

QUALIFICATION FILE

<Welding Technician -Oil & Gas/Railways/ Shipbuilding (using AR)>

☒ 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

Submitted By:

< Capital Goods and Strategic Skill Council >

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

Table of Contents

Section 1: Basic Details.....	3
Section 2: Module Summary	4
NOS/s of Qualifications	4
Mandatory NOS/s:	5
Elective NOS/s:	6
Optional NOS/s:.....	6
Assessment - Minimum Qualifying Percentage	6
Section 3: Training Related	7
Section 4: Assessment Related.....	7
Section 5: Evidence of the need for the Qualification	8
Section 6: Annexure & Supporting Documents Check List.....	9
Annexure: Evidence of Level	9
Annexure: Tools and Equipment (Lab Set-Up).....	13
Annexure: Industry Validations Summary.....	14
Annexure: Training & Employment Details	15
Annexure: Blended Learning	15
Annexure: Detailed Assessment Criteria	16
Annexure: Assessment Strategy	35
Annexure: Acronym and Glossary.....	36

Section 1: Basic Details

1.	Qualification Name	Welding Technician -Oil & Gas/Railways/ Shipbuilding (using AR)																
2.	Sector/s	Capital Goods and Manufacturing																
3.	Type of Qualification: ☒ New ☐ Revised ☐ Has Electives/Options ☐ OEM	NQR Code & version of existing/previous qualification: <i>(change to previous, once approved)</i>	Qualification Name of existing/previous version:															
4.	a. OEM Name b. Qualification Name <i>(Wherever applicable)</i>																	
5.	National Qualification Register (NQR) Code &Version <i>(Will be issued after NSQC approval)</i>	QG-04-IT-04205-2025-V1-CGSC & v1.0	6. NCrf/NSQF Level: 4															
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 AR-Based Railways Welding Technician is responsible for executing high-quality welding operations on railway components and structures using advanced augmented reality (AR) technologies.																
9.	Eligibility Criteria for Entry for Student/Trainee/Learner/Employee	a. Entry Qualification & Relevant Experience: <table border="1"> <thead> <tr> <th>S. No.</th> <th>Academic/Skill Qualification (with Specialization - if applicable)</th> <th>Required Experience (with Specialization - if applicable)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12th or Equivalent</td> <td>Not required</td> </tr> <tr> <td>2</td> <td>UG Diploma</td> <td>3 year of relevant experience</td> </tr> <tr> <td>3</td> <td>Certificate NSQF Level 3.5</td> <td>1.5 year</td> </tr> <tr> <td>4</td> <td>Certificate NSQF Level 3</td> <td>3 year of relevant experience</td> </tr> </tbody> </table> b. Age: NA		S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)	1	12 th or Equivalent	Not required	2	UG Diploma	3 year of relevant experience	3	Certificate NSQF Level 3.5	1.5 year	4	Certificate NSQF Level 3	3 year of relevant experience
S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)																
1	12 th or Equivalent	Not required																
2	UG Diploma	3 year of relevant experience																
3	Certificate NSQF Level 3.5	1.5 year																
4	Certificate NSQF Level 3	3 year of relevant experience																
10.	Credits Assigned to this Qualification, Subject to Assessment <i>(as per National Credit Framework (NCrF))</i>	16	11. Common Cost Norm Category (I/II/III) <i>(wherever applicable): I</i>															

12.	Any Licensing requirements for Undertaking Training on This Qualification <i>(wherever applicable)</i>																							
13.	Training Duration by Modes of Training Delivery <i>(Specify Total Duration as per selected training delivery modes and as per requirement of the qualification)</i>	☒ Offline ☐ Online ☐ Blended <table border="1"> <thead> <tr> <th>Training Delivery Modes</th> <th>Theory (Hours)</th> <th>Practical (Hours)</th> <th>OJT Mandatory (Hours)</th> <th>Viva (Hours)</th> <th>Total (Hours)</th> </tr> </thead> <tbody> <tr> <td>Classroom (offline)</td> <td>194</td> <td>226</td> <td>60</td> <td>-</td> <td>480</td> </tr> <tr> <td>Online</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <i>(Refer Blended Learning Annexure for details)</i>					Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	Viva (Hours)	Total (Hours)	Classroom (offline)	194	226	60	-	480	Online					
Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	Viva (Hours)	Total (Hours)																			
Classroom (offline)	194	226	60	-	480																			
Online																								
14.	Aligned to NCO/ISCO Code(s) <i>(if no code is available mention the same)</i>	NCO-2015/7212.0302																						
15.	Progression path after attaining the qualification <i>(Please show Professional and Academic progression)</i>	Welding Automation Engineer -L5																						
16.	Other Indian languages in which the Qualification & Model Curriculum are being submitted	NA																						
17.	Is similar Qualification(s) available on NQR-if yes, justification for this qualification	☐ Yes ☒ No URLs of similar Qualifications:																						
18.	Is the Job Role Amenable to Persons with Disability	☐ Yes ☒ No If "Yes", specify applicable type of Disability:																						
19.	How Participation of Women will be Encouraged	Yes via Industry or College Engagement																						
20.	Are Greening/ Environment Sustainability Aspects Covered <i>(Specify the NOS/Module which covers it)</i>	☐ Yes ☐ No																						
21.	Is Qualification Suitable to be Offered in Schools/Colleges	Schools ☐ Yes ☐ No Colleges ☒ Yes ☐ No																						
22.	Name and Contact Details of Submitting / Awarding Body SPOC <i>(In case of CS or MS, provide details of both Lead AB & Supporting ABs)</i>	Name: Hitesh Email : standards@cgssc.org Contact No.: +91-78382 93838 Website: www.cgssc.org																						
23.	Final Approval Date by NSQC: 08 May 2025	24. Validity Duration: 3 Years			25. Next Review Date 08/05/2028																			

