



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

MSME TECHNOLOGY CENTRE



Skill India
कौशल भारत - कुशल भारत

QUALIFICATION FILE

SR. TECHNICIAN -MECHATRONICS

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: 4.5

Submitted By:

MSME TECHNOLOGY CENTRE

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

Govt. of India

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Section 1: Basic Details

1.	Qualification Name	SR. TECHNICIAN -MECHATRONICS	
2.	Sector/s	Capital Goods & Manufacturing	
3.	Type of Qualification: <input checked="" type="checkbox"/> New <input type="checkbox"/> Revised <input type="checkbox"/> Has Electives/Options <input type="checkbox"/> OEM	NQR Code & version of existing/previous qualification: <i>(change to previous, once approved)</i> QG-4.5-CG-02405-2024-V1-MSME	Qualification Name of existing/previous version: Master Certificate Course In Mechatronics (MCCM)
4.	a. OEM Name b. Qualification Name <i>(Wherever applicable)</i>	NA	
5.	National Qualification Register (NQR) Code & Version <i>(Will be issued after NSQC approval)</i>	QG-4.5-CG-02405-2024-V1-MSME	6. NCrF/NSQF Level: 4.5
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	The qualification contains different modules which are required for the job role of Sr. Technician (Mechatronics), This qualified learner shall be able to: <ul style="list-style-type: none">• Install, operate the mechatronics system.• Prepare and execute logic using PLC / SCADA programming.• Prepare Electrical system drawing• Use and control the system using pneumatics and Hydraulic• To get an employment in Engineering/ Manufacturing industries and also become an entrepreneur	

9.	Eligibility Criteria for Entry for Student/Trainee/Learner/Employee	<p>a. Entry Qualification & Relevant Experience: Diploma or Degree in Mechanical / Electrical / Electronics / Instrumentation / Equivalent.</p> <table border="1" data-bbox="958 199 2072 582"> <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>10th + 3-year diploma in relevant field *</td> <td>-</td> </tr> <tr> <td>2</td> <td>Pursuing 3rd year of 3-year diploma after 10th and continuing education</td> <td>-</td> </tr> <tr> <td>3</td> <td>Previous relevant Qualification of NSQF Level 4 in the field of CNC</td> <td>1.5 year relevant experience</td> </tr> <tr> <td>4</td> <td>2 years of NTC/ NAC*</td> <td>2 year relevant experience</td> </tr> </tbody> </table> <p>b. Age: 17 Years</p>						S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)	1	10th + 3-year diploma in relevant field *	-	2	Pursuing 3rd year of 3-year diploma after 10th and continuing education	-	3	Previous relevant Qualification of NSQF Level 4 in the field of CNC	1.5 year relevant experience	4	2 years of NTC/ NAC*	2 year relevant experience									
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4	2 years of NTC/ NAC*	2 year relevant experience																													
10.	Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))	20			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)	<p><input type="checkbox"/>Offline <input type="checkbox"/>Online <input checked="" type="checkbox"/>Blended</p> <table border="1" data-bbox="958 922 2161 1177"> <thead> <tr> <th>Training Delivery Modes</th> <th>Theory (Hours)</th> <th>Practical (Hours)</th> <th>OJT Mandatory (Hours)</th> <th>OJT Recommended (Hours)</th> <th>Total (Hours)</th> </tr> </thead> <tbody> <tr> <td>Classroom (offline)</td> <td>120</td> <td>360</td> <td>60</td> <td>-</td> <td>540</td> </tr> <tr> <td>Online</td> <td>60</td> <td>-</td> <td>-</td> <td>-</td> <td>60</td> </tr> <tr> <td>Total</td> <td>180</td> <td>360</td> <td>60</td> <td>-</td> <td>600</td> </tr> </tbody> </table> <p>(Refer Blended Learning Annexure for details)</p>						Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)	Classroom (offline)	120	360	60	-	540	Online	60	-	-	-	60	Total	180	360	60	-	600
Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)																										
Classroom (offline)	120	360	60	-	540																										
Online	60	-	-	-	60																										
Total	180	360	60	-	600																										
14.	Aligned to NCO/ISCO Code/s (if no code is available mention the same)	7412.01(Automation Specialist)																													
15.	Progression path after attaining the qualification (Please show Professional and Academic progression)	Professional/Career Progress: Supervisor																													

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	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No URLs of similar Qualifications:	
18.	Is the Job Role Amenable to Persons with Disability	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If "Yes", specify applicable type of Disability: As per Govt. norms.	
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)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No The said aspect is covered in the module name Employability Skills.	
21.	Is Qualification Suitable to be Offered in Schools/Colleges	Schools <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Colleges <input checked="" type="checkbox"/> Yes <input type="checkbox"/> 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:30.04.2024	24. Validity Duration:3years	25. Next Review Date:30.04.2027

