# Model Curriculum

**QP Name: Automotive Welding Simulation Trainee (using AR)**

**QP Code: ASC/Q3112**

**QP Version: 1.0**

**NSQF Level: 4**

Automotive Skills Development Council || E 113, Okhla Industrial Area, Phase – III
New Delhi – 110020

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# Training Parameters

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|---|---|
| **Sector** | Automotive |
| **Sub-Sector** | Manufacturing |
| **Occupation** | Welding Operations |
| **Country** | India |
| **NSQF Level** | 4 |
| **Aligned to NCO/ISCO/ISIC Code** | NCO-2015/7212.0303 |
| **Minimum Educational Qualification and Experience** | 12th Pass or Equivalent<br>Or<br>10th Pass or Equivalent with 3 years of Experience in Welding/ AR/VR Simulation<br>Or<br>Completed NSQF Level 3.0 with 3 years of relevant experience |
| **Pre-Requisite License or Training** | |
| **Minimum Job Entry Age** | 18 |
| **Last Reviewed On** | 08 May 2025 |
| **Next Review Date** | 08 May 2028 |
| **NSQC Approval Date** | 08 May 2025 |
| **QP Version** | 1.0 |
| **Model Curriculum Creation Date** | 08 May 2025 |
| **Model Curriculum Valid Up to Date** | 08 May 2028 |
| **Model Curriculum Version** | 1.0 |
| **Minimum Duration of the Course** | 480 Hours |
| **Maximum Duration of the Course** | 720 Hours |

# Program Overview

This section summarizes the end objectives of the program along with its duration.

## Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills.

- Prepare for SMAW, MIG and TIG welding activities using AR technology
- Perform SMAW, MIG and TIG welding using AR technology
- Work effectively and efficiently as per schedules and timelines.
- Implement safety practices.
- Optimize the use of resources to ensure less wastage and maximum conservation.

**Option 1:**

- Perform robotic welding using AR technology.

**Option 2:**

- Perform advanced MIG and TIG welding techniques using AR technology.

## Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

| NOS and Module Details | Theory Duration | Practical Duration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
|---|---|---|---|---|---|
| **ASC/N9803 – Organize work and resources (Manufacturing) NOS Version No. – 3.0 NSQF Level – 4** | **25:00** | **35:00** | | | **60:00** |
| Module 1: Introduction to the role of an Additive/3D Printing Technician | 5:00 | 0:00 | | | 5:00 |
| Module 2: Organize work and resources according to safety and conservation standards | 20:00 | 35:00 | | | 55:00 |
| **ASC/N3129 – Perform SMAW welding using AR technology NOS Version No. – 1.0 NSQF Level – 4** | **35:00** | **55:00** | | | **90:00** |
| Module 3: Perform SMAW welding using AR technology | 35:00 | 55:00 | | | 90:00 |
| **ASC/N3130 – Perform GMAW welding using AR technology NOS Version No. – 1.0 NSQF Level – 4** | **30:00** | **60:00** | | | **90:00** |
| Module 4: Perform GMAW welding using AR technology | 30:00 | 60:00 | | | 90:00 |

| NOS and Module Details | Theory Duration | Practical Duration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
|---|---|---|---|---|---|
| **ASC/N3131 – Perform GTAW welding using AR technology** <br> **NOS Version No. – 1.0** <br> **NSQF Level – 4** | **30:00** | **60:00** | | | **90:00** |
| Module 5: Perform GTAW welding using AR technology | 30:00 | 60:00 | | | 90:00 |
| **DGT/VSQ/N0101 -Employability Skills (30 hours)** <br> **NOS Version No. – 1.0** <br> **NSQF Level – 2** | **12:00** | **18:00** | | | **30:00** |
| Module 8: Introduction to Employability Skills | 0:30 | 0:30 | | | 1:00 |
| Module 9: Constitutional values - Citizenship | 0:30 | 0:30 | | | 1:00 |
| Module 10: Becoming a Professional in the 21st Century | 0:30 | 0:30 | | | 1:00 |
| Module 11: Basic English Skills | 1:00 | 1:00 | | | 2:00 |
| Module 12: Communication Skills | 1:30 | 2:30 | | | 4:00 |
| Module 13: Diversity & Inclusion | 0:30 | 0:30 | | | 1:00 |
| Module 14: Financial and Legal Literacy | 1:30 | 2:30 | | | 4:00 |
| Module 15: Essential Digital Skills | 1:00 | 2:00 | | | 3:00 |
| Module 16: Entrepreneurship | 2:30 | 4:30 | | | 7:00 |
| Module 17: Customer Service | 1:30 | 2:30 | | | 4:00 |
| Module 18: Getting ready for apprenticeship & Jobs | 1:00 | 1:00 | | | 2:00 |
| **OJT** | | | **120:00** | | **120:00** |
| **Total Duration** | **132:00** | **228:00** | **120:00** | | **480:00** |

## Optional Modules

The table lists the modules and their duration corresponding to the Optional NOS of the QP.

### Option 1

| NOS and Module Details | Theory Duration | Practical Duration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
|---|---|---|---|---|---|
| **ASC/N3132 – Perform robotic welding using AR technology** <br> **NOS Version No. – 1.0** <br> **NSQF Level – 4** | **40:00** | **80:00** | | | **120:00** |
| Module 6: Perform robotic welding using AR technology | 40:00 | 80:00 | | | 120:00 |
| **Total Duration** | **40:00** | **80:00** | | | **120:00** |

### Option 2

| NOS and Module Details | Theory Duration | Practical Duration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
|---|---|---|---|---|---|
| **ASC/N3133 – Advanced Automotive Welding Mastery NOS Version No. – 1.0 NSQF Level – 4** | **40:00** | **80:00** | | | **120:00** |
| Module 7: Advanced Automotive Welding Mastery | 40:00 | 80:00 | | | 120:00 |
| **Total Duration** | **40:00** | **80:00** | | | **120:00** |

# Module Details

## Module 1: Introduction to the job role
### *Mapped to ASC/N9803, v1.0*

**Terminal Outcomes:**

- Discuss the job role of a Technician: Automotive AR Welding Simulation.

| Duration: 05:00 | Duration: 00:00 |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • List the role and responsibilities of a Technician: Automotive AR Welding Simulation. <br> • Discuss the job opportunities for a Technician: Automotive AR Welding Simulation in the automobile industry. <br> • Explain about Indian automobile manufacturing market. <br> • List various automobile Original Equipment Manufacturers (OEMs) and different products/ models manufactured by them. <br> • Discuss manufacturing and automotive product design standards and procedures followed in the company. | |
| **Classroom Aids** | |
| Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop | |
| **Tools, Equipment and Other Requirements** | |
| NA | |