Section 2: Module Summary

NOS/s of Qualifications

(In exceptional cases these could be described as components)

Mandatory NOS/s:

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

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

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/Non-Core	NCrF/N SQF 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.	Bridge Module & Follow the health and safety practices at work	CSC/N1335 NOS Version- 2.0	Non-Core	4	2	25	35	-	-	60	30	70	-	-	100	10
2.	Coordinate with co-workers to achieve work efficiency.	CSC/N1336: Version No. – 2.0	Non-Core	4	2	40	20	-	-	60	30	70	-	-	100	10
3.	Weld carbon and low alloy steels by using Metal Arc Welding (MMAW)/ Shielded Metal Arc Welding (SMAW)	CSC/N0204: Version No. – 2.0	Core	4	5	50	70	30	-	150	30	50	-	20	100	30
4.	Weld metals by using MIG/MAG welding	CSC/N0209: Version No. – 2.0	Core	4	5	55	65	30	-	150	30	50	-	20	100	30
5.	Perform AR-guided SMAW/GMAW in Railways	CSC/N: CSC/N0215 –v2.0	Core	4	1	10	20	-	-	30	30	50	-	20	100	10
6.	Employability Skills (30 hours)	DGT/VSQ/N 0101 V1.0	Non Core	4	1	14	16	-	-	30	20	30	0	0	50	10
Duration (in Hours) / Total Marks					16	194	226	60		480	170	320	0	60	550	100

Elective NOS/s:

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

Optional NOS/s:

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

Assessment - Minimum Qualifying Percentage

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

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

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

Section 3: Training Related

1.	Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	B.E. in Mechanical Engineering – Minimum 5 years of relevant industry experience in Railway Integral Coach Design and 1 year of training experience Or B.Tech in Mechanical Engineering – Minimum 5 years of relevant industry experience in Railways Integral Coach Design and 1 year of training experience
2.	Master Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	B.E./B.Tech in Mechanical, Electrical, Electronics, Automobile, or Instrumentation – Minimum 6 years of relevant industry experience and 2 years of training experience Or B.E./B.Tech in Mechanical, Electrical, Electronics, Automobile, or Instrumentation – Minimum 7 years of relevant industry experience and 1 year of training experience Or M.E./M.Tech in Mechanical, Electrical, Electronics, Automobile, or Instrumentation – Minimum 4 years of relevant industry experience and 2 years of training experience
3.	Tools and Equipment Required for Training	☒ Yes ☐ No (If "Yes", details to be provided in Annexure)
4.	In Case of Revised Qualification, Details of Any Upskilling Required for Trainer	NA

Section 4: Assessment Related

1	Assessor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	B.E. in Mechanical Engineering – Minimum 5 years of relevant industry experience in Railway Integral Coach Design and 1 year of training/assessment experience Or
---	--	---

