



# Model Curriculum

**QP Name: Automotive Robotics and Automation Manager**

**QP Code: ASC/Q8306**

**QP Version: 1.0**

**NSQF Level: 7**

**Model Curriculum Version: 1.0**

Automotive Skills Development Council | 153, Gr Floor, Okhla Industrial Area, Phase – III, Leela Building,  
New Delhi – 110020

# Table of Contents

|  |    |
|--|----|
| Training Parameters.....   | 3  |
| Program Overview .....   | 4  |
| Training Outcomes.....   | 4  |
| Compulsory Modules.....  | 4  |
| Module 1: Introduction to the role of an Automotive Robotics and Automation Manager .....  | 6  |
| Module 2: Organize work and resources according to safety and conservation standards ..... | 7  |
| Module 3: Communicate Effectively and Efficiently.....                                     | 9  |
| Module 4: Manage robot operations for automobile manufacturing process .....               | 10 |
| Module 5: Plan installation and execution of robotic system .....                          | 12 |
| Module 6: Manage robotic line operations and team.....                                     | 14 |
| Module 7: Liason with vendors and other departments .....                                  | 16 |
| Annexure.....  | 18 |
| Trainer Requirements .....   | 18 |
| Assessor Requirements.....   | 19 |
| Assessment Strategy .....  | 20 |
| References .....   | 21 |
| Glossary.....  | 21 |
| Acronyms and Abbreviations.....  | 22 |

## Training Parameters

|   |   |
|---|---|
| <b>Sector</b>   | Automotive  |
| <b>Sub-Sector</b>                                       | Manufacturing   |
| <b>Occupation</b>                                       | Automotive Product Development  |
| <b>Country</b>  | India   |
| <b>NSQF Level</b>                                       | 7   |
| <b>Aligned to NCO/ISCO/ISIC Code</b>                    | NCO-2015/1223.0101y   |
| <b>Minimum Educational Qualification and Experience</b> | M.E./M.Tech in the relevant field with 4 Years of relevant experience<br>OR<br>B.E./B.Tech in the relevant field with 5 Years of relevant experience<br>OR<br>3 years Diploma (Mechanical/Automobile/ Electrical / Electronics) after class 12th from recognized regulatory body with 5 years of relevant experience<br>OR<br>Certificate-NSQF (Automotive Robotics and Automation Simulation Engineer/Automotive Automation and Robotics Engineer Level 6) with 3 Years of relevant experience |
| <b>Pre-Requisite License or Training</b>                | NA  |
| <b>Minimum Job Entry Age</b>                            | 22 years  |
| <b>Last Reviewed On</b>                                 | 28 <sup>th</sup> July, 2022   |
| <b>Next Review Date</b>                                 | 28 <sup>th</sup> July, 2025   |
| <b>NSQC Approval Date</b>                               | 28 <sup>th</sup> July, 2022   |
| <b>QP Version</b>                                       | 1.0   |
| <b>Model Curriculum Creation Date</b>                   | 28 <sup>th</sup> July, 2022   |
| <b>Model Curriculum Valid Up to Date</b>                | 28 <sup>th</sup> July, 2025   |
| <b>Model Curriculum Version</b>                         | 1.0   |
| <b>Minimum Duration of the Course</b>                   | 660 Hours   |
| <b>Maximum Duration of the Course</b>                   | 660 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.

- Verify and approve designing, selection and integration of automation systems
- Manage selection, installation, commissioning and maintenance of industrial Robot
- Manage integration of robots and automation system
- Prepare reports and documents related to installation, commissioning and maintenance of industrial Robot
- Work effectively and efficiently as per schedules and timelines.
- Implement safety practices.
- Use resources optimally to ensure less wastage and maximum conservation.
- Communicate effectively and develop interpersonal skills.