## Module 2: Organize work and resources according to safety and conservation standards

### Mapped to ASC/N9803, v1.0

**Terminal Outcomes:**

- Employ appropriate ways to maintain safe and secure working environment.
- Perform work as per the quality standards.
- Apply conservation practices at the workplace.

| Duration: <16:00> | Duration: <24:00> |
|---|---|
| Theory – Key Learning Outcomes | Practical – Key Learning Outcomes |
| • List the potential workplace related risks and hazards, their causes and preventions.<br>• Identify PPE to be used at workplace.<br>• Identify various warning signs used at the workplace.<br>• Describe appropriate strategies to deal with emergencies and accidents at the workplace.<br>• Outline the organizational structure to be followed to report about health, safety and security breaches to the concerned authorities.<br>• Discuss the importance of keeping work area clean and tidy.<br>• Discuss the significance of conforming to basic hygiene practices such as washing hands, using alcohol based hand sanitizers or soap.<br>• Discuss organizational hygiene and sanitation guidelines and ways of reporting breaches/gaps if any to the concerned authorities.<br>• Discuss the ways of dealing with stress and anxiety.<br>• Discuss how to complete the given work within the stipulated time period.<br>• Explain how to maintain a proper balance between team and individual goals.<br>• Explain 5S guidelines at workplace.<br>• List the various materials used at the workplace.<br>• Explain organisational recommended procedure for storage of tools, equipment and material after completion of work.<br>• Explain the ways to optimize usage of resources.<br>• Discuss various methods of waste management and its disposal. | • Apply appropriate safety practices to ensure safety of people at the workplace<br>• Display the correct way of wearing and removing PPE such as face masks, hand gloves, face shields, PPE suits, etc.<br>• Demonstrate the use of fire extinguisher.<br>• Apply basic first aid procedure in case of emergencies.<br>• Perform routine cleaning of tools, equipment and machines.<br>• Employ various techniques for checking malfunctions in the equipment as per Standard Operating Procedure (SOP).<br>• Show how to sanitize and disinfect one's work area regularly.<br>• Demonstrate the correct way of washing hands using soap and water.<br>• Demonstrate the correct way of sanitizing hands using alcohol-based hand rubs.<br>• Demonstrate how to evacuate the workplace in case of an emergency.<br>• Demonstrate sorting of materials, tools and equipment and spare parts after completion of work.<br>• Demonstrate the steps involved in storage of tools, equipment and material after completion of work.<br>• Perform basic checks to identify any spills and leaks and that need to be plugged /stopped.<br>• Demonstrate different disposal techniques depending upon types of waste.<br>• Employ different ways to check if equipment/machines are functioning as per requirements and report malfunctioning, if observed.<br>• Employ ways for efficient utilization of material and water. |

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| • List the different categories of waste for the purpose of segregation<br>• Differentiate between recyclable and non-recyclable waste<br>• State the importance of using appropriate colour dustbins for different types of waste.<br>• Discuss common practices for conserving electricity at workplace.<br>• Discuss the common sources of pollution and ways to minimize it. | |

**Classroom Aids:**

Whiteboard, marker pen, projector

**Tools, Equipment and Other Requirements**

• Housekeeping material: Cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel, fire extinguisher
• Safety gears: Safety shoes, ear plug, goggles, gloves, helmet, first-aid kit

## Module 3: Perform SMAW welding using AR technology

### Mapped to ASC/N3129, v1.0

**Terminal Outcomes:**

- Perform preparatory activities related to SMAW welding using AR technology.

| Duration: 35:00 | Duration: 55:00 |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Discuss occupational health and safety practices in welding<br>• Describe basics of Welding (including types of joint and welding symbols)<br>• Describe SMAW process<br>• Outline SMAW welding and its process flow<br>• Describe various types of welding joints i.e. fillet lap joints, tee fillet joints, corner joints, butt joints (square, single, vee, double vee)<br>• Describe various welding positions i.e. flat (PA) IG/1F, horizontal vertical (PB)2F, horizontal (PC)2G, vertical upwards (PF) 3F / 3G, vertical downwards (PG) 3F / 3G, Plate to Pipe (Fixed) 5F<br>• Discuss the information obtained from engineering drawing, Welding Procedure Specification (WPS) and job orders related to work<br>• List AR system welding simulator, tools, welding machines, measuring instruments, accessories, consumables and input materials (MS and SS plates) required<br>• Elaborate different current and voltage settings, gas flow rates, wire diameters, wire feed speed and other variables to suit typical situations<br>• List steps for material and equipment preparation<br>• Describe properties and characteristics of materials and consumables<br>• Describe impact of various welding parameters on the quality and quantity of SMAW welding<br>• Elaborate types, selection and application of filler wires and welding electrodes<br>• Describe shielding gas properties and applications<br>• List safety practices as specified by organization during the work<br>• Describe concept of weldability and selection of filler wires and shielding gases | • Show how to interpret the engineering drawing, Welding Procedure Specification (WPS) and job orders<br>• Apply appropriate ways to select and arrange the right material, equipment, fixtures, accessories such as welding torch and consumables such as electrode, filler wire, shielding gas etc. as per the SOP and job requirements<br>• Apply appropriate ways to check that material to be welded is as per the required specifications and job requirement<br>• Apply appropriate ways to diagnose and resolve any technical issues related to AR tools and systems, including software, hardware, and connectivity issues<br>• Apply appropriate ways to calibrate AR devices to maintain accuracy in the overlayed instructions and welding parameters<br>• Show how to set up virtual SMAW welding scenario on the AR system simulator as per the WPS requirement<br>• Show how to set welding parameters like current, voltage, electrode size, material thickness, and joint type in the AR simulator as per the WPS requirement<br>• Show how to run the simulation and verify that the values of parameters are appropriate or not<br>• Show how to follow AR system to prepare the workpiece and materials for welding by cleaning, grinding, and positioning them according to project specification and the chosen welding scenario<br>• Apply appropriate ways to install the work pieces and fixture on the apparatus and align them with the electrodes by following the AR system simulator<br>• Apply appropriate ways to adjust the settings of the SMAW welding machine |