		B.Tech in Mechanical Engineering – Minimum 5 years of relevant industry experience in Railways Integral Coach Design and 1 year of training/assessment experience
2	Proctor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	B.E. in Mechanical Engineering – Minimum 5 years of relevant industry experience in Railway Integral Coach Design and 1 year of training/assessment experience Or B.Tech in Mechanical Engineering – Minimum 5 years of relevant industry experience in Railways Integral Coach Design and 1 year of training/assessment experience
3	Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	B.E./B.Tech in Mechanical, Electrical, Electronics, Automobile, or Instrumentation – Minimum 6 years of relevant industry experience and 2 years of training experience Or B.E./B.Tech in Mechanical, Electrical, Electronics, Automobile, or Instrumentation – Minimum 7 years of relevant industry experience and 1 year of training experience Or M.E./M.Tech in Mechanical, Electrical, Electronics, Automobile, or Instrumentation – Minimum 4 years of relevant industry experience and 2 years of training experience
4	Assessment Mode (Specify the assessment mode)	Formative, Summative & Skill Assessment
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): No
2.	Latest Market Research Reports or any other source (not older than 2 years) (Yes/No): No (Industry driven)
3.	Government /Industry initiatives/ requirement (Yes/No): Yes
4.	Number of Industry validation provided: 05
5.	Estimated nos. of persons to be trained and employed: 16250
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>	Q File
2.	Annexure: List of tools and equipment relevant for qualification <i>(Mandatory, except in case of online course)</i>	Q File
3.	Annexure: Detailed Assessment Criteria <i>(Mandatory)</i>	Q File
4.	Annexure: Assessment Strategy <i>(Mandatory)</i>	Q File
5.	Annexure: Blended Learning <i>(Mandatory, in case selected Mode of delivery is “Blended Learning”)</i>	Yes Provided
6.	Annexure: Multiple Entry-Exit Details <i>(Mandatory, in case qualification has multiple Entry-Exit)</i>	Yes Provided
7.	Annexure: Acronym and Glossary <i>(Optional)</i>	Yes Provided
8.	Supporting Document: Model Curriculum <i>(Mandatory – Public view)</i>	Yes Provided
9.	Supporting Document: Career Progression <i>(Mandatory - Public view)</i>	Yes Provided
10.	Supporting Document: Occupational Map <i>(Mandatory)</i>	Yes Provided
11.	Supporting Document: Assessment SOP <i>(Mandatory)</i>	Yes Provided
12.	Any other document you wish to submit:	

Annexure: Evidence of Level

NCrf/NSQF Level Descriptors	Key requirements of the job role/ outcome of the qualification	How the job role/ outcomes relate to the NCrf/NSQF level descriptor	NCrf/NSQF Level
Professional Theoretical Knowledge/Process	Understanding Welding Processes: a. Types of Welding: Arc Welding: Understanding of MIG, TIG, and Stick welding processes. Resistance Welding: Spot welding and seam welding techniques. Other Techniques: Familiarity with techniques like Oxy-fuel welding and laser welding. b. Welding Materials:	The job involves a range of theoretical understanding and practical skills as can be seen from the job requirements given in the adjacent cell. The skills include setting, adjusting and operating resistance welding apparatus	4

	• Metals: Knowledge of various metals used in railways (steel, aluminum alloys). • Welding Filler Materials: Selection of appropriate filler rods and wires. • c. Welding Codes and Standards: • Familiarity with AWS, ASME, and other relevant standards that apply specifically to railway applications. • 2. Augmented Reality Competencies: • a. AR Tools and Software: • Understanding various AR platforms (e.g., Microsoft HoloLens, Google ARCore). • Familiarity with software used for AR in welding training and applications, such as Autodesk and similar design tools. • b. AR Integration in Welding: • How AR can illustrate welding processes in real-time for training and operational purposes. • Using AR for remote assistance in welding techniques and procedure adherence. • c. Data Visualization: • Ability to interpret AR displays, including 3D models of welding processes, symbols, and workflows.	and carrying out TIG welding activities on given work piece	
Professional and Technical Skills/ Expertise/ Professional Knowledge	• Welding Techniques Knowledge: • Proficiency in various welding processes such as MIG, TIG, Stick, and Flux-Cored Arc Welding specific to railway applications. • Railway Safety Standards: • Understanding of safety regulations and standards specific to railway construction and maintenance, including OSHA standards and rail industry best practices. • Augmented Reality Application:	As indicated by the knowledge and understanding requirements mentioned in the adjacent cell, the job holder needs to have a wide range of information for welding the metal by TIG welding process.	4

	• Familiarity with AR tools and software used for welding training, inspection, and real-time guidance. • Ability to operate AR headsets and devices for displaying welding designs, instructions, and safety warnings. •		
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	• Welding Techniques: • Proficiency in various welding methods (MIG, TIG, arc welding, etc.). • Understanding of welding symbols and blueprints relevant to railway applications. • Augmented Reality Knowledge: • Familiarity with AR tools and software relevant to welding training and inspection. • Ability to use AR devices effectively for real-time guidance, training, or troubleshooting. • Safety Standards and Protocols: • Knowledge of safety regulations and best practices in welding and railway operations. • Ability to conduct risk assessments and implement safety measures during operations.	As indicated by the performance criteria in the adjacent cell, the job holder needs to have wide-ranging practical skills for welding the metal by TIG welding process.	4
Broad Learning Outcomes/Core Skill	• Welding Expertise: • Proficiency in various welding techniques (e.g., MIG, TIG, Arc, and Resistance welding).	The job holder requires logical and relevant skills for conducting TIG welding activities. As indicated by the performance criteria in the adjacent cell, the job	4