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

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	Demonstrate the Application of Sensors and Actuators	MSME/MCCM/01 & Version 1.0	Core	4.5	3	30	60	-	-	90	100	-	-	-	100	
2	Develop Automation Logics using PLC and SCADA	MSME/MCCM/02 & Version 1.0	Core	4.5	4	30	90	-	-	120	100	100	-	-	200	
3	Create & Modify the Electrical circuit diagram using CAD software	MSME/MCCM/03 & Version 1.0	Core	4.5	2	-	60	-	-	60	-	100	-	-	100	
4	Develop Hydraulics & Pneumatics circuit for automation application	MSME/MCCM/04 & Version 1.0	Core	4.5	4	30	90	-	-	120	100	100	-	-	200	
5	Mechatronics Technology	MSME/MCCM/05 & Version 1.0	Core	4.5	5	30	60	60	-	150	100	100	-	-	200	
6	Employability skills	MSME/ES/02	None Core	4.5	2	60	-	-	-	60	100	-	-	-	100	
Duration (in Hours) / Total Credit / Marks					20	180	360	60	-	600	500	400	-	-	900	

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)
-	-	-														

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 .	Viv a	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 Electrical Engineering or Electronics Engineering or Mechanical Engineering or MSc. Electronics or Equivalent with Practical skills and knowledge required in the relevant job role at least one level higher i.e level 4.5 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
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2.	Master Trainer’s Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	Degree in Engineering (Mechanical/ Production/Manufacturing Technology) or MSc. Electronics or equivalent with 3 to 5 years of experience in Electrical / Electronics / Mechatronics / Training/ Design Department from Tool Room/ Technology Centre 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	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> 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 Engineering (Mechanical/ Electrical/ Electronics/Mechatronics) or MSc. Electronics or equivalent with 3 years of experience in Electrical / Electronics / Production/ Training/ Design 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)	Diploma / Degree in Engineering (Mechanical/ Electrical/ Electronics / Mechatronics) or MSc. Electronics or equivalent With 5 years of experience in Electrical / Electronics / Production/ Training/ Design Department from Tool Room/ Technology Centre of MSME or any reputed industry.
3.	Lead Assessor’s/Proctor’s Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	Post Graduate in the relevant discipline with minimum 5 years of experience in Electrical / Electronics / Production/ Training/ Design Department from Tool Room/ Technology Centre of MSME or any reputed industry.
4.	Assessment Mode(Specify the assessment mode)	Blended Type (Online + Offline)
5.	Tools and Equipment Required for Assessment	<input checked="" type="checkbox"/> Same as for training <input checked="" type="checkbox"/> Yes <input type="checkbox"/> 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, MSDE's Skill Assessment and Anticipation Study Report
2.	Latest Market Research Reports or any other source (not older than 2 years) (Yes/No): Yes https://www.mckinsey.com/featured-insights/future-of-work/skill-shift-automation-and-the-future-of-the-workforce
3.	Government /Industry initiatives/ requirement (Yes/No):Yes
4.	Number of Industry validation provided: 49
5.	Estimated nos. of persons to be trained and employed: Approx. 2000 per Year
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 <i>(Mandatory)</i>	<i>Annexure-I</i>
2.	Annexure: List of tools and equipment relevant for qualification <i>(Mandatory, except in case of online course)</i>	<i>Annexure-II</i>
3.	Annexure: Industry Validations Summary	<i>Annexure-III</i>
4.	Annexure: Training & Employment Details	<i>Annexure-IV</i>
5.	Annexure: Blended Learning <i>(Mandatory, in case selected Mode of delivery is "Blended Learning")</i>	<i>Annexure-V</i>
6.	Annexure: Detailed Assessment Criteria <i>(Mandatory)</i>	<i>Annexure-VI</i>

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: 1 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	To have broad knowledge of Automation Techniques, Mechatronics systems, Drives, Sensors, hydraulics & Pneumatics.	The job holder will have a factual and theoretical knowledge in the areas of Sensors & their applications, electrical/ hydraulics/ pneumatics component, working of different components, the functions of element / component, PLC/SCADA, PMDC Motor, Stepper motor, three phase squirrel cage induction motor, three phase permanent magnet synchronous motor, servo motor	4.5
Professional and Technical Skills/ Expertise/Professional Knowledge	To apply Mechatronics principles for solutions to the specific problems	•The job holder will identify the problems whenever system breakdown occurs and requisition for particular breakdown comes.	4.5