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| • Describe types of beads, characteristics and uses (stringer, weave, weave patterns)<br>• Discuss the importance and procedure to clean torch tip and liner<br>• List steps for set up AR system simulator for functional operation<br>• List steps for using AR system simulator for conducting SMAW welding<br>• Discuss the importance of correct angle of torch and filler wire, direction of weld and feed and travel speed during the welding operation<br>• Elaborate ways to measure the welded workpiece<br>• Elaborate ways to remove extra material from the welded piece<br>• Describe finishing processes after completion of welding<br>• Describe post-welding treatments<br>• Discuss need of controlling stress and distortion in welding<br>• Describe quality control and defect analysis<br>• Elaborate SOP recommended by the organisation for checking irregularities in the product/work piece<br>• List factors that affect weld quality standards<br>• Describe various defects associated with the SMAW welding process<br>• Describe various testing techniques like visual, destructive and non-destructive<br>• List records of weld quality and any issues that are identified, including photographs or videos captured via AR devices for quality audits need to be maintained | (e.g., amperage, voltage) as set on the AR system simulator<br>• Demonstrate procedures of operating AR system simulator as specified in SOP and manufacturer manual<br>• Show how to set up AR system simulator for functional operation in accordance with manufacturer's specifications<br>• Demonstrate SMAW welding by following AR simulator guidance and tack weld the joint in accordance with job plan<br>• Demonstrate use of AR headsets and software to access welding instructions, visualize weld paths, and check for potential defects in real-time during the welding process<br>• Demonstrate use of AR overlays to accurately position welds, identify critical areas, and ensure proper joint alignment<br>• Apply appropriate ways to monitor the welding process parameters are within standards by reading the feedbacks or warning indicators on the AR system<br>• Show how to follow AR system suggestions for corrections to maintain an optimal arc length<br>• Apply appropriate ways to produce joints of the specified dimensional accuracy and required weld quality by following AR simulator<br>• Apply appropriate ways to measure the final welded piece and compare with the dimensions as prescribed in the WPS and engineering drawing<br>• Apply appropriate ways to remove extra material by using chipping hammers, grinders etc., from the welded piece<br>• Show how to hammer the work piece to get the desired shape, if there are any welding bulges/distortions<br>• Demonstrate use of AR system simulator for conducting quality check and inspection of welded piece as specified in SOP and manufacturer manual<br>• Demonstrate use of AR systems to visually inspect welds, ensuring they meet specified standards and regulations<br>• Apply appropriate ways to inspect welds using AR simulation to identify defects like porosity, undercuts, improper penetration etc. |

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| | • Demonstrate destructive and non-destructive tests on the work pieces by following AR system simulator |
| | • Apply appropriate ways to separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair and maintain records of each category |
| | • Show how to tag and store the right quality pieces by following organisational policies and procedures |
| | • Apply appropriate ways to clean and store all the tools, machine and equipment after completion of work |
| | • Apply appropriate ways to remove chips from different machine areas and dispose scrap or waste material in accordance with the company policies and environmental regulations |
| | • Apply appropriate ways to report to the supervisor about any problems faced or anticipated during the complete process |

**Classroom Aids**

Whiteboard and Markers, Sketch pens, LCD Projector and Laptop for presentations

**Tools, Equipment and Other Requirements**

- Basic tool box, Work bench with vice
- Hammer, Chisel set, Centre punch 9mm x 127mm, Dividers 20 cm, Wire brush 15 cm x 3.7 mm, Spark lighter, Number punch 6 mm and letter punch 6 mm, Scriber 15 cm, Tongs holding
- Steel rule, Screw driver set, Hacksaw frame adjustable 30 cm, Magnifying glass 15 cm, Weld measuring gauge fillet and butt, file set, Steel tape 182 cm flexible in case, Try square
- Rubber hose clips, Spindle key (for opening cylinder valve), Pressure regulator oxygen double stage, Pressure regulator acetylene regulator, Tip cleaner, Outfit spanner
- Power hacksaw, Portable grinder
- Power source, SMAW welding set, AR simulator
- Dye penetrant test kit, Ultrasonic testing kit, Magnetic particle testing kit, X-ray testing kit
- Hand book, job orders, work order, completion material requests, and Technical Reference Books.
- **Safety materials**: Fire extinguisher, welding helmet, Leather sleeves, leather safety gloves, leather aprons, safety glasses with side shields, ear plug, safety shoes and first-aid kit
- **Cleaning material**: Tip cleaner, wire brush (M.S.), cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel

## Module 4: Perform GMAW welding using AR technology

*Mapped to ASC/N3130, v1.0*

**Terminal Outcomes:**

- Perform preparatory activities related to MIG welding using AR technology.

| **Duration**: *30:00* | **Duration**: *60:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Describe GMAW process <br> • Outline MIG welding and its process flow <br> • Discuss the information obtained from engineering drawing, Welding Procedure Specification (WPS) and job orders related to work <br> • List AR system welding simulator, tools, welding machines, measuring instruments, accessories, consumables and input materials (MS and SS plates) required <br> • Elaborate different current and voltage settings, gas flow rates, wire diameters, wire feed speed and other variables to suit typical situations <br> • List steps for material and equipment preparation <br> • Describe properties and characteristics of materials and consumables <br> • Describe impact of various welding parameters on the quality and quantity of MIG welding <br> • Elaborate types, selection and application of filler wires and welding electrodes <br> • Describe concept of weldability and selection of filler wires and shielding gases <br> • Discuss the importance and procedure to clean torch tip and liner <br> • List steps for set up AR system simulator for functional operation <br> • List steps for using AR system simulator for conducting MIG welding <br> • Discuss the importance of correct angle of torch and filler wire, direction of weld and feed and travel speed during the welding operation <br> • Elaborate ways to measure the welded workpiece <br> • Elaborate ways to remove extra material from the welded piece <br> • Describe finishing processes after completion of welding <br> • Describe post-welding treatments | • Show how to interpret the engineering drawing, Welding Procedure Specification (WPS) and job orders <br> • Apply appropriate ways to select and arrange the right material, equipment, fixtures, accessories such as welding torch and consumables such as electrode, filler wire, shielding gas etc. as per the SOP and job requirements <br> • Apply appropriate ways to check that material to be welded is as per the required specifications and job requirement <br> • Apply appropriate ways to diagnose and resolve any technical issues related to AR tools and systems, including software, hardware, and connectivity issues <br> • Apply appropriate ways to calibrate AR devices to maintain accuracy in the overlayed instructions and welding parameters <br> • Show how to set up virtual MIG welding scenario on the AR system simulator as per the WPS requirement <br> • Show how to set welding parameters like current, voltage, electrode size, material thickness, and joint type in the AR simulator as per the WPS requirement <br> • Show how to run the simulation and verify that the values of parameters are appropriate or not <br> • Show how to follow AR system to prepare the workpiece and materials for welding by cleaning, grinding, and positioning them according to project specification and the chosen welding scenario <br> • Apply appropriate ways to install the work pieces and fixture on the apparatus and align them with the electrodes by following the AR system simulator <br> • Apply appropriate ways to adjust the settings of the MIG welding machine (e.g., |