### 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 |
|---|-----------------|--------------------|--|--|----------------|
| <b>Bridge Module</b>  |                 |                    |  |  |                |
| Module 1: Introduction to the role of an Automotive Robotics and Automation Manager                                 | 5:00            | 0:00               |  |  | 5:00           |
| <b>ASC/N9810: Manage work and resources (Manufacturing) NOS Version No. – 1.0 NSQF Level – 5</b>                    | <b>20:00</b>    | <b>40:00</b>       |  |  | <b>60:00</b>   |
| Module 2: Manage work and resources according to safety and conservation standards                                  | 20:00           | 40:00              |  |  | 60:00          |
| <b>ASC/N9812 – Interact effectively with team, customers and others NOS Version No. 1.0 NSQF Level 5</b>            | <b>20:00</b>    | <b>35:00</b>       |  |  | <b>55:00</b>   |
| Module 3: Communicate effectively and efficiently   | 20:00           | 35:00              |  |  | 55:00          |
| <b>ASC/N8309 – Manage robot operations for automobile manufacturing process NOS Version No. –1.0 NSQF Level - 7</b> | <b>10:00</b>    | <b>50:00</b>       | <b>60:00</b>                             |  | <b>120:00</b>  |
| Module 4: Manage robot  | 10:00           | 50:00              | 60:00                                    |  | 120:00         |

|  |              |               |               |  |               |
|--|--------------|---------------|---------------|--|---------------|
| operations for automobile manufacturing process  |              |               |               |  |               |
| <b>ASC/N8310 – Plan installation and execution of robotic system<br/>NOS Version No. –1.0<br/>NSQF Level - 7</b> | <b>15:00</b> | <b>60:00</b>  | <b>75:00</b>  |  | <b>150:00</b> |
| Module 5: Plan installation and execution of robotic system  | 15:00        | 60:00         | 75:00         |  | 150:00        |
| <b>ASC/N8311 – Manage robotic line operations and team<br/>NOS Version No. –1.0<br/>NSQF Level - 7</b>           | <b>10:00</b> | <b>65:00</b>  | <b>75:00</b>  |  | <b>150:00</b> |
| Module 6: Manage robotic line operations and team  | 10:00        | 65:00         | 75:00         |  | 150:00        |
| <b>ASC/N8312 – Liaison with vendors and other departments<br/>NOS Version No. –1.0<br/>NSQF Level - 7</b>        | <b>10:00</b> | <b>50:00</b>  | <b>60:00</b>  |  | <b>120:00</b> |
| Module 7: Liaison with vendors and other departments   | 10:00        | 50:00         | 60:00         |  | 120:00        |
| <b>Total Duration</b>  | <b>90:00</b> | <b>300:00</b> | <b>270:00</b> |  | <b>660:00</b> |

# Module Details

## Module 1: Introduction to the role of an Automotive Robotics and Automation Manager

### *Bridge module*

#### Terminal Outcomes:

- Discuss the role and responsibilities of an Automotive Robotics and Automation Manager.

| <b>Duration:</b> <05:00>   | <b>Duration:</b> <00:00>                 |
|--|--|
| <b>Theory – Key Learning Outcomes</b>  | <b>Practical – Key Learning Outcomes</b> |
| <ul style="list-style-type: none"> <li>• List the role and responsibilities of an Automotive Robotics and Automation Manager.</li> <li>• Discuss the job opportunities for an Automotive Robotics and Automation Manager in the automobile industry.</li> <li>• Explain about Indian automobile manufacturing market.</li> <li>• List various automobile Original Equipment Manufacturers (OEMs) and different products/ models manufactured by them.</li> <li>• Discuss automation and manufacturing standards and procedures followed in the company.</li> </ul> |  |
| <b>Classroom Aids:</b>   |  |
| Whiteboard, marker pen, projector  |  |
| <b>Tools, Equipment and Other Requirements</b>   |  |
|  |  |

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

### Mapped to ASC/N9810, v1.0

#### Terminal Outcomes:

- Employ appropriate ways to maintain safe and secure working environment
- Apply material and energy conservation practices at the workplace.