	• Understanding of welding materials and metallurgy relevant to railway components. • Augmented Reality Proficiency: • Ability to operate AR devices and navigate AR software. • Skill in interpreting AR overlays and instructions for welding tasks. • Technical Drawing Interpretation: • Competency in reading and interpreting technical drawings, schematics, and fabrication blueprints enhanced by AR visuals.	involves conducting the TIG welding process on various metals as per drawing and job order requirement.	
Responsibility	• Welding Operations: Perform various types of welding (MIG, TIG, arc welding) on railway components, ensuring high-quality welds that meet industry standards. • Inspection and Quality Control: Conduct inspections of welds to ensure compliance with safety standards and specifications. Utilize AR tools to assess welding quality effectively. • AR Technology Utilization: Use augmented reality (AR) systems to visualize welding procedures, instructions, and schematics in real-time, enhancing precision and reducing errors. • Equipment Maintenance: Maintain welding equipment and tools in good working condition. Troubleshoot and repair issues as needed. •	The incumbent in the job is responsible for performing GTAW welding process to produce various joints in basic positions and other welding activities such as inspection of equipment condition, gauging, testing and inspection of welded work pieces.	4

Annexure: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment

Batch Size: 20-25 Nos

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1	Chairs/Tables	As standard	25
2	Computer with internet	As standard	25
3	LCD projector with screen	As standard	1
4	Trainer chair and Table	As standard	1
5	Demonstration table pin up boards	As standard	1
6	White board with marker	As standard	1
7	Welding Consumables	As standard	1
8	Railways Welding Blueprint	As standard	1 Each
9	Transmitters – Wi-Fi Antennas	As standard	1
10	Welding Set	As standard	1
11	AR Glasses & Software	As standard	1
12	Fire Extinguisher	As standard	1
13	Safety Gloves (Rubber)	As standard	25
14	Ear Plugs	As standard	25
15	Safety Shoes & Helmet	As standard	25
16	Goggles	As standard	25
17	First-Aid Kit	As standard	2
18	PC with Minimum System Requirements (Seabery Simulator – Soldamatic AT Weld)	POWER SUPPLY NOX Hummer Bronze 500W PROCESSOR Intel® Core™ i5-9500E CHIPSET Intel H310 RAM 8+8 GB DDR4 GRAPHIC CARD Intel UHD	1 Each

		Graphics HARD DISK M.2 SSD 128Gb AUDIO Realtek Audio • BACK PANEL PORTS 1 x HDMI 4 x USB 2 x Ethernet 2 x Wifi Antennas 1 x jack AR VISION MODULE RESOLUTION MIPI LCD 4,7" HDMI Display input up to 1280x720 Ultra-low video distortion 24-bit True Colour • RAM MEMORY 4GB DDR4 2400MHz MOTHERBOARD ASUS H110M-D MICROPROCESSOR Intel Core I3-7100 POWER SUPPLY 550W 100-240Vac HARD DISK 1TB SATA3 NETWORK CARD Gigabit Ethernet PCIe 10/100/1000Mbps	
19	catalogue	• Soldamatic Advanced Multi joint catalogue (for railways)	10

Classroom Aids

The aids required to conduct sessions in the classroom are:

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

Annexure: Industry Validations Summary

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

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile (if available)
1	Broadline Computer Systems	Prabhakaran	Manager R&D	No7, 2 nd Floor Khader Nawaz Khan Road, Nungambakkam, Chennai	044 28333083	contact@broadline.co.in	
2	Jain Laboratory Instruments	Ravi Jain	Director	449, HSIIDC, Industrial Area Saha, Haryana	8569909696	sales@jlabexport.com	

3	Marathwada Autocluster	Sudarshan Dhavurkar	Center In charge	P-174, MIDC Waluj	8237272802	macluster@gmail.com	
4	Mindbridge Innovations	Aruna Anchal	General Manager	New Delhi			
5	TANSAM	Sukhpreet Singh	CEO	6 th floor, Tidel Park, Chennai	4469255700	info@tansam.org	

Annexure: Training & Employment Details

Training and Employment Projections:

Year	Total Candidates		Women		People with Disability	
	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities
2025-26	16250	13250	250	240	15	10
2026-27	16250	15000	500	450	15	10
2027-28	16250	14500	500	450	15	10

Data to be provided year-wise for next 3 years

Training, Assessment, Certification, and Placement Data for previous versions of qualifications: Not applicable

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

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: Not applicable

- 1.
- 2.