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| • List various defects associated with MIG welding<br>• Elaborate SOP recommended by the organisation for checking irregularities in the product/work piece<br>• List factors that affect weld quality standards<br>• List records of weld quality and any issues that are identified, including photographs or videos captured via AR devices for quality audits need to be maintained | amperage, voltage) as set on the AR system simulator<br>• Demonstrate procedures of operating AR system simulator as specified in SOP and manufacturer manual<br>• Show how to set up AR system simulator for functional operation in accordance with manufacturer's specifications<br>• Demonstrate GMAW welding by following AR simulator guidance and tack weld the joint in accordance with job plan<br>• Demonstrate use of AR headsets and software to access welding instructions, visualize weld paths, and check for potential defects in real-time during the welding process<br>• Demonstrate use of AR overlays to accurately position welds, identify critical areas, and ensure proper joint alignment<br>• Apply appropriate ways to monitor the welding process parameters are within standards by reading the feedbacks or warning indicators on the AR system<br>• Show how to follow AR system suggestions for corrections to maintain an optimal arc length<br>• Apply appropriate ways to produce joints of the specified dimensional accuracy and required weld quality by following AR simulator<br>• Apply appropriate ways to measure the final welded piece and compare with the dimensions as prescribed in the WPS and engineering drawing<br>• Apply appropriate ways to remove extra material by using chipping hammers, grinders etc., from the welded piece<br>• Show how to hammer the work piece to get the desired shape, if there are any welding bulges/distortions<br>• Demonstrate use of AR system simulator for conducting quality check and inspection of welded piece as specified in SOP and manufacturer manual<br>• Demonstrate use of AR systems to visually inspect welds, ensuring they meet specified standards and regulations<br>• Apply appropriate ways to inspect welds using AR simulation to identify defects like porosity, undercuts, improper penetration etc. |

| | • Demonstrate destructive and non-destructive tests on the work pieces by following AR system simulator |
| | • Apply appropriate ways to separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair and maintain records of each category |
| | • Show how to tag and store the right quality pieces by following organisational policies and procedures |
| | • Apply appropriate ways to clean and store all the tools, machine and equipment after completion of work |
| | • Apply appropriate ways to remove chips from different machine areas and dispose scrap or waste material in accordance with the company policies and environmental regulations |
| | • Apply appropriate ways to report to the supervisor about any problems faced or anticipated during the complete process |

**Classroom Aids**

Whiteboard and Markers, Sketch pens, LCD Projector and Laptop for presentations

**Tools, Equipment and Other Requirements**

- Basic tool box, Work bench with vice
- Hammer, Chisel set, Centre punch 9mm x 127mm, Dividers 20 cm, Wire brush 15 cm x 3.7 mm, Spark lighter, Number punch 6 mm and letter punch 6 mm, Scriber 15 cm, Tongs holding
- Steel rule, Screw driver set, Hacksaw frame adjustable 30 cm, Magnifying glass 15 cm, Weld measuring gauge fillet and butt, file set, Steel tape 182 cm flexible in case, Try square
- Rubber hose clips, Spindle key (for opening cylinder valve), Pressure regulator oxygen double stage, Pressure regulator acetylene regulator, Tip cleaner, Outfit spanner
- Power hacksaw, Portable grinder
- Power source, MIG welding set, AR simulator
- Dye penetrant test kit, Ultrasonic testing kit, Magnetic particle testing kit, X-ray testing kit
- Hand book, job orders, work order, completion material requests, and Technical Reference Books.
- **Safety materials**: Fire extinguisher, welding helmet, Leather sleeves, leather safety gloves, leather aprons, safety glasses with side shields, ear plug, safety shoes and first-aid kit
- **Cleaning material**: Tip cleaner, wire brush (M.S.), cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel

# Module 5: Perform GTAW welding using AR technology

*Mapped to ASC/N3131, v1.0*

**Terminal Outcomes:**

- Perform preparatory activities related to TIG welding using AR technology.

| **Duration**: *30:00* | **Duration**: *60:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Describe GTAW process<br>• Outline TIG welding and its process flow<br>• Discuss the information obtained from engineering drawing, Welding Procedure Specification (WPS) and job orders related to work<br>• List AR system welding simulator, tools, welding machines, measuring instruments, accessories, consumables and input materials (MS and SS plates) required<br>• Elaborate different current and voltage settings, gas flow rates, wire diameters, wire feed speed and other variables to suit typical situations<br>• List steps for material and equipment preparation<br>• Describe properties and characteristics of materials and consumables<br>• Describe impact of various welding parameters on the quality and quantity of TIG welding<br>• Elaborate types, selection and application of filler wires and welding electrodes<br>• Describe concept of weldability and selection of filler wires and shielding gases<br>• Discuss the importance and procedure to clean torch tip and liner<br>• List steps for set up AR system simulator for functional operation<br>• List steps for using AR system simulator for conducting TIG welding<br>• Discuss the importance of correct angle of torch and filler wire, direction of weld and feed and travel speed during the welding operation<br>• Elaborate ways to measure the welded workpiece<br>• Elaborate ways to remove extra material from the welded piece<br>• Describe finishing processes after completion of welding<br>• Describe post-welding treatments | • Show how to interpret the engineering drawing, Welding Procedure Specification (WPS) and job orders<br>• Apply appropriate ways to select and arrange the right material, equipment, fixtures, accessories such as welding torch and consumables such as electrode, filler wire, shielding gas etc. as per the SOP and job requirements<br>• Apply appropriate ways to check that material to be welded is as per the required specifications and job requirement<br>• Apply appropriate ways to diagnose and resolve any technical issues related to AR tools and systems, including software, hardware, and connectivity issues<br>• Apply appropriate ways to calibrate AR devices to maintain accuracy in the overlayed instructions and welding parameters<br>• Show how to set up virtual TIG welding scenario on the AR system simulator as per the WPS requirement<br>• Show how to set welding parameters like current, voltage, electrode size, material thickness, and joint type in the AR simulator as per the WPS requirement<br>• Show how to run the simulation and verify that the values of parameters are appropriate or not<br>• Show how to follow AR system to prepare the workpiece and materials for welding by cleaning, grinding, and positioning them according to project specification and the chosen welding scenario<br>• Apply appropriate ways to install the work pieces and fixture on the apparatus and align them with the electrodes by following the AR system simulator<br>• Apply appropriate ways to adjust the settings of the TIG welding machine (e.g., |