| Duration: <20:00>  | Duration: <40:00>  |
|--|--|
| Theory – Key Learning Outcomes   | Practical – Key Learning Outcomes  |
| <ul style="list-style-type: none"> <li>• Discuss organisational procedures for health, safety and security and individual role and responsibilities related to the same.</li> <li>• List the potential workplace related risks, threats and hazards, their causes and preventions.</li> <li>• List personal protective equipment like safety gloves, glasses, shoes and mask used at the workplace.</li> <li>• List various types of fire extinguisher.</li> <li>• Identify various safety boards/ signs placed on the shop floor.</li> <li>• Explain 5S standards, procedures and policies followed at workplace.</li> <li>• Discuss organisational procedures to deal with emergencies and accidents at the workplace and importance of following them.</li> <li>• State the importance of conducting safety drills or training sessions.</li> <li>• Explain the process of filling daily check sheet for reporting to the concerned authorities about improvements done and risks identified.</li> <li>• Discuss how and when to report about potential hazards identified in the workplace and limits of responsibility for dealing with them.</li> <li>• Outline the importance of keeping workplace, equipment, restrooms etc. clean and sanitised.</li> <li>• Explain the importance of following hygiene and sanitation regulations developed by organisation at the workplace.</li> <li>• Discuss the importance of maintaining the availability of running water, hand wash and alcohol-based sanitizers at the</li> </ul> | <ul style="list-style-type: none"> <li>• Apply appropriate ways to implement safety practices to ensure safety of people at the workplace.</li> <li>• Display the correct way of wearing and disposing PPE.</li> <li>• Demonstrate the use of fire extinguisher.</li> <li>• Demonstrate how to provide first aid procedure in case of emergencies.</li> <li>• Demonstrate how to evacuate the workplace in case of an emergency.</li> <li>• Employ various techniques for checking malfunctions in the machines with the support of maintenance team and as per Standard Operating Procedures (SOP).</li> <li>• Demonstrate to arrange tools/ equipment/ fasteners/ spare parts into proper trays, cabinets, lockers as mentioned in the 5S guidelines/work instructions.</li> <li>• Apply appropriate ways to organise safety drills or training sessions for others on the identified risks and safety practices.</li> <li>• Prepare a report about the health, safety and security breaches.</li> <li>• Apply appropriate ways to check that workplace, equipment, restrooms etc. are cleaned and sanitised.</li> <li>• Role play a situation to brief the team about the hygiene and sanitation regulations developed by organisation.</li> <li>• Demonstrate the correct way of washing hands using soap and water and alcohol-based hand rubs.</li> <li>• Apply appropriate methods to support the employees to cope with stress, anxiety etc.</li> <li>• Demonstrate proper waste collection and disposal mechanism depending upon types of waste.</li> </ul> |

|  |  |
|--|--|
| <p>workplace.</p> <ul style="list-style-type: none"> <li>• Discuss the significance of conforming to basic hygiene practices such as washing hands, using alcohol based hand sanitizers or soap.</li> <li>• Recall ways of reporting advanced hygiene and sanitation issues to the concerned authorities.</li> <li>• Elucidate various stress and anxiety management techniques.</li> <li>• Discuss the significance of greening.</li> <li>• Classify different categories of waste for the purpose of segregation.</li> <li>• Differentiate between recyclable and non-recyclable waste.</li> <li>• Discuss various methods of waste collection and disposal.</li> <li>• List the various materials used at the workplace.</li> <li>• Explain organisational recommended norms for storage of tools, equipment and material.</li> <li>• Discuss the importance of efficient utilisation of material and water.</li> <li>• Explain basics of electricity and prevalent energy efficient devices.</li> <li>• Explain the processes to optimize usage of material and energy/electricity.</li> <li>• Enlist common practices for conserving electricity at workplace.</li> </ul> | <ul style="list-style-type: none"> <li>• Perform the steps involved in storage of tools, equipment and material after completion of work.</li> <li>• Employ appropriate ways to resolve malfunctioning (fumes/ sparks/ emission/ vibration/ noise) and lapse in maintenance of equipment as per requirements.</li> <li>• Perform the steps to prepare a sample material and energy audit reports.</li> <li>• Employ practices for efficient utilization of material and energy/electricity.</li> </ul> |
| <p><b>Classroom Aids:</b></p>  |  |
| <p>Whiteboard, marker pen, projector</p>   |  |
| <p><b>Tools, Equipment and Other Requirements</b></p>  |  |
| <ul style="list-style-type: none"> <li>• Housekeeping material: Cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel, fire extinguisher</li> <li>• Safety gears: Safety shoes, ear plug, goggles, gloves, helmet, first-aid kit</li> </ul>  |  |