Content availability for previous versions of qualifications: Not applicable

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

Languages in which Content is available:

Annexure: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools:

Refer NCVET “Guidelines for Blended Learning for Vocational Education, Training & Skilling” available on:

<https://ncvet.gov.in/sites/default/files/Guidelines%20for%20Blended%20Learning%20for%20Vocational%20Education,%20Training%20&%20Skilling.pdf>

Annexure: Detailed Assessment Criteria

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

CSC/N1335: Follow the health and safety practices at the work

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Maintain personal health and safety</i>	7	12	-	-
PC1. follow the recommended practices to ensure protection from infections and transmission to others, such as the use of hand sanitiser and face mask	2	3	-	-
PC2. check the work conditions, assess the potential health and safety risks, and take appropriate measures to mitigate them	1	2	-	-
PC3. select and use the appropriate Personal Protective Equipment (PPE) relevant to the task and work conditions	1	2	-	-
PC4. follow the recommended techniques while lifting and moving heavy objects to avoid injury	1	3	-	-

PC5. follow the manufacturer's instructions and workplace safety guidelines while working on heavy machinery, tools and equipment	2	2	-	-
<i>Assist in hazard management</i>	4	10	-	-
PC6. identify existing and potential hazards at work	1	1	-	-
PC7. assess the potential risks and injuries associated with the identified hazards	1	3	-	-
PC8. coordinate with the supervisor or other relevant personnel to prevent or minimise the identified hazards	1	3	-	-
PC9. handle hazardous materials safely and store them in the designated storage	1	3	-	-
<i>Check the first aid box, firefighting and safety equipment</i>	3	7	-	-
PC10. check the first aid box to ensure it is updated with the relevant first aid supplies	1	2	-	-
PC11. check and test the firefighting and various safety equipment to ensure they are in usable condition	1	3	-	-
PC12. coordinate with the supervisor for the repair and replacement of firefighting and safety equipment	1	2	-	-
<i>Assist in waste management</i>	3	8	-	-

PC13. segregate waste into appropriate categories	1	3	-	-
PC14. recycle the recyclable waste appropriately	1	3	-	-
PC15. dispose of the non-recyclable waste in an environment-friendly manner, complying with the applicable regulations	1	2	-	-
<i>Follow the fire safety guidelines</i>	3	12	-	-
PC16. use the appropriate type of fire extinguisher to extinguish different types of fires safely	1	4	-	-
PC17. follow the recommended practices for a safe rescue during a fire emergency	1	4	-	-
PC18. coordinate with the fire department to request assistance to extinguish a serious fire	1	4	-	-
<i>Follow the emergency and first-aid procedures</i>	7	12	-	-
PC19. follow the organisational health and safety guidelines during workplace emergencies to ensure own and co-workers' safety	1	2	-	-
PC20. follow the recommended practices to minimise loss to organisational property during an emergency	1	3	-	-
PC21. follow the recommended procedure to free a person from electrocution	1	2	-	-
PC22. administer appropriate first aid to the injured personnel	1	2	-	-

PC23. perform Cardiopulmonary Resuscitation (CPR) on a potential victim of cardiac arrest	1	2	-	-
PC24. coordinate with the emergency services to request medical assistance for seriously injured/ ill personnel requiring professional medical attention or hospitalisation	2	1	-	-
<i>Carry out relevant documentation and review</i>	3	9	-	-
PC25. carry out appropriate documentation following a health and safety incident at work, including all the required information	1	3	-	-
PC26. coordinate with the relevant personnel to review health and safety conditions at work regularly or following an incident	1	3	-	-
PC27. assist in implementing appropriate changes to improve the health and safety conditions at work	1	3	-	-
NOS Total	30	70	-	-

CSC/N1336: Coordinate with co-workers to achieve work efficiency

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
----------------------------------	--------------	-----------------	---------------	------------

<i>Work effectively with co-workers</i>	20	43	-	-
PC1. plan daily tasks at work to ensure their timely completion and efficient use of time	2	4	-	-
PC2. carry out work responsibilities adhering to the limits of authority	2	4	-	-
PC3. follow the supervisor's instructions to ensure adherence to the applicable quality standards and timescales	2	4	-	-
PC4. coordinate with the co-workers to achieve the work objectives efficiently	2	4	-	-
PC5. prepare the relevant documents and reports as per the supervisor's instructions, providing appropriate information clearly and systematically	2	4	-	-
PC6. coordinate with the supervisor or relevant personnel to deal with out of authority tasks and concerns	2	4	-	-
PC7. mentor and assist subordinates in the execution of their work responsibilities	2	4	-	-
PC8. identify possible disruptions to work through coordination with the relevant stakeholders and take appropriate preventive measures	2	4	-	-

PC9. use various resources efficiently to ensure maximum utilisation and minimum wastage	2	4	-	-
PC10. follow the recommended practices to avoid and resolve conflicts at work	1	4	-	-
PC11. follow the relevant organisational policies to ensure disciplined behaviour with maximum productivity at work	1	3	-	-
<i>Communicate effectively with co-workers</i>	6	15	-	-
PC12. follow the organisational policy for the efficient and timely dissemination of information to the authorised personnel	2	5	-	-
PC13. communicate clearly and politely to ensure effective communication with co-workers	2	5	-	-
PC14. follow the appropriate techniques for active listening during interactions	2	5	-	-
<i>Practice inclusion at work</i>	4	12	-	-
PC15. empathise with Persons with Disabilities (PWD)	2	6	-	-
PC16. adopt gender-neutral behaviour at work	2	6	-	-
NOS Total	30	70	-	-