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|---|---|
| • List various defects associated with TIG welding<br>• Elaborate SOP recommended by the organisation for checking irregularities in the product/work piece<br>• List factors that affect weld quality standards<br>• List records of weld quality and any issues that are identified, including photographs or videos captured via AR devices for quality audits need to be maintained | amperage, voltage) as set on the AR system simulator<br>• Demonstrate procedures of operating AR system simulator as specified in SOP and manufacturer manual<br>• Show how to set up AR system simulator for functional operation in accordance with manufacturer's specifications<br>• Demonstrate GTAW welding by following AR simulator guidance and tack weld the joint in accordance with job plan<br>• Demonstrate use of AR headsets and software to access welding instructions, visualize weld paths, and check for potential defects in real-time during the welding process<br>• Demonstrate use of AR overlays to accurately position welds, identify critical areas, and ensure proper joint alignment<br>• Apply appropriate ways to monitor the welding process parameters are within standards by reading the feedbacks or warning indicators on the AR system<br>• Show how to follow AR system suggestions for corrections to maintain an optimal arc length<br>• Apply appropriate ways to produce joints of the specified dimensional accuracy and required weld quality by following AR simulator<br>• Apply appropriate ways to measure the final welded piece and compare with the dimensions as prescribed in the WPS and engineering drawing<br>• Apply appropriate ways to remove extra material by using chipping hammers, grinders etc., from the welded piece<br>• Show how to hammer the work piece to get the desired shape, if there are any welding bulges/distortions<br>• Demonstrate use of AR system simulator for conducting quality check and inspection of welded piece as specified in SOP and manufacturer manual<br>• Demonstrate use of AR systems to visually inspect welds, ensuring they meet specified standards and regulations<br>• Apply appropriate ways to inspect welds using AR simulation to identify defects like porosity, undercuts, improper penetration etc. |

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|---|---|
| | • Demonstrate destructive and non-destructive tests on the work pieces by following AR system simulator<br>• Apply appropriate ways to separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair and maintain records of each category<br>• Show how to tag and store the right quality pieces by following organisational policies and procedures<br>• Apply appropriate ways to clean and store all the tools, machine and equipment after completion of work<br>• Apply appropriate ways to remove chips from different machine areas and dispose scrap or waste material in accordance with the company policies and environmental regulations<br>• Apply appropriate ways to report to the supervisor about any problems faced or anticipated during the complete process |

**Classroom Aids**

Whiteboard and Markers, Sketch pens, LCD Projector and Laptop for presentations

**Tools, Equipment and Other Requirements**

- Basic tool box, Work bench with vice
- Hammer, Chisel set, Centre punch 9mm x 127mm, Dividers 20 cm, Wire brush 15 cm x 3.7 mm, Spark lighter, Number punch 6 mm and letter punch 6 mm, Scriber 15 cm, Tongs holding
- Steel rule, Screw driver set, Hacksaw frame adjustable 30 cm, Magnifying glass 15 cm, Weld measuring gauge fillet and butt, file set, Steel tape 182 cm flexible in case, Try square
- Rubber hose clips, Spindle key (for opening cylinder valve), Pressure regulator oxygen double stage, Pressure regulator acetylene regulator, Tip cleaner, Outfit spanner
- Power hacksaw, Portable grinder
- Power source, TIG welding set, AR simulator
- Dye penetrant test kit, Ultrasonic testing kit, Magnetic particle testing kit, X-ray testing kit
- Hand book, job orders, work order, completion material requests, and Technical Reference Books.
- **Safety materials**: Fire extinguisher, welding helmet, Leather sleeves, leather safety gloves, leather aprons, safety glasses with side shields, ear plug, safety shoes and first-aid kit
- **Cleaning material**: Tip cleaner, wire brush (M.S.), cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel

# Module 6: Perform Robotic welding using AR technology

## Mapped to ASC/N3132, v1.0

**Terminal Outcomes:**

- Perform preparatory activities related to robotic welding using AR technology.

| Duration: 40:00 | Duration: 80:00 |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| <ul><li>Describe robotic welding process</li><li>Outline robotic welding and its process flow</li><li>Discuss robotic automation and its application in welding</li><li>Describe mechanization, orbital and robot welding</li><li>Discuss the information obtained from engineering drawing, Welding Procedure Specification (WPS) and job orders related to work</li><li>List AR system welding simulator, tools, welding machines, measuring instruments, accessories, consumables and input materials (MS and SS plates) required</li><li>Elaborate different current and voltage settings, gas flow rates, wire diameters, wire feed speed and other variables to suit typical situations</li><li>List steps for material and equipment preparation</li><li>Describe properties and characteristics of materials and consumables</li><li>Describe impact of various welding parameters on the quality and quantity of robotic welding</li><li>Elaborate types, selection and application of filler wires and welding electrodes</li><li>Describe concept of weldability and selection of filler wires and shielding gases</li><li>Discuss the importance and procedure to clean torch tip and liner</li><li>List steps for set up AR system simulator for functional operation</li><li>List steps for using AR system simulator for conducting robotic welding</li><li>Discuss the importance of correct angle of torch and filler wire, direction of weld and feed and travel speed during the welding operation</li><li>Elaborate ways to measure the welded workpiece</li></ul> | <ul><li>Show how to interpret the engineering drawing, Welding Procedure Specification (WPS) and job orders</li><li>Apply appropriate ways to select and arrange the right material, equipment, fixtures, accessories such as welding torch and consumables such as electrode, filler wire, shielding gas etc. as per the SOP and job requirements</li><li>Apply appropriate ways to check that material to be welded is as per the required specifications and job requirement</li><li>Apply appropriate ways to diagnose and resolve any technical issues related to AR tools and systems, including software, hardware, and connectivity issues</li><li>Apply appropriate ways to calibrate AR devices to maintain accuracy in the overlayed instructions and welding parameters</li><li>Show how to set up virtual robotic welding scenario on the AR system simulator as per the WPS requirement</li><li>Show how to set welding parameters like current, voltage, electrode size, material thickness, and joint type in the AR simulator as per the WPS requirement</li><li>Show how to run the simulation and verify that the values of parameters are appropriate or not</li><li>Show how to follow AR system to prepare the workpiece and materials for welding by cleaning, grinding, and positioning them according to project specification and the chosen welding scenario</li><li>Show how to identify robotic technology, welding robot features and specifications including robot language and welding process and parameter capabilities to be used in welding applications</li><li>Apply appropriate ways to plan robot welding program</li></ul> |