		<ul style="list-style-type: none">•The job holder will identify the nature of fault whether it mechanical breakdown, electrical breakdown and break down which should be rectified by developing Programmes.•The job holder will further identifying classified problems of the system by using the measuring instruments and electrical and electronics tools such as multimeter (voltage, current, resistance), megger tester, earth tester, continuity tester, tong tester, by checking the existing Programmes of particular controller. •Job holder will apply his/her command of wide ranging mechatronics theoretical skills and knowledge of basics of electricity, behavior of current flowing through the system, controller used in particular system and the basics of programming concept of particular controller to identify the problems in the system.•The job holder will further formulate the identified problems of the system by applying his/her knowledge of relationship between facts and theory of particular system, mathematical calculations on laws and theorems of particular system, practice on solving numerical by considering the specification of component used in the system, calculations to match input-output characteristics with particular controller i.e. voltage ratings, current ratings and power ratings, frequency calculations such as low frequency and high frequency circuits, calculations of communication protocols, calculations for logical design using logic gates while doing program interface, calculations of output voltage waveform of signal conditioning circuits.•The job holder will develop solutions for particular maintenance problems which is already classified, identified and formulated by him/her.	
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<p>Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill</p>	<p>Understand Personal Strengths \ Value ,Digital Literacy, Money Matters and Preparing for Employment & Self Employment</p>	<p>Learner 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.</p> <p>Leaner can understand the basic process of becoming an entrepreneur &start up and can get benefits from various government schemes applicable.</p>	<p>4.5</p>
<p>Broad Learning Outcomes/Core Skill</p>	<p>To use mathematical skills for solving specific problems.</p>	<p>Job holder will work on internal projects during his sessions where he/she shall gather accurate information on project concept and requirements, Confirm the project objectives, preparation of conceptual plan, selection of software based on capabilities of modelling, use Presentation skills, utilize Mechatronics Software, communicate clearly about the project requirement to the group members through written /verbal/e mail etc. as per organizational standard, identify different design options which will meet requirements and design specification, Develop solution to the specific problems like setting the cycle time, mechanical adjustments of the system, matching the programme output with the requirement using latest technology example PLC Programming, Electrical CAD, Mechatronics assistant. Carry out mathematical calculation required to solve a specific problem like calculation of working pressure for the system, finding out the size of cylinder required for the application, calculating the size of the valves etc.</p>	<p>4.5</p>
	<p>To Communicate Effectively</p>	<p>The job holder will communicate clearly about the project and other requirement to the group members through written /verbal/e mail etc. as per organizational standard, identify different design options which will meet requirements and design specification.</p>	
	<p>Develop entrepreneurship skills</p>	<p>Qualification holder explains Meaning and importance of entrepreneurship, Describes Motivations and reasons to start business, Explains: Entrepreneurial process, Entrepreneurship framework, Role of information in opportunity recognition, Emergence of entrepreneurship, Entrepreneurial personality, Meaning and importance of start-up factors of entrepreneurship, Financial planning, Stages of growth of entrepreneurial</p>	

		<p>ventures, Strategic management process, Linkage of strategy and entrepreneurship, Concept of intellectual property, Role perspective of intellectual property concept in entrepreneurship, •Lists Entry barriers, Barriers to growth, Advantages and disadvantages of family businesses ,Recognize Significance and associated details of new ventures, Carry out Organizational planning, Describe Meaning and importance of various organizational structures in new ventures,</p>	
<p>Responsibility</p>	<p>To work as individual & member of inter discipline team in the management supervision.</p>	<ul style="list-style-type: none"> •Job holder obtains sources of information and recognizes information, Uses and draw up technical drawings and documents, Uses documents and technical regulations and occupationally related provisions, Conducts appropriate and target oriented discussions with higher authority and within the team. Recommendations or remarks from the higher authority is the learning source for the job holder. •Job holder Presents facts and circumstances, possible solutions & uses English special terminology, Resolve disputes within the team. •Job holder shall encourage team members for continues learning by time to time discussing with them various issues of project like unpredictable behavior of sensors, servo motors, steeper motors, interfacing elements etc. •Job holder shall follow work standard, specific norms and procedures laid down by the organization. Job holder shall develop moral, values and ethical practices in business operation. 	<p>4.5</p>
	<p>To observe & follow safety</p>	<p>Job holder Follows and maintains procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements and according to site policy. He/she Recognizes and reports all unsafe situations according to site policy.</p> <p>Identifies and take necessary precautions on fire and safety hazards and report according to site policy and procedures. Identifies, handles and stores / dispose of dangerous goods and substances according to site policy and procedures following safety regulations and</p>	