CSC/N0204: Weld carbon and low alloy steels by using Metal Arc Welding (MMAW)/ Shielded Metal Arc Welding (SMAW)

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Prepare for welding operations</i>	13	19	-	7
PC1. identify the work to be done and product specifications by interpreting the product drawing, Welding Procedure Specification (WPS) and job orders	1	2	-	1
PC2. identify the tools, welding machines, measuring instruments, accessories, consumables and input materials (i.e. carbon, low alloy steel etc.) as per the requirements mentioned in WPS or drawing	3	2	-	2
PC3. select and arrange the right material, equipment, fixtures, accessories, welding torch and consumables i.e. electrode, filler wire, shielding gas etc. as per the SOP and job requirements	2	3	-	1
PC4. check the input material, tools and equipment for any defects and that they are as per the required quality standards	2	4	-	1
PC5. prepare the work area for the welding activities	1	1	-	-
PC6. prepare the materials (i.e. plate(1.5 - 24mm)/ sheet (1.5mm)) and joint for welding process	1	1	-	1

PC7. set the MMAW machine and its parameters as per the WPS and SOP	1	2	-	1
PC8. re-dry electrodes as per electrode classification requirement	1	1	-	-
PC9. install the work pieces and fixture on the apparatus and align them with the electrodes as per the job requirements	1	2	-	-
PC10. verify set up by running test weld specimen (scrap plate)	-	1	-	-
<i>Perform MMAW/SMAW operations</i>	11	20	-	8
PC11. follow safety precautions during welding work as per SOP and organizational guidelines	-	1	-	-
PC12. start the MMAW machine for welding operations	1	2	-	-
PC13. strike and maintain a stable arc by applying correct technique (i.e. scratch start, tapping techniques) and to avoid welding defects	1	2	-	1
PC14. perform MMAW welding process as per SOP and tack weld the joint at appropriate intervals to produce joints of the specified quality, dimensions and profile	2	4	-	2
PC15. produce fillet and groove joints in 1F/1G, 2F/2G and 3F/ 3G welding positions as specified in WPS by using single or multi-run welds	2	4	-	2

PC16. ensure correct angle of torch, travel speed, direction of weld and feed during the welding operation	1	1	-	1
PC17. maintain proper bead sequence with respect to groove/fillet configurations and positions	-	1	-	-
PC18. monitor the welding process parameters (air pressure, electrode force, electrode distance, gas flow etc.) are within standards by reading the various gauges and correct them if not within standards	1	1	-	1
PC19. measure the final welded piece and compare with the dimensional and geometrical aspects of the weld as prescribed in the WPS and engineering drawing	1	1	-	1
PC20. remove extra material, slag etc. by using brush, chipping hammers, grinders etc., from the welded piece	1	1	-	-
PC21. hammer the work piece to get the desired shape, if there are any welding bulges/distortions	1	1	-	-
PC22. shut down the welding equipment and remove the workpiece after completion of welding activities	-	1	-	-
<i>Perform post-welding operations</i>	6	11	-	5
PC23. check the work pieces as per the work instructions for product quality	1	2	-	1
PC24. identify various weld defects by conducting visual inspection, destructive and non-destructive tests on the work pieces	2	4	-	2

PC25. separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair	1	1	-	1
PC26. clean and store all the tools, machine and equipment after completion of work	1	2	-	1
PC27. dispose scrap or waste material in accordance with the company policies and environmental regulations	1	1	-	-
PC28. report to the supervisor about any problems faced or anticipated during the complete process	-	1	-	-
<i>NOS Total</i>	30	50	-	20

CSC/N0209: Weld metals by using MIG/MAG welding

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Prepare for welding operations</i>	15	21	-	7
PC1. identify the work to be done and product specifications by interpreting the product drawing, Welding Procedure Specification (WPS) and job orders	1	2	-	1
PC2. identify the tools, MIG welding machines, measuring instruments, accessories, consumables and input materials (i.e. ferrous metals/materials: carbon steel, stainless steel etc.) as per the requirements mentioned in WPS or drawing	3	2	-	1