| | |
|---|---|
| • Elaborate ways to remove extra material from the welded piece | • Show how to confirm required operations for robot arm and torch, types of weld, any positions or welds requiring non-standard instructions to be performed using appropriate technical reference sources |
| • Describe finishing processes after completion of welding | • Show how to review robot file library for correct references to weld size and weld type |
| • Describe post-welding treatments | |
| • List various defects associated with robotic welding | • Apply appropriate ways to identify suitable program code for robotic technology and welding applications |
| • Elaborate SOP recommended by the organisation for checking irregularities in the product/work piece | • Show how to write joint arm and welding moves using teach pendant or software |
| • List factors that affect weld quality standards | • Demonstrate use of software including canned cycles and sub-routines for programming welding operations |
| • List records of weld quality and any issues that are identified, including photographs or videos captured via AR devices for quality audits need to be maintained | • Show how to program weld procedure for the robot using short, interrupted and continuous welds |
| | • Show how to create command instructions for welding instructions |
| | • Show how to perform any additional programming required including instructions, weld data recording and lower-level programming |
| | • Apply appropriate ways to check the sequence of the program as per the process sheet |
| | • Apply appropriate ways to test and debug the program for weld accuracy, compatibility and efficiency requirements by conducting trial run of the robotic arm on test material |
| | • Apply appropriate ways to verify trial welds and program performance against required specifications |
| | • Show how to edit program to adjust welding operations based on trial outcomes |
| | • Apply appropriate ways to save final program and complete operation sheets and any required records according to enterprise procedures |
| | • Apply appropriate ways to install the work pieces and fixture on the apparatus and align them with the electrodes by following the AR system simulator |
| | • Apply appropriate ways to adjust the settings of the robotic welding machine (e.g., amperage, voltage) as set on the AR system simulator |

| | |
|---|---|
| | • Demonstrate procedures of operating AR system simulator as specified in SOP and manufacturer manual |
| | • Show how to set up AR system simulator for functional operation in accordance with manufacturer's specifications |
| | • Demonstrate robotic welding by following AR simulator guidance and tack weld the joint in accordance with job plan |
| | • Demonstrate use of AR headsets and software to access welding instructions, visualize weld paths, and check for potential defects in real-time during the welding process |
| | • Demonstrate use of AR overlays to accurately position welds, identify critical areas, and ensure proper joint alignment |
| | • Apply appropriate ways to monitor the welding process parameters are within standards by reading the feedbacks or warning indicators on the AR system |
| | • Show how to follow AR system suggestions for corrections to maintain an optimal arc length |
| | • Apply appropriate ways to produce joints of the specified dimensional accuracy and required weld quality by following AR simulator |
| | • Apply appropriate ways to measure the final welded piece and compare with the dimensions as prescribed in the WPS and engineering drawing |
| | • Apply appropriate ways to remove extra material by using chipping hammers, grinders etc., from the welded piece |
| | • Show how to hammer the work piece to get the desired shape, if there are any welding bulges/distortions |
| | • Demonstrate use of AR system simulator for conducting quality check and inspection of welded piece as specified in SOP and manufacturer manual |
| | • Demonstrate use of AR systems to visually inspect welds, ensuring they meet specified standards and regulations |
| | • Apply appropriate ways to inspect welds using AR simulation to identify defects like porosity, undercuts, improper penetration etc. |
| | • Demonstrate destructive and non-destructive tests on the work pieces by following AR system simulator |

| | |
|---|---|
| | • Apply appropriate ways to separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair and maintain records of each category |
| | • Show how to tag and store the right quality pieces by following organisational policies and procedures |
| | • Apply appropriate ways to clean and store all the tools, machine and equipment after completion of work |
| | • Apply appropriate ways to remove chips from different machine areas and dispose scrap or waste material in accordance with the company policies and environmental regulations |
| | • Apply appropriate ways to report to the supervisor about any problems faced or anticipated during the complete process |

**Classroom Aids**

Whiteboard and Markers, Sketch pens, LCD Projector and Laptop for presentations

**Tools, Equipment and Other Requirements**

- Basic tool box, Work bench with vice
- Hammer, Chisel set, Centre punch 9mm x 127mm, Dividers 20 cm, Wire brush 15 cm x 3.7 mm, Spark lighter, Number punch 6 mm and letter punch 6 mm, Scriber 15 cm, Tongs holding
- Steel rule, Screw driver set, Hacksaw frame adjustable 30 cm, Magnifying glass 15 cm, Weld measuring gauge fillet and butt, file set, Steel tape 182 cm flexible in case, Try square
- Rubber hose clips, Spindle key (for opening cylinder valve), Pressure regulator oxygen double stage, Pressure regulator acetylene regulator, Tip cleaner, Outfit spanner
- Power hacksaw, Portable grinder
- Power source, robotic welding arm, AR simulator
- Dye penetrant test kit, Ultrasonic testing kit, Magnetic particle testing kit, X-ray testing kit
- Hand book, job orders, work order, completion material requests, and Technical Reference Books.
- **Safety materials**: Fire extinguisher, welding helmet, Leather sleeves, leather safety gloves, leather aprons, safety glasses with side shields, ear plug, safety shoes and first-aid kit
- **Cleaning material**: Tip cleaner, wire brush (M.S.), cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel

# Module 7: Advanced Automotive Welding Mastery

*Mapped to ASC/N3133, v1.0*

**Terminal Outcomes:**

- Perform advanced automotive welding techniques.