		<p>requirements.</p> <p>He/she Identifies and observes site policies and procedures in regard to illness or accident, safety alarms accurately.</p> <ul style="list-style-type: none"> •Job holder reports to competent authority or health and safety Manager or Management representative for health and safety in the event of accident or sickness of any staff and record accident details correctly according to site accident/injury procedures, communicates site evacuation procedures according to site policy to his subordinates. •Job holder demonstrates the use Personal Productive Equipment (PPE) and use the same as per related working environment, he/she uses the basic first aid under different circumstances, demonstrates the use of different fire extinguisher and use the same as per requirement, Identifies environmental pollution & contribute to the avoidance of instances of environmental pollution. He/she deploys environmental protection legislation & regulations. <p>Uses energy and materials in an environmentally friendly manner and demonstrates others to do same. Avoids waste and dispose waste as per procedure, recognize different components of 5S and apply the same in the working environment.</p>	
	<p>To have business ethics & values.</p>	<ul style="list-style-type: none"> • Job holder shall follow work standard, specific norms and procedures laid down by the organization. Job holder shall develop moral, values and ethical practices in business operation. • The job holder will Follow self-discipline, confidentiality, integrity in the work, Maintains / understand organization culture & perform accordingly. He / She Contributes in the attainment organization, mission, vision, policies & core values, Execute behavior of best citizen & member of organization while following professional practices. 	

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	Basic PLC Training Kits	Industry Standard	5
2	Advanced PLC Training Kits		3
3	Mechatronics Training Kits		1
4	Pneumatics & Hydraulics Training Kits		1
5	Electro – Pneumatic Training Kits		1
6	SCADA Software		20
7	Motors and Drive Training Kits		3
8	Desktop / Computer system With LAN		20
9	CAD-Auto CAD Software		20 Seats
10	Sensors: Inductive proximity sensor, Capacitive Proximity sensor, Photo electric proximity sensor, Temperature sensor RTD, Thermo couple, Thermister, IR thermometer, Pressure sensor,		1 Set
11	Measuring Instruments: Multi-meter, Vernier Calliper, Micrometre: External & Internal, Height Gauge, Dial Indicators (Lever type & Plunger type), Profile Projector, Different types of Gauges		1 Set
12	Cutting tools: Wire cutter, wire stripper, Nose plier,		1 Set

13	Contactora, Relay, Solid state relay (SSR), Tester,		1 set
14	Hand Tools: Centre punches, Hammers, Combination Plier, set of number punches, set of double ended spanners, set of box spanners with ratchet handle, Adjustable spanner, set of screw drivers, Nylon / Soft hammer, set of hexagonal Allen keys, cutting files: flat, round, half round, square and triangular		1 set
15	Others Miscellaneous items for workshop / Lab : Industry hand gloves, Apron, Safety goggles, Bench vice, Magnetic stand for dial indicators, Spring dividers, Angle Plates, Scribing blocks, Vice mounted tables, Scrap box, Tool storage trolley, Set of soft jaws, Power Saw, Surface plate, Oil stone , Hand pallet truck and First aid kit.		1 set
16	General Equipment for Classroom: White Board, Smart Board, Duster, Marker, Multimedia /LCD Projector, Audio Video Aids, Pen drive and Practice exercise etc.		1 set

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	Arrow Aviation	Sanjib De	Quality Managaer	53/1/3, Hazra Road, Kolkata - 700019	9831092407	qualitymanager@arrowaviation.com	

2	Unique Enterprises	Partha Roy	Proprieter	.S.- Dasnagar, Howrah- 711 13	98741 27130	partha@enterprisesindia.com	
3	SHIV ENGINEERS	S.Maity	Proprieter	BALITIKURI, HOWRAH - 711 113	7980872335	shivengineer1980@gmail.com	
4	SK Synthetics	MANISH JAIN	CEO	40 STRAND RD,3RD FLOOR KOLKATTA- 700001	9331022044	SKSYNTHETICS@HOTMAIL.COM	
5	A. C. STEEL TRADING CORPORATION	A. C. JASWAL	PROPRIETER	BELILIOUS RD,LOAN BAZER,ROOM-141,142, HOWRAH-711101	9830073612	ACSTEEL_2004@YAHOO.CO.IN	
6	CALCUTTA TECHNO HEATERS (INDIA) PVT. LTD	M. K. SAHA	DIRECTOR	22A, DUM DUM ROAD, KOLKATA - 700 002	9831086241	MKSOCT55@GMAIL.COM	
7	MAX MILL Technologies	PRADEEP SHARMA	MANAGER	172/1,Ashokgarh,Dunl op, Baranagar, Kolkata-700108	7003462714	maxmilltechnologies@gmail.com	
8	SPECIAL ENGINEERING SERVICES LTD.	ASHIM GANGULY	JR. Factory Manager	16, COSSIPORE ROAD, KOLKATA-700 002	9133255784 34	sescatcn@cal2.vsl.net.in	
9	ABHAYA PRECISION INDUSTRIES PVT LTD	Abhesek Ghosh	Managing Director	70/2,YOURIBANI LANE,KOLKATTA-04	9831617997	MAIL@ABHAYAMD.COM	
10	SATYANARAYAN ENGINEERINGWORK S	NILANGSHU GHARUI	MANAGER	SHANPUR, DAONAGAR, HW- 711105	7980278984	DATYANARAYANEGG@GMAIL.COM	

