manufacturing database and application of computer in production management PC.8 Explain and streamline creation of manufacturing database PC.9 Describe Computer aided manufacturing process. PC.10 List of tool elements are used in press tool, Mould, Jigs and fixture and Die Casting Die PC.11 Describe functions of each element are used in press tool, Mould, Jigs and fixture and Die Casting Die PC.12 Identify application of each part and importance in there. PC.13 Details each parts are used in press tool, Mould, Jigs and fixture and Die Casting Die PC.14 Identify manufacturing operation are used to by making tool elements PC.15 Identify accuracy criteria for tooling elements PC.16 Identify various materials of tool elements PC.17 explain concept of hardenability Detail knowledge of Properties of tool elements material				
NOS/Module: **MSME/PGDTD/11** Design of Tools With Advance CAD Software Module II	PC.1 Develop intricate and precise die designs for die casting using PRO-E, ensuring compliance with dimensional and functional specifications. PC.2 Create accurate 3D models of die components such as core, cavity, and inserts using PRO-E's parametric modeling features. PC.3 Implement solid and surface modeling techniques for designing complex geometries within the die. PC.4 Validate the 3D model through cross-section analysis, ensuring that all design features are precise and manufacturable.				

	PC.5 Conduct simulations using PRO-E to predict the behavior of molten metal flow, cooling, and solidification within the die. PC.6 Utilize parametric design capabilities in PRO-E to create flexible die models that can easily be modified for different product variations. PC.7 Use feature-based modeling to manage design changes efficiently and automate repetitive design tasks. PC.8 Implement design constraints and rules to ensure consistency across multiple die design iterations. PC.9 Create die assemblies in PRO-E, ensuring that all components (e.g., ejector pins, runners, slides) fit and function together without interference. PC.10 Use interference checking tools to detect any overlaps or clashes between die components and adjust the design accordingly. PC.11 Simulate the movement of die components (such as core and cavity motion) to ensure smooth operation during the casting process. PC.12 Design and optimize gating systems (sprues, runners, gates) for efficient metal flow into the die cavity using PRO-E. PC.13 Conduct stress analysis using PRO-E to identify areas of high stress and potential failure within the die during the casting process. PC.14 Analyze the behavior of different materials (such as steel alloys) under die casting conditions to ensure durability and optimal performance. PC.15 Incorporate material properties such as hardness, thermal conductivity, and expansion rates into the die design.				

	PC.16 Implement changes based on optimization results to enhance production efficiency and minimize defects. PC.17 Utilize PRO-E's automation features (such as macros or scripting) to speed up the design process and reduce manual work. PC.18 Generate detailed 2D drawings from 3D models in PRO-E, including dimensions, tolerances, and annotations necessary for die manufacturing. PC.19 Ensure that all drawing views (exploded views, sectional views) provide clear and comprehensive information to toolmakers. PC.20 Maintain proper documentation, including BOM (Bill of Materials), material specifications, and assembly instructions. PC.21 Communicate effectively with stakeholders to ensure that die design aligns with production goals, quality standards, and customer requirements. PC.22 Ensure that the die design process follows environmental and quality management standards (ISO, etc.), ensuring product safety and sustainability.				
NOS/Module: **MSME/PGDTD/12** FEA using CAE Software	PC.1 Solve the problem on Cantilever Beam PC.2 Solve the problem on Simple Supported beam PC.3 Solve the problem on 3D Models PC.4 Maximum Load Condition PC.5 Stress Calculation PC.6 Maximum and Minimum Deflection PC.7 spring back, cutting clearance, burr, sheet metal thinning, and loss of flatness after sheet metal forming	-	100	-	-

	PC.8 Solve problem of heat checks, weld line, air entrapments, blow holes, draft, and problems during ejection etc. PC.9 solve above problems by undertaking self-study and providing creative solution PC.10 Experimentation on the problem and can generate feasible solution wherever applicable				
NOS/Module: **MSME/PGDTD/13** Additive Manufacturing	PC.1 Identify basic of Additive manufacturing PC.2 design potential in 3D Printing PC.3 knowledge of 3D Printing and 3D scanning PC.4 describe design complexity PC.5 apply basic CAD properties PC.6 test the functional of 3D scanning & 3D printing PC.7 Use the 3D scanning to reconstruct the design PC.8 To get the dimensions over physical modal PC.9 Basic knowledge of materials PC.10 Use the concept of photo polymerization PC.11 Apply the processes control of 3D printing PC.12 Ensure Basic knowledge of materials PC.13 Use the concept of photo polymerization PC.14 Apply the processes control of 3D printing PC.15 Apply the knowledge in medical PC.16 Identify the digital manufacturing PC.17 Describe electronic and electronic modeling PC.18 Use selective laser sintering(SLS), Stereo lithography apparatus(SLA) PC.19 Clarify the applications of 3D printing & 3D scanning PC.20 Evaluate the scope of 3D scanning & 3D printing PC.21 Work with different Technology problem and proposed solutions	100	-	-	-

NOS/Module: **MSME/PGDTD/14** Innovative Design And Research Methodology	PC1. Encompasses various modules and functionalities Innovation PC2. Explain Needs, Challenges and Strategies of Innovations. PC3. Describe different types of Innovative Problem solving and Matrixes. PC4.Explain different Innovative Idea generation processes and Techniques PC5. Describe Objectives and Motivation of Research, PC.6. Explain different Types of Research and Research Approaches, PC.7. Describe different methods of Literature survey PC.8. Describe Principal of DOE PC.9. Types of Research design PC.10. Explain different methods of Data collection, Data Analysis PC.42 PC.11. Report Writing	100	-		
NOS/Module: **MSME/ES/02** Employability Skills / Entrepreneurship	PC.1 Introduction to Employability Skills PC.2 Constitutional values - Citizenship Entrepreneurial process PC.3 Becoming a Professional in the 21st Century PC.4 Basic English Skills PC.5 Career Development & Goal Setting PC.6 Communication Skills PC.7 Diversity & Inclusion PC.8 Financial and Legal Literacy PC.9 Essential Digital Skills PC.10 Entrepreneurship PC.11 Customer Service PC.12 Getting ready for apprenticeship & Job	100	-	-	-
NOS/Module: **MSME/PGDTD/15** OJT	PC.1 gather accurate information on project concept and requirements PC.2 Confirm the project objectives PC.3 preparation of conceptual plan PC.4 selection of CAD software based on capabilities of modeling PC.5 Presentation skills, analytical thinking	-	100	-	-