| Duration: *40:00* | Duration: *80:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Describe advanced welding techniques<br>• List welding specific equipment requirements during welding<br>• Describe different current and voltage settings, gas flow rates, electrode feed and other variables to suit typical situations<br>• List steps for material and equipment preparation<br>• Describe properties and characteristics of materials and consumables<br>• Describe impact of various welding parameters like voltage, current, gas flow rate, speed, pressure, torch angle, cycle time, electrode distance etc. on the quality and quantity of MIG welding<br>• Describe SOP recommended by the organisation for welding of advance vehicles<br>• List various defects associated with the welding process<br>• Describe various testing techniques like visual, destructive and non-destructive | • Apply appropriate ways to identify and arrange required tools, machines and material as mentioned in WPS or drawing<br>• Apply appropriate ways to check that material to be welded is as per the required specifications, quality and job requirement<br>• Apply appropriate ways to plan the welding activities before starting the actual process as per WPS<br>• Show how to set welding parameters like current, voltage, electrode size, material thickness, and joint type as per the requirement<br>• Apply appropriate ways to install the work pieces and fixture on the apparatus and align them with torch and electrode as per the job requirements<br>• Demonstrate advanced welding techniques such as MIG welding to weld critical components of advanced vehicles in accordance with job plan, specifications, relevant welding standards and manufacturers'<br>• Apply appropriate ways to 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<br>• Show how to produce joints of the specified dimensional accuracy and required weld quality<br>• Apply appropriate ways to measure the final welded piece and compare with the dimensions as prescribed in the WPS and engineering drawing<br>• Apply appropriate ways to remove extra material, distortion etc. by using chipping hammers, grinders etc., from the welded piece |

| | • Apply appropriate ways to check the work pieces as per the work instructions for product quality |
| | • Show how to conduct destructive and non-destructive tests on the work pieces |
| | • Apply appropriate ways to separate the defective pieces which can be repaired/ reworked and pieces which are beyond repair and maintain records of each category |
| | • Show how to tag and store the right quality pieces by following organisational policies and procedures |
| | • Apply appropriate ways to clean and store all the tools, machine and equipment after completion of work |
| | • Apply appropriate ways to check the robotic arm for any malfunctions/defects or any service requirements and immediately inform the supervisor/maintenance team for the same |
| | • Apply appropriate ways to remove chips from different machine areas and dispose scrap or waste material in accordance with the company policies and environmental regulations |

**Classroom Aids**

Whiteboard and Markers, Sketch pens, LCD Projector and Laptop for presentations

**Tools, Equipment and Other Requirements**

- Basic tool box, Work bench with vice
- Hammer, Chisel set, Centre punch 9mm x 127mm, Dividers 20 cm, Wire brush 15 cm x 3.7 mm, Spark lighter, Number punch 6 mm and letter punch 6 mm, Scriber 15 cm, Tongs holding
- Steel rule, Screw driver set, Hacksaw frame adjustable 30 cm, Magnifying glass 15 cm, Weld measuring gauge fillet and butt, file set, Steel tape 182 cm flexible in case, Try square
- Rubber hose clips, Spindle key (for opening cylinder valve), Pressure regulator oxygen double stage, Pressure regulator acetylene regulator, Tip cleaner, Outfit spanner
- Power hacksaw, Portable grinder
- Power source, MIG, TIG welding set, AR simulator
- Dye penetrant test kit, Ultrasonic testing kit, Magnetic particle testing kit, X-ray testing kit
- Hand book, job orders, work order, completion material requests, and Technical Reference Books.
- **Safety materials**: Fire extinguisher, welding helmet, Leather sleeves, leather safety gloves, leather aprons, safety glasses with side shields, ear plug, safety shoes and first-aid kit
- **Cleaning material**: Tip cleaner, wire brush (M.S.), cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel

## Module 8: Introduction to Employability Skills

## *Mapped to DGT/VSQ/N0101*

**Terminal Outcomes:**

- Discuss about Employability Skills in meeting the job requirements

| Duration: *<0:30>* | Duration: *<0:30>* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Discuss the importance of Employability Skills in meeting the job requirements | • Demonstrate Employability Skills |
| **Classroom Aids:** | |
| Whiteboard, marker pen, projector | |
| **Tools, Equipment and Other Requirements** | |
| | |

## Module 9: Constitutional values - Citizenship

## *Mapped to DGT/VSQ/N0101*

**Terminal Outcomes:**

- Discuss about constitutional values to be followed to become a responsible citizen

| Duration: *<0:30>* | Duration: *<0:30>* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen. | • Show how to practice different environmentally sustainable practices |
| **Classroom Aids:** | |
| Whiteboard, marker pen, projector | |
| **Tools, Equipment and Other Requirements** | |
| | |

## Module 10: Becoming a Professional in the 21st Century

### Mapped to DGT/VSQ/N0101

**Terminal Outcomes:**
- Demonstrate professional skills required in 21st century

| Duration: *<0:30>* | Duration: *<0:30>* |
| --- | --- |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Discuss 21st century skills. | • Display positive attitude, self -motivation, problem solving, time management skills and continuous learning mindset in different situations. |
| **Classroom Aids:** | |
| Whiteboard, marker pen, projector | |
| **Tools, Equipment and Other Requirements** | |
| | |

## Module 11: Basic English Skills

### Mapped to DGT/VSQ/N0101

**Terminal Outcomes:**
- Practice basic English speaking.

| Duration: *<1:00>* | Duration: *<1:00>* |
| --- | --- |
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Discuss need of basic English skills. | • Use appropriate basic English sentences/phrases while speaking |
| **Classroom Aids:** | |
| Whiteboard, marker pen, projector | |
| **Tools, Equipment and Other Requirements** | |
| | |

## Module 12: Communication Skills

*Mapped to DGT/VSQ/N0101*

**Terminal Outcomes:**

- Practice basic communication skills.

| Duration: *<1:30>* | Duration: *<2:30>* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Discuss need of communication skills<br>• Describe importance of team work | • Demonstrate how to communicate in a well -mannered way with others.<br>• Demonstrate working with others in a team |
| **Classroom Aids:** | |
| Whiteboard, marker pen, projector | |
| **Tools, Equipment and Other Requirements** | |
| | |

## Module 13: Diversity & Inclusion

*Mapped to DGT/VSQ/N0101*

**Terminal Outcomes:**

- Describe PwD and gender sensitisation.

| Duration: *<0:30>* | Duration: *<0:30>* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Discuss the significance of reporting sexual harassment issues in time | • Show how to conduct oneself appropriately with all genders and PwD |
| **Classroom Aids:** | |
| Whiteboard, marker pen, projector | |
| **Tools, Equipment and Other Requirements** | |
| | |

## Module 14: Financial and Legal Literacy

*Mapped to DGT/VSQ/N0101*

**Terminal Outcomes:**

- Describe ways of managing expenses, income, and savings.