PC3. select and arrange the right material, equipment, fixtures, accessories, welding torch and consumables i.e. electrode, filler wire, shielding gas etc. as per the SOP and job requirements	2	3	-	1
PC4. check the input material, tools and equipment for any defects and that they are as per the required quality standards	2	3	-	1
PC5. prepare the work area for welding activities	1	1	-	-
PC6. prepare the materials (i.e. sheet (less than 1.5 mm), plate, structural section, pipe/tube, other forms) and joint for welding process	1	1	-	1
PC7. clean wire feeder and torch tip	-	1	-	-
PC8. set the MIG welding machine and its parameters i.e. wire feed rate, amperage, gas flow rate etc. as per the WPS and SOP	1	2	-	1
PC9. connect and adjust regulators and flow meters to cylinders	1	1	-	-
PC10. choose appropriate mode of metal transfer	1	1	-	-
PC11. set pre-purge with shielding gas as required	1	1	-	1
PC12. install the work pieces and fixture on the apparatus and align them with the electrodes as per the job requirements	1	2	-	-
PC13. verify set up by running test weld on the specimen (scrap plate)	-	1	-	-
<i>Perform MIG/MAG welding operations</i>	8	17	-	8

PC14. follow safety precautions during welding work as per SOP and organizational guidelines	-	1	-	-
PC15. start the MIG welding machine for welding operations	1	2	-	-
PC16. perform MIG welding process in all welding positions as per SOP and tack weld the joint at appropriate intervals to produce joints of the specified quality, dimensions and profile	2	4	-	2
PC17. adjust wire stick-out as per requirement	1	1	-	1
PC18. produce joints of the required quality and of specified dimensional accuracy which achieve a weld quality equivalent to Level C of ISO 5817	1	4	-	2
PC19. ensure correct angle of torch, travel speed, direction of weld and feed during the welding operation	1	1	-	1
PC20. monitor the welding process parameters (air pressure, electrode force, electrode distance, gas flow etc.) are within standards by reading the various gauges and correct them if not within standards	1	1	-	1
PC21. measure the final welded piece and compare with the dimensions as prescribed in the WPS and engineering drawing	1	1	-	1
PC22. remove extra material, slag etc. by using brush, chipping hammers, grinders etc., from the welded piece	-	1	-	-

PC23. shut down the welding equipment and remove the workpiece after completion of welding activities	-	1	-	-
<i>Perform post-welding operations</i>	7	12	-	5
PC24. check the work pieces as per the work instructions for product quality	1	2	-	1
PC25. identify various weld defects by conducting visual inspection, destructive and non-destructive tests on the work pieces	2	3	-	2
PC26. separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair	1	1	-	1
PC27. clean and store all the tools, machine and equipment after completion of work	1	2	-	1
PC28. dispose scrap or waste material in accordance with the company policies and environmental regulations	1	1	-	-
PC29. check the machine operations for any malfunctions/defects in the component and immediately inform the supervisor/maintenance team for correction	1	2	-	-
PC30. report to the supervisor about any problems faced or anticipated during the complete process	-	1	-	-
NOS Total	30	50	-	20

CSC/N:CSC/N0215 Perform AR-guided SMAW/GMAW in Railways

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Weld Preparation & Set Up</i>	10	15	-	7
PC1. Utilize the AR enabled Tablet/Headset overlays for instruction, measurements & visual cues for joint preparation (eg; bevel angles, root gap etc.).	3	3	-	2
PC2. Perform real time measurements of weld joint dimensions using AR tools.	2	4	-	2
PC3. Follow AR guidelines for setting up of welding equipment.	2	3	-	1
PC4. Utilize AR tools to identify & mark areas required for cleaning & grinding	1	3	-	1
PC5. Follow AR guidelines for application of appropriate flux cleansing agents	1	1		
PC6. Utilize AR overlays to ensure correct alignment of weld joints and components	1	1		1
<i>Welding Execution</i>	10	15	-	8

PC7. Utilize AR overlays for welding parameters (eg: voltage, amperage, wire speed) and settings onto welding environment.	3	5	-	3
PC8. Utilize AR overlays that provide step-by-step guidance on welding techniques, acceptable angles, and movement patterns.	4	5	-	2
PC9. Ensure accurate measurements during welding preparations and executions using AR tools.	3	5	-	3
<i>Perform post-AR Guided welding operations</i>	10	20	-	5
PC10. Allow welded joints to cool naturally or use appropriate cooling methods following the welding process to prevent warping or cracking.	3	3	-	1
PC11. Utilize AR inspection tools overlay for visual inspection of welds (inspection points & reference lines).	2	4	-	2
PC12. Utilize AR overlay measurement tools to accurately measure weld dimensions (eg: weld height, width).	2	4	-	1
PC13. Follow step by step instructions through AR overlays and get real time feedback to welding parameters/techniques.	3	4	-	1
NOS Total	30	50	-	20

DGT/VSQ/N0101: Employability Skills (30 Hours)