## Module 3: Communicate Effectively and Efficiently

### Mapped to ASC/N9812, v1.0

#### Terminal Outcomes:

- Use effective communication and interpersonal skills.
- Apply sensitivity while interacting with different genders and people with disabilities.

| <b>Duration: &lt;20:00&gt;</b>   | <b>Duration: &lt;35:00&gt;</b>   |
|--|--|
| <b>Theory – Key Learning Outcomes</b>  | <b>Practical – Key Learning Outcomes</b>   |
| <ul style="list-style-type: none"> <li>• Explain the importance of complying with organizational requirements to share information with team members.</li> <li>• Discuss the ways to adjust the communication styles to reflect sensitivity towards gender and persons with disability (PwD).</li> <li>• Explain the importance of respecting personal space of colleagues and customers.</li> <li>• Describe the ways to manage and coordinate with team members for work integration.</li> <li>• State the importance of team goals over individual goals, keeping commitment made to team members, and informing them in case of delays.</li> <li>• Discuss the importance of following the organisation’s policies and procedures</li> <li>• Discuss the importance of rectifying errors as per feedback and minimizing mistakes.</li> <li>• Discuss gender-based concepts, issues and legislation as well organization standards, guidelines, rights and duties of PwD.</li> <li>• Discuss the importance of PwD and gender sensitization to ensure that team shows sensitivity towards them.</li> <li>• State the importance of following organizational standards and guidelines related to PwD.</li> <li>• Recall the rights and duties at workplace with respect to PwD.</li> <li>• Outline organisation policies and procedures pertaining to written and verbal communication.</li> </ul> | <ul style="list-style-type: none"> <li>• Employ different means and methods of communication depending upon the requirement to interact with the team members.</li> <li>• Employ appropriate ways to maintain good relationships with team members and superiors.</li> <li>• Apply appropriate techniques to resolve conflicts and manage team members for smooth workflow.</li> <li>• Conduct training sessions to train the team members on proper reporting of completed work and receiving feedback.</li> <li>• Employ suitable ways to escalate problems to superiors as and when required.</li> <li>• Prepare a sample report on the progress and team performance .</li> <li>• Role play a situation on how to offer help to people with disability (PwD) if required at work.</li> </ul> |
| <b>Classroom Aids:</b>   |  |
| Whiteboard/blackboard, marker/chalk, duster, computer or Laptop attached to LCD projector  |  |
| <b>Tools, Equipment and Other Requirements</b>   |  |
|  |  |

## Module 4: Manage robot operations for automobile manufacturing process

### Mapped to ASC/N8309, v1.0

#### Terminal Outcomes:

- Perform the steps of managing robot operations for automobile manufacturing process.
- Demonstrate organisational procedure of planning for the robotic operations for automobile manufacturing process.

| Duration: <10:00>  | Duration: <50:00>   |
|--|---|
| Theory – Key Learning Outcomes   | Practical – Key Learning Outcomes   |
| <ul style="list-style-type: none"> <li>• Discuss the information obtained from the documents like need analysis, feasibility, technical specification and process flow diagram, product drawings and other engineering documents.</li> <li>• Discuss the selection criteria of automation elements in align with electrical, mechanical and environmental parameters.</li> <li>• List all the components to be joined in a particular production cell.</li> <li>• Discuss core and auxiliary support process required during automation process.</li> <li>• Discuss the information obtained from assembly plan and Production/ Assembly documents.</li> <li>• Describe sequence of operations for the integration activities.</li> <li>• Describe Standard work cycle.</li> <li>• Discuss potential failures in process.</li> <li>• Describe process repeatability and cycle time.</li> <li>• Discuss the records and documents needed to be prepared as a reference for future development.</li> </ul> | <ul style="list-style-type: none"> <li>• Show how to verify and approve project documents like need analysis, feasibility, technical specification and process flow diagram, assembly plan, product drawings and other engineering documents.</li> <li>• Show how to identify inputs and outputs in a robotic cell.</li> <li>• Show how to identify scope of process improvements in the work cell.</li> <li>• Apply appropriate ways to monitor the problems and their solutions during I/O mapping in a robotic cell</li> <li>• Apply appropriate ways to monitor the material loading and unloading sequence in the robotic cell.</li> <li>• Apply appropriate ways to collect production volume, product size and data of available time for the production.</li> <li>• Show how to interpret total work to be done on robotic systems.</li> <li>• Demonstrate organisational procedure of interpreting and approving the application to be implemented on robotic system.</li> <li>• Apply appropriate ways to organize other jigs/fixture and equipment required to run a robotic automation cell.</li> <li>• Show how to define and standardize work cycle of process and Process Flow Diagram.</li> <li>• Show how to interpret the application to be implemented on robotic system and identify jigs/fixture and equipment required for integration.</li> <li>• Show how to identify machine type and equipment to be used in the application.</li> <li>• Demonstrate organisational procedure of interpreting and approving list of specification and quantity of material required.</li> </ul> |