11	SHREE RADHA KRISHNA INDUSTRIES	MANI BHUSHAN SINGH	Proprieter	1/1d, Joy Krishna Ghosal Road, Ariadaha, Rathtala, Kolkata-700 057	9883368597	SHREERADHAKRISHNA21@GMAIL.C OM	
12	NSCB AVIATION (P) LIMITED	SUBHASISH HALDER	DIRECTOR	34, Scout Para, Ganga Nagar, Kolkata 700132	8910627096	subhasish.haldar@nscbaviation.co m	
13	SSK PRECISION COMPONENTS Mfg. Put. LTD.	SOUVIK SINHA	DIRECTOR	P31, KB.. Roy Garden, Garia Station Road, Kolkata-84	9831065851	SSKCNC@REDIFFMAIL.COM	
14	SABBD TECHNOLOGIES	NAGARAJAN.A	CEO	41C, SECTOR.F, INDORE	9977250649	ADMIN@SANBD.COM	
15	MIKRONIX GAUGES PVT LTD		MD	B-25 MIDC , CHIKALTHANA, CH. SAMBHAJINAGAR	9822004674	MGPLAY@GMAIL.COM	
16	ALLWIN UNITED ASSOCIATION PVT.LTD	MI PANKAJ	DIRECTOR	ALLWIN UNITED ASSOCIATION PVT.LIMITED	7588537412	CONTACT@TECHNOCADDAPL.COM	
17	MIS ANNA BLOCK BORING CENTER	MASIT KHAN	PROPRIETOR	MIS ANNA BLOCK BORING CENTER	9767375083		
18	LAXMI ENTERPRISES	RANJANA BHAYYA SAHEB PAWAR	MI.MANAGER	SAINAGAR GHANEGAON MIDC WALUJ, AURANGABAD	7387431128		
19	M/S HR INDUSTRIES	VASPUT JAUGELE	PROPRIETOR	SAJAPUR, AURANGABAD	9637384737		

20	GAYATRI AUTO COMPONENTS, AURANGABAD	MR. RANJEET METE	MANAGER	AURANGABAD	7385613842	INFO@GAYATRIAUTO.IN	
21	SHARP TOOLS	MAHESH DORLE	SR.MANAGER		9689574563		
22	CHANCHAL ENGINEERING WORKS AURANGABAD	DRYHAEBHWAR	PROPRIETOR	AURANGABAD	9765499939	CHANCHALENGINEERINGWORKS@GMAIL.COM	
23	AKSHARA ENGINEERING WORKS	SHIVAJI GAIKWAD		WALUJ MIDC AURANGABAD	9096420857		
24	ARUSHI ENGINEERING AND BREEZING	VIJAYA PARADE	MANAGER	WALUJ MIDC AURANGABAD	9049596736		
25	SR INDUSTRIES AURANGABAD	RAJENDRA SAUDAGAR MARE	SR. MANAGER	AURANGABAD	8698145607		
26	DEVA ENGINEERING AURANGABAD	ASHOK MOTINAM VEOR	SR. MANAGER	AURANGABAD	8459567793		
27	MAULI PATTERN AURANGABAD	MR.PANCHAL	PROFESSOR	AURANGABAD	9673067755		
28	NAVARATNA INDUSTRIES			WALUJ MIDC AURANGABAD			
29	PRANAW ENTERPRISES	PANDRINATH DEVKAR	PROPRIETOR	AURANGABAD	9371671146	PRANAVENT@GMAIL.COM	