	PC.6 utilize CAD & CAM Software PC.7 communicate clearly about the project requirement to the group members PC.8 identify different design options which will meet requirements and design specification PC.9 Develop creative solution among different options available using latest technology e.g. CAE software, Reverse Engineering, Rapid Prototyping etc. PC.10 Analyze project concepts to meet design requirements PC.11 identify problems with work planning, procedures, output and behavior and their implications e.g. Unpredictable behavior of material in sheet metal, mould and die casting during validation PC.12 prioritize and plan for problem solving PC.13 communicate problems appropriately to others PC.14 identify sources of information and support for problem solving PC.15 seek assistance and support from other sources to solve problems PC.16 Identify effective resolution techniques e.g. CAE software, Engineering research methodology etc. PC.17 select and apply resolution techniques PC.18 seek evidence for problem resolution PC.19 inspect quality of own or other's work PC.20 analyze information according to enterprise and work requirements PC.21 use diagnostic skills to identify and determine causes of faults, including interpretation of in-built fault indicators and error codes PC.22 take decisions within if within own jurisdiction or take approval for case outside own jurisdiction PC.23 Prepare cost estimate of the project.				

	PC.24 Prepare design & development project plan with timeline and responsibilities of self and team members PC.25 Carry out mathematical calculation required for designing the tool e.g. economy factor calculation, different forces calculation, tool element size design calculations, no. of cavities calculation etc. PC.26 carry out mathematical calculation for selection of optimum machining parameters PC.27 Prepare CAM program PC.28 Involvement in Departmental procedural system for project PC.29 Responsibility of task completion PC.30 Validate the project outcomes with specified acceptance criteria PC.31 interpret Assembly Drawing & detail drawing PC.32 Assign Process & Work Planning PC.33 identify Individual job operations PC.34 prepare process plan PC.35 arrange sequence of operations in logical manner PC.36 identification of Priorities in the project for timely completion of the project PC.37 Monitor tool manufacturing process with the help of manufacturing process plan, bar chart, and appropriate management information system available. PC.38 Determine acceptance criteria for the required quality specified in the project. PC.39 Select the required measuring methods/instruments to obtain desired quality PC.40 Carry out Tool fitting, Assembly & Try out PC.41 Inspect Quality of project				

	PC.42 Keep record of rejection and rework and undertake self-study to eliminate the same in future project				
	Total Marks	**900**	**1200**	**-**	**-**

Annexure VII: 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 are assigned to the MSME NSQF Assessment Agency via email for the assessment.
- MSME NSQF Assessment Agency sends the assessment confirmation to respective TC.
- MSME NSQF Assessment Agency deploys the certified Assessor for executing the assessment at respective TC via online / offline mode.
- MSME NSQF Assessment Agency & respective TC Internal Assessment cell monitors the assessment process & records.

2. Testing Environment:

- MSME NSQF Assessment Agency confirms the Assessment location, date and time
- For number of candidates more than 30 separate assessors are assigned for the assessment.
- MSME NSQF Assessment Agency & respective assessor confirms that the allotted time to the candidates to complete Theory & Practical Assessment is correct.

3. Assessment Quality Assurance levels/Framework:

- Each TC Submits the Question Bank for the individual subject Theory &Practice separately, submits to MSME NSQF Assessment Agency and it is verified by the MSME NSQF Assessment Agency Committee members.
- Questions are mapped to the specified assessment criteria
- All the assessors & Trainers are well qualified & trained to carry out the specified task.

4. Types of evidence or evidence-gathering protocol:

- Online Link is send by MSME NSQF Assessment Agency to respective TC & Assessor. Reporting of the assessor from assessment location is verified by the MSME NSQF Assessment Agency through the online Meeting Link. Students are also required to join for the online link for verification by the MSME NSQF Assessment Agency.
- Assessment Photographs are shared with the MSME NSQF Assessment Agency & are also with the respective TC.

5. Method of verification or validation:

- Online Link is send by MSME NSQF Assessment Agency to respective TC & Assessor. Reporting of the assessor from assessment location is verified by the MSME NSQF Assessment Agency through the online Meeting Link. Students are also required to join for the online link for verification by the MSME NSQF Assessment Agency.

6. Method for assessment documentation, archiving, and access:

- The Assessment records are shared with MSME NSQF Assessment Agency & also stored at respective TC.
- Assessor fills the assessment report and shares with the MSME NSQF Assessment Agency.

On the Job Training:

- Each module will be assessed separately.
- The candidate must score 60% marks to successfully complete the OJT.
- Learner will be assessed on the basis of OJT report followed by Viva
- Assessment will ensure that the Learner is able to:
    - ✓ Effective engagement with the customers / Subordinates and team
    - ✓ Understand the working of various tools and equipment
    - ✓ Understand the working environment of the industry

Annexure VIII: 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.
Short Term Training (STT)	STT/ Short -term skilling means any vocational training program undertaken for less than a year (Theory + Practical + OJT). https://ncvet.gov.in/sites/default/files/NCVET.pdf