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Introduction to Employability Skills</i>	1	1	-	-
PC1. identify employability skills required for jobs in various industries	-	-	-	-
PC2. identify and explore learning and employability portals	-	-	-	-
<i>Constitutional values – Citizenship</i>	1	1	-	-
PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
PC4. follow environmentally sustainable practices	-	-	-	-
<i>Becoming a Professional in the 21st Century</i>	2	4	-	-
PC5. recognize the significance of 21st Century Skills for employment	-	-	-	-
PC6. practice the 21st Century Skills such as Self- Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
<i>Basic English Skills</i>	2	3	-	-

PC7. use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-
PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
PC9. write short messages, notes, letters, e-mails etc. in English	-	-	-	-
<i>Career Development & Goal Setting</i>	1	2	-	-

PC10. understand the difference between job and career	-	-	-	-
PC11. prepare a career development plan with short- and long-term goals, based on aptitude	-	-	-	-
<i>Communication Skills</i>	2	2	-	-
PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-	-	-	-
PC13. work collaboratively with others in a team	-	-	-	-
<i>Diversity & Inclusion</i>	1	2	-	-
PC14. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC15. escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-

<i>Financial and Legal Literacy</i>	2	3	-	-
PC16. select financial institutions, products and services as per requirement	-	-	-	-
PC17. carry out offline and online financial transactions, safely and securely	-	-	-	-
PC18. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
<i>Essential Digital Skills</i>	3	4	-	-
PC20. operate digital devices and carry out basic internet operations securely and safely	-	-	-	-
PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively	-	-	-	-
PC22. use basic features of word processor, spreadsheets, and presentations	-	-	-	-
<i>Entrepreneurship</i>	2	3	-	-
PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-

PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
<i>Customer Service</i>	1	2	-	-
PC26. identify different types of customers	-	-	-	-
PC27. identify and respond to customer requests and needs in a professional manner.	-	-	-	-
PC28. follow appropriate hygiene and grooming standards	-	-	-	-
<i>Getting ready for apprenticeship & Jobs</i>	2	3	-	-
PC29. create a professional Curriculum vitae (Résumé)	-	-	-	-
PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
PC31. apply to identified job openings using offline /online methods as per requirement	-	-	-	-
PC32. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-

NOS Total	10	20	-	-
------------------	----	----	---	---

Assessment Parameters:

Assessment Plan:

1. Components of Assessment:

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

2. Passing Parameters:

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

Parameter 1 - Weighted Semester Score:

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

Parameter 2 - Individual Component Score:

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

Annexure: Assessment Strategy

This section includes the processes involved in identifying, gathering, and interpreting information to evaluate the Candidate on the required competencies of the program.

Mention the detailed assessment strategy in the provided template.

<1. Assessment System Overview:

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

- SSC monitors the assessment process & records
2. Testing Environment:
- Check the Assessment location, date and time
 - If the batch size is more than 30, then there should be 2 Assessors.
 - Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
3. Assessment Quality Assurance levels/Framework:
- Question bank is created by the Subject Matter Experts (SME) are verified by the other SME
 - Questions are mapped to the specified assessment criteria
 - Assessor must be ToA certified & trainer must be ToT Certified
4. Types of evidence or evidence-gathering protocol:
- Time-stamped & geotagged reporting of the assessor from assessment location
 - Centre photographs with signboards and scheme specific branding
5. Method of verification or validation:
- Surprise visit to the assessment location
6. Method for assessment documentation, archiving, and access
- Hard copies of the documents are stored

On the Job:

1. Each module (which covers the job profile of AR based Railways Welding Technician) will be assessed separately.
2. The candidate must score 60% in each module to successfully complete the OJT.
3. Tools of Assessment that will be used for assessing whether the candidate is having desired skills and etiquette of dealing with customers, understanding needs & requirements, assessing the customer and perform Soft Skills effectively:
 - Videos of Trainees during OJT
 -
4. Assessment of each Module will ensure that the candidate is able to:
 - Effective engagement with the customers
 - Understand the working of various tools and equipment
 -

Annexure: Acronym and Glossary

Acronym

Acronym	Description
AA	Assessment Agency
AB	Awarding Body
ISCO	International Standard Classification of Occupations
NCO	National Classification of Occupations

NCrF	National Credit Framework
NOS	National Occupational Standard(s)
NQR	National Qualification Register
NSQF	National Skills Qualifications Framework
OJT	On the Job Training

Glossary

Term	Description
National Occupational Standards (NOS)	NOS define the measurable performance outcomes required from an individual engaged in a particular task. They list down what an individual performing that task should know and also do.
Qualification	A formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards
Qualification File	A Qualification File is a template designed to capture necessary information of a Qualification from the perspective of NSQF compliance. The Qualification File will be normally submitted by the awarding body for the qualification.
Sector	A grouping of professional activities on the basis of their main economic function, product, service or technology.
Long Term Training	Long-term skilling means any vocational training program undertaken for a year and above. https://ncvet.gov.in/sites/default/files/NCVET.pdf