	AURANGABAD						
30	R.P INDUSTRIES	PRASHANT PATIL	CEO	MIDC CHIKATHANA AURANGABAD	8007222251	PRASHANTPATIL@GMAIL.COM	
31	TECHNO MOULD SOLUTION	MR.PANDA	PROPRIETOR	AURANGABAD	7774077907	TECHNOMOULD.SOLUTIONS@GMAIL.COM	
32	SANJAY THCHNO PRODUCTS	HEMANT CHAUDHURY	VP- MANUFACTURING	AURANGABAD	9158898090	HEMANT.CHAUDHARI@SANJAYTEC HNOPRODUCTS.IN	
33	SPECIAL PRECISION	ASHIWINI TADHAV	PROPRIETOR	AURANGABAD		SPECIALASHIWINI@GMAIL.COM	
34	PARASON MACHINERY (INDIA) PVT LTD	GHAHU	GM	AURANGABAD	9325202860	AMOIL.MOGAL@PASASEN.COM	
35	PADMA INDUSTRIES	VITTHALKADOM	CEO	MIDC AURANGABAD	9421688212	VITTHALKADOM2525@GMAIL.COM	
36	VANI ENGINEERING CO.PVT LTD	SUBH	GENERAL MANAGER	AURANGABAD	9730729991	SKAPE@GMAIL.COM	
37	GLANCE ENGINEERING -6 PVT.LIMITED CHIKALTHANA	SUBH SK	GENERAL MANAGER	CHIKALTHANA	9730729991	S.KALE@GMAIL.COM	
38	SURAJ TOOLS AND ENGINEERING WORKS	DEIM	CEO	MIDC CHIKATHANA AURANGABAD	7447375273	SURAJTOOLS@GMAIL.COM	
39	JAI BHAVANI ENGINEERING		GENERAL MANAGER		9370251815		

	WORKS						
40	S N ENGINEERINGWORK S	SNEHA	CEO	CH SAMBHAJINAGAR	9822859974	SNEHAG858@GMAIL.COM	
41	R N INDUSTRIES	TLC	CEO	KAIAGRAM, AURANGABAD	9890718928	R.N.INDUSTRIES01@GMAIL.COM	
42	MADURA DIE CAST PVT LIMITD	MADHURA	CEO	SHENDRA AURANGABAD	9422204622	MADHRADIECAST@GMAIL.COM	
43	SWAGATI ENGINEERING WIS2		CEO	CHIKALTHNA,AURANG ABAD	9763714369	SWAGATIENGG@GMAIL.COM	
44	IDEAL ENTERPRISE		GENERAL MANAGER	CHIKALTHANA AURANGABAD	9763785199	IDEAL1993@GMAIL.COM	
45	INDEXABLE CUTTING TOOL	TOR	PROPRIETOR	BAJAJNAGAR,AURANG ABAD			
46	INDOTURAN INDUSTRIES	USHAL SHINDE	PROPRIETOR	MIDC AURANGABAD WALUJ	9595280808		
47	CREATIVE CASTING INDUSTRIES	MR. SANJAY RANDIRE	PARTNER	K-30, MIDC WALUJ , AURANGABAD	9011001671	CREATIVECAST@REDIFFMAIL.COM	
48	PYRAMID INDUSTRIES	MR. RAJENDRA KALE	PROPRIETOR				
49	RMG INDUSTRIES	RAOUAL	CEO	MIDC AURANGABAD WALUJ	9766699611	EAJUQANDA@RMGINDUSTRIES.CO M	

Annexure IV: Training & Employment Details

Training and Employment Projections:

Sr. TECHNICIAN (MECHATRONICS)

Year	Total Candidates		Women		People with Disability	
	Estimated Training	Estimated Employment Opportunities	Estimated Training	Estimated Employment Opportunities	Estimated Training	Estimated Employment Opportunities
23-24	3000	2500	300	210	-	-
24-25	4000	3000	400	280	-	-
25-26	5000	3500	500	350	-	-

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	20-21	33	33	33	29	5	5	5	3	-	-	-	-
1.0	21-22	131	131	131	116	16	16	16	14	-	-	-	-
1.0	22-23	224	224	224	204	35	34	34	30	-	-	-	-

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. Fee based Training Program under the Ministry of MSME.
2. ESDP Scheme under the Ministry of MSME.
3. PM Dakshta Aur Kushalta Sampann Hitgrahi Yojana under M/o SJE, GOI

- 4. Capacity building Training program under National SC/ST Hub, M/o MSME, GOI
- 5. Schemes under the different state Government.

Content availability for previous versions of qualifications:

Participant Handbook Facilitator Guide Digital Content Qualification Handbook Any Other:

Languages in which Content are available:

English

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	<input type="checkbox"/> 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	40:60
2	<input type="checkbox"/> Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners	Self-Learning Videos , Broadcasts, Mobile Learning , Curated Digital content	40:60
3	<input type="checkbox"/> Showing Practical Demonstrations to the learners	PLC Programming software with Simulators/ CAD Software, Video Content , E-Resource library	100:0
4	<input type="checkbox"/> Imparting Practical Hands-on Skills/ Lab Work/ workshop/	PLC Programming software with Simulators / Pneumatic and hydraulic simulation software / CAD Software / SCADA	100:0

	shop floor training	software	
5	<input type="checkbox"/> Tutorials/ Assignments/ Practice	Online Question Bank, Mobile Quick test app, MCQ based tests, Practical Test on Machines	40:60
6	<input type="checkbox"/> Proctored Monitoring/ Assessment/ Evaluation/ Examinations	Assessment engine for Essays, Up-loadable file examinations, Mock test sessions	50:50