|  |   |
|--|---|
|  | <ul style="list-style-type: none"> <li>• Apply appropriate ways to identify potential failures in process.</li> <li>• Show how to interpret workload and manpower requirements of the process for robot system.</li> <li>• Apply appropriate ways to analyse process repeatability and cycle time.</li> </ul> |
| <p><b>Classroom Aids:</b></p>  |   |
| <p>Whiteboard, marker pen, projector</p>   |   |
| <p><b>Tools, Equipment and Other Requirements</b></p>  |   |
| <p>PCs/Laptops, Internet with Wi-Fi (Min2 Mbps Dedicated)<br/>         18 documents of PPAP, Design records, Design Records, Authorized Engineering Change Documents, Customer Engineering Approval, Design Failure Modes and Effects Analysis (DFMEA), applied in special situations, Process Flow Diagram, Process Failure Modes and Effects Analysis (PFMEA) Control Plan, Part Submission Warrant (PSW), Engineering Change Documents<br/>         Dimensional Results, PLC Simulator, Hydraulic, Pneumatic, Electronic Control Systems Simulator, Internet of Things study material and IOT communication devices, Manufacturing Execution system, manufacturing operation management system.<br/>         Hydraulics and pneumatics systems simulator, PLC Simulator with required software, Air Cylinders, valves, connector/tubing simulators, Pick and place robots assembly<br/>         Electronics sensor like proximity, optical, magnetic sensors.</p> |   |

## Module 5: Plan installation and execution of robotic system

### Mapped to ASC/N8310, v1.0

#### Terminal Outcomes:

- Perform preparatory activities like robot selection, preparation of mounting design, etc.
- Demonstrate organisational procedure of selection installation and execution of robotic system.

| <b>Duration: &lt;15:00&gt;</b>  | <b>Duration: &lt;60:00&gt;</b>   |
|---|--|
| <b>Theory – Key Learning Outcomes</b>   | <b>Practical – Key Learning Outcomes</b>   |
| <ul style="list-style-type: none"> <li>• Discuss the information obtained from the project document related to the robots and automation system requirements.</li> <li>• Discuss the information obtained from manual and technical specification of robots.</li> <li>• Describe the selection criteria of industrial robot based on applications, robot types and technical parameters.</li> <li>• Describe reachability and accuracy requirements of the robot in application.</li> <li>• Describe types of end effector and their selection criteria.</li> <li>• Describe zoning area and stroke area of robot.</li> <li>• List application controllers and external I/O devices required.</li> <li>• Describe the functioning and use of components of robotic cell like robot, tip dressers, jigs/fixture/grippers, Docking units, sensor and cable trays etc.</li> <li>• Describe tolerance &amp; matching quality fit and finish.</li> <li>• List the steps to be performed for robot integration with automation elements.</li> </ul> | <ul style="list-style-type: none"> <li>• Employ appropriate ways to design / interpret the project document from the information related to robots and automation system requirements.</li> <li>• Perform steps to configure manual and technical specification of robots.</li> <li>• Apply appropriate ways to determine and approve reachability and accuracy requirements of the robot in application.</li> <li>• Show how to determine maximum load of the EOAT.</li> <li>• Show how to identify and finalize zoning area and stroke area of robot.</li> <li>• Apply appropriate ways to identify and configure area required for system implementation and availability of power, pneumatic and coolant supply.</li> <li>• Apply appropriate ways to plan material space, trolleys, supply of material to line side &amp; material handling equipment.</li> <li>• Perform steps to finalize the position of equipment in the cell and robot positions.</li> <li>• Demonstrate organisational procedure for approving the place for all the components of robotic cell like robot, tip dressers, jigs/fixture/grippers, docking units, sensor and cable trays etc.</li> <li>• Apply appropriate ways to finalize the required work tables of fixtures, orientation of loading and unloading and material flow in the cell.</li> <li>• Show how to determine the production flow at shop floor.</li> <li>• Apply appropriate ways to monitor timelines/Deadlines and host review meetings.</li> <li>• Apply appropriate ways to monitor and audit robot programs at shop floor for cycle time improvement and productivity</li> </ul> |