| Duration: *<1:30>* | Duration: *<2:30>* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Discuss the significance of using financial products and services safely and securely. <br> • Explain the importance of managing expenses, income, and savings. <br> • Explain the significance of approaching the concerned authorities in time for any exploitation as per legal rights and laws | • Demonstrate ways of managing expenses, income, and savings. |
| **Classroom Aids:** | |
| Whiteboard, marker pen, projector | |
| **Tools, Equipment and Other Requirements** | |
| | |

## Module 15: Essential Digital Skills

*Mapped to DGT/VSQ/N0101*

**Terminal Outcomes:**

- Demonstrate procedure of operating digital devices and associated applications safely.

| Duration: *<1:00>* | Duration: *<2:00>* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Discuss the significance of using internet for browsing, accessing social media platforms, safely and securely | • Show how to operate digital devices and use the associated applications and features, safely and securely |
| **Classroom Aids:** | |
| Whiteboard, marker pen, projector | |
| **Tools, Equipment and Other Requirements** | |
| | |

## Module 16: Entrepreneurship

### Mapped to DGT/VSQ/N0101

**Terminal Outcomes:**

- Describe opportunities as an entrepreneur.

| Duration: *<2:30>* | Duration: *<4:30>* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Discuss the need for identifying opportunities for potential business, sources for arranging money and potential legal and financial challenges | • Demonstrate ways for identifying opportunities for potential business, sources for arranging money and potential legal and financial challenges |
| **Classroom Aids:** | |
| Whiteboard, marker pen, projector | |
| **Tools, Equipment and Other Requirements** | |
| | |

## Module 17: Customer Service

### Mapped to DGT/VSQ/N0101

**Terminal Outcomes:**

- Describe ways of maintaining customer.

| Duration: *<1:30>* | Duration: *<2:30>* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Differentiate between types of customers.<br>• Explain the significance of identifying customer needs and addressing them.<br>• Discuss the significance of maintaining hygiene and dressing appropriately. | • Show how to maintain hygiene and dressing appropriately. |
| **Classroom Aids:** | |
| Whiteboard, marker pen, projector | |
| **Tools, Equipment and Other Requirements** | |
| | |

## Module 18: Getting ready for apprenticeship & Jobs

*Mapped to DGT/VSQ/N0101*

**Terminal Outcomes:**

- Describe ways of preparing for apprenticeship & Jobs appropriately.

| Duration: *<1:00>* | Duration: *<1:00>* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Discuss the significance of dressing up neatly and maintaining hygiene for an interview<br>• Discuss how to search and register for apprenticeship opportunities | • Create a biodata<br>• Use various sources to search and apply for jobs |
| **Classroom Aids:** ||
| Whiteboard, marker pen, projector ||
| **Tools, Equipment and Other Requirements** ||
|  ||

# Annexure

## Trainer Requirements

| Trainer Prerequisites | | | | | | |
|---|---|---|---|---|---|---|
| Minimum Educational Qualification | Specialization | Relevant Industry Experience | | Training Experience | | Remarks |
| | | Years | Specialization | Years | Specialization | |
| Diploma | Mechanical | 5 | Welding | 1 | Welding | preferably CTI/ATI cleared |
| B.Tech | Mechanical | 3 | Welding | 1 | Welding | |

| Trainer Certification | |
|---|---|
| Domain Certification | Platform Certification |
| Certified for Job Role: "Technician: Automotive AR Welding Simulation" mapped to QP: "ASC/Q3112", v1.0. Minimum accepted score as per SSC guideline is 80% | Recommended that the Trainer is certified for the Job Role: "Trainer" (VET & SKILLS), mapped to the Qualification Pack: "MEP/Q2601", v2.0. Minimum accepted score is 80 % as per SSC guidelines. |

## Assessor Requirements

| Assessor Prerequisites | | | | | |
|---|---|---|---|---|---|
| **Minimum Educational Qualification** | **Specialization** | **Relevant Industry Experience** | | **Training/Assessment Experience** | | **Remarks** |
| | | *Years* | *Specialization* | *Years* | *Specialization* | |
| Diploma | Mechanical | 5 | Welding | 1 | Welding | preferably CTI/ATI cleared |
| B.Tech | Mechanical | 3 | Welding | 1 | Welding | |

| Assessor Certification | |
|---|---|
| **Domain Certification** | **Platform Certification** |
| Certified for Job Role: "Technician: Automotive AR Welding Simulation" mapped to QP: "ASC/Q3112", v1.0. Minimum accepted score as per SSC guideline is 80% | Recommended that the Assessor is certified for the Job Role: "Assessor" (VET & SKILLS), mapped to the Qualification Pack: "MEP/Q2701", v2.0. Minimum accepted score is 80 % as per SSC guidelines. |

## Assessment Strategy

1. Assessment System Overview:
   - Batches assigned to the assessment agencies for conducting the assessment on SDMS/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:
   - Confirm that the centre is available at the same address as mentioned on SDMS or SIP
   - Check the duration of the training.
   - Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
   - 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.
   - Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
   - Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
   - Check the availability of the Lab Equipment for the particular Job Role.

3. Assessment Quality Assurance levels / Framework:
   - Question papers created by the Subject Matter Experts (SME)
   - Question papers created by the SME verified by the other subject Matter Experts
   - Questions are mapped with NOS and PC
   - Question papers are prepared considering that level 1 to 3 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
   - Assessor must be ToA certified & trainer must be ToT Certified
   - Assessment agency must follow the assessment guidelines to conduct the assessment

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
   - Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
   - Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos

5. Method of verification or validation:
   - Surprise visit to the assessment location
   - Random audit of the batch
   - Random audit of any candidate

6. Method for assessment documentation, archiving, and access
   - Hard copies of the documents are stored
   - Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage
   - Soft copies of the documents & photographs of the assessment are stored in the Hard Drives

# References

## Glossary

| Term | Description |
|---|---|
| Declarative Knowledge | Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem. |
| Key Learning Outcome | Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application). |
| OJT (M) | On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site |
| OJT (R) | On-the-job training (Recommended); trainees are recommended the specified hours of training on site |
| Procedural Knowledge | Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills. |
| Training Outcome | Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training. |
| Terminal Outcome | Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome. |

## Acronyms and Abbreviations

| Term | Description |
|------|-------------|
| QP | Qualification Pack |
| NSQF | National Skills Qualification Framework |
| NSQC | National Skills Qualification Committee |
| NOS | National Occupational Standards |
| PPE | Personal Protective Equipment |