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/MCCM/01 Demonstrate the Application of Sensors and Actuators	PC.1 Describe units and standards. PC.2 Discuss errors in measurement. PC.3 Explain characteristics of transducers. PC.4 Classify the transducers. PC.5 Describe functioning of different temperature measuring instruments. PC.6 Explain working of different gauges. PC.7 Explain working of different transducers. PC.8 Differentiate between different transducers. PC.9 List functions of transducers. PC.10 List smart sensors PC.11 Differentiate between smart sensors and others.	100	100	-	-

	<p>PC.12 Give applications of smart sensors.</p> <p>PC.13 List types of actuators.</p> <p>PC.14 Describe the function of each type of actuator.</p> <p>PC.15 Differentiate between mechanical, electrical and other actuators.</p> <p>PC.16 Give applications of each type of actuator.</p> <p>PC.17 Demonstrate operation of different motors such as PMDC Motor, Stepper motor, three phase squirrel cage induction motor, three phase permanent magnet synchronous motor, servo motor</p>				
<p>NOS / Module:</p> <p>MSME/MCCM/02</p> <p>Develop Automation Logics using PLC and SCADA</p>	<p>PC.1 Understand the concept of industrial automation.</p> <p>PC.2 List the advantages and disadvantages of automation.</p> <p>PC.3 Describe different control systems.</p> <p>PC.4 Understand & draw various electrical symbols.</p> <p>PC.5 Draw and explain one line diagram for different situations.</p> <p>PC.6 List the different field devices.</p> <p>PC.7 List the different field devices.</p> <p>PC.8 Explain the working of a relay.</p> <p>PC.9 Describe the construction of a relay.</p> <p>PC.10 Explain the importance of relay.</p> <p>PC.11 Give applications of relay in industrial circuits.</p> <p>PC.12 Demonstrate the hardware configuration of PLC.</p> <p>PC.13 Understand the addressing of inputs and outputs in PLC.</p> <p>PC.14 Explain the environment of PLC software.</p> <p>PC.15 Demonstrate the software installation.</p> <p>PC.16 Develop the program in the PLC with different formats.</p> <p>PC.17 Understand the output of a program.</p>	-	100	-	-

	PC.18 Use the different internal peripherals of PLC. PC.19 Demonstrate the networking of the PLC. PC.20 Understand the need of SCADA system in automation. PC.21 Differentiate between PLC & SCADA. PC.22 Describe the application of SCADA system. PC.23 Understand procedure of installing the SCADA software. PC.24 Create new application in software in SCADA. PC.25 Work on graphic designer window in SCADA. PC.26 Create and modify graphic display with animation in SCADA. PC.27 Detect the fault in the production system by using the SCADA software PC.28 Understand the details of process tags and internal tags in SCADA PC.29 Apply the LAD programming on SCADA projects. PC.30 Use the property setting of tags in SCADA. PC.31 Apply standard and other objects for the graphic design. PC.32 Create a SCADA picture window related to any process. PC.33 Develop multi screens. PC.34 Apply LAD program to simulate the screen designed. PC.35 Use the different tags in a project. PC.36 Understand the concept of logging system in SCADA. PC.37 Understand the principles of message system. PC.38 Create on line trend. PC.39 Develop a new system. PC.40 Interface field devices with the SCADA system. PC.41 Simulate the designed SCADA system				
NOS / Module :	PC.1 Understand Procedure to be adopted for computer aided	-	100	-	-

<p>MSME/MCCM/03</p> <p>Create & Modify the Electrical circuit diagram using CAD software</p>	<p>drawings</p> <p>PC.2 Describe co-ordinate system</p> <p>PC.3 Understand the applications of co-ordinate system</p> <p>PC.4 Use the AutoCAD workspace and user interface.</p> <p>PC.5 Use the AutoCAD workspace and user interface.</p> <p>PC.6 Optimize commands effectively</p> <p>PC.7 Use more advanced editing and construction techniques.</p> <p>PC.8 Add parametric constraints to objects.</p> <p>PC.9 List the steps of Computer aided electrical drawing.</p> <p>PC.10 Use the Electrical CAD workspace and user interface.</p> <p>PC.11 Use the Electrical CAD workspace and user interface.</p> <p>PC.12 Draw various electrical circuits using CAD software.</p> <p>PC.13 Build intelligent ladder diagrams and panel layouts.</p> <p>PC.14 Insert and edit parametric PLC modules, nonparametric PLC modules, and Stand-alone PLC I/O points</p>				
<p>NOS / Module :</p> <p>MSME/MCCM/04</p> <p>Develop Hydraulics & Pneumatics circuit for automation application</p>	<p>PC.1 List different energy supply elements relate to hydraulics & pneumatics.</p> <p>PC.2 Identify the hydraulics & pneumatic power system elements relate to hydraulics & pneumatics.</p> <p>PC.3 Identify the hydraulics & pneumatic power system elements.</p> <p>PC.4 Select appropriate elements / components / symbols for the given process.</p> <p>PC.5 Select different standard elements</p> <p>PC.6 Recommend variation within the standards, symbols.</p> <p>PC.7 Describe the functioning of different elements, systems</p> <p>PC.8 Differentiate between systems.</p> <p>PC.9 Perform basic mathematical calculation required for cylinder speed.</p>	<p>100</p>	<p>100</p>	<p>-</p>	<p>-</p>

	<p>PC.10 Select appropriate Hydraulic Pump.</p> <p>PC.11 Describe the functioning of different control valves.</p> <p>PC.12 Identify different type of control valves & accessories</p> <p>PC.13 Discuss applications & advantages of hydro -pneumatic systems</p> <p>PC.14 Design the conceptual hydraulic and pneumatic circuit diagram.</p> <p>PC.15 Simulate the circuit diagrams.</p> <p>PC.16 Identify different electrical, pneumatic, hydraulic elements</p> <p>PC.17 Apply logic & creativity to design circuits.</p> <p>PC.18 Analyze the simulation results.</p> <p>PC.19 Communicate the simulation results</p> <p>PC.20 Design the programmable circuit sequence</p> <p>PC.21 Analyze stepper control outputs.</p> <p>PC.22 Explain servo controls applications.</p> <p>PC.23 Design circuits with proportional valves.</p> <p>PC.24 Design cartridge valves</p> <p>PC.25 Troubleshoot faults in system components.</p> <p>PC.26 Follow safety standards.</p> <p>PC.27 Follow safety standards.</p> <p>PC.28 Suggest remedy for the fault.</p>				
<p>NOS / Module :</p> <p>MSME/MCCM/05</p> <p>Mechatronics Technology</p>	<p>PC.1 Understand the Mechatronics project kits and its components.</p> <p>PC.2 Understand the mechanical set up, electrical connection, pneumatics connection</p> <p>PC.3 Understand the trouble shooting of all the kits.</p> <p>PC.4 Discuss about input outputs of the kits.</p>	<p>-</p>	<p>100</p>		

	<p>PC.5 Understand the interfacing of plc with robotics.</p> <p>PC.6 Understands the working ,principle and how actually robot is working</p> <p>PC.7 Process of designing a Mechatronics process</p> <p>PC.8 Identify electrical/ hydraulics/ pneumatics components.</p> <p>PC.9 Explain Mechatronics system and illustrate its relevance in engineering design</p>				
<p>NOS / Module:</p> <p>MSME/ES/01</p> <p>Employability skills</p>	<p>PC.1 Explain the major applications of MS Office</p> <p>PC.2 Explain the different types of e-commerce</p> <p>PC.3 List the benefits of e-commerce for retailers and customers</p> <p>PC.4 Discuss how the Digital India campaign will help boost e-commerce in India</p> <p>PC.5 Write applications pertaining to various matters.</p> <p>PC.6 Explain power of positive attitude and Importance of commitment</p> <p>PC.7 Explain motivation and the Ways to motivate oneself and Personal goal setting</p> <p>PC.8 Explain the Effective & Level of Communication</p> <p>PC.9 Explain communication and Significance of technical communication?</p> <p>PC.10 Explain the methods of listening Skills.</p> <p>PC.11 Explain the differences between bio-data, CV and Resume.</p> <p>PC.12 Explain verbal and non-verbal Communication</p> <p>PC.13 Explain how to face an interview.</p> <p>PC.14 Explain team work, group work, team formation process</p> <p>PC.15 How to Minimize the team conflicts</p> <p>PC.16 Explain Ethics & values</p>	<p>100</p>	<p>-</p>	<p>-</p>	<p>-</p>

	PC.17 Explain the concept of entrepreneurship, and entrepreneurship v/s Management PC.18 Explain the process of project report preparation for setting up a new business PC.19 Explain the role of various schemes and institute for self-employment i.e MSME, DIC, NSIC, SIDBI etc, PC.20 Role of financial institution to support startup PC.21 Discuss the importance of saving money PC.22 Discuss the main types of bank accounts PC.23 Differentiate between fixed and variable costs PC.24 Describe the different types of insurance products PC.25 Discuss the main types of electronic funds transfers				
	Total Marks	300	500	-	-

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
MCCM	Master Certificate Course in Mechatronics

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