|  |              |
|--|--------------|
|  | enhancement. |
| <b>Classroom Aids:</b>   |              |
| Whiteboard, marker pen, projector  |              |
| <b>Tools, Equipment and Other Requirements</b>   |              |
| <p>PCs/Laptops, Internet with Wi-Fi (Min2 Mbps Dedicated)</p> <p>18 documents of PPAP, Design records, Design Records, Authorized Engineering Change Documents, Customer Engineering Approval, Design Failure Modes and Effects Analysis (DFMEA), applied in special situations, Process Flow Diagram, Process Failure Modes and Effects Analysis (PFMEA) Control Plan, Part Submission Warrant (PSW), Engineering Change Documents</p> <p>Dimensional Results, PLC Simulator, Hydraulic, Pneumatic, Electronic Control Systems Simulator, Internet of Things study material and IOT communication devices, Manufacturing Execution system, manufacturing operation management system.</p> <p>Hydraulics and pneumatics systems simulator, PLC Simulator with required software, Air Cylinders, valves, connector/tubing simulators, Pick and place robots assembly</p> <p>Electronics sensor like proximity, optical, magnetic sensors.</p> |              |

## Module 6: Manage robotic line operations and team

### Mapped to ASC/N8311, v1.0

#### Terminal Outcomes:

- Demonstrate ways to implement process improvement techniques.
- Prepare sample shift rosters and production MIS reports.
- Demonstrate ways to implement team improvement practices.

| Duration: <10:00>  | Duration: <65:00>   |
|--|---|
| Theory – Key Learning Outcomes   | Practical – Key Learning Outcomes   |
| <ul style="list-style-type: none"> <li>• Elucidate procedure of planning manpower shift and preparing shift rosters on day to day basis as per the organisational norms and guidelines.</li> <li>• Discuss ways to reduce production losses and wastages in the production and increase minimum rejection of components during shift operation.</li> <li>• List improvement areas in the production line and corrective measures for following the identified gaps.</li> <li>• Explain process improvement techniques, Kaizens, TQM, Poka Yoke etc. and their impact on the production line to rectify the failure and gaps in the production process.</li> <li>• Identify ways for analysing breakdown trends and current maintenance process and areas of improvement in it.</li> <li>• Discuss corrective measures for reducing the breakdown and improving the maintenance process.</li> <li>• Describe use of ERP system for maintaining and updation production line data.</li> <li>• Discuss the documents and reports needed to maintain and prepare related to production process.</li> <li>• Discuss the importance and ways of involving employees in various engagement and development activities such as trainings, meets, brainstorming sessions, safety drills etc. organised in the plant.</li> <li>• List different types of information such as production targets, new guidelines, new processes etc. to be shared with team.</li> <li>• Discuss the importance of organising training sessions and making the team</li> </ul> | <ul style="list-style-type: none"> <li>• Prepare a plan for allocating manpower shifts based on the skills matrix.</li> <li>• Prepare shift rosters for the week and month based on the production plan to support the Shift In Charge/ Process head/ Shop head.</li> <li>• Apply appropriate ways for maintaining the information of leaves, IN-Out time and shift/ line overtime for the operators and helpers and sharing it with the concerned authorities.</li> <li>• Apply organisational specified procedures to send inventory requirements and follow up with the stores and purchase department for timely receipt of material.</li> <li>• Employ appropriate ways to maintain the movement and availability of required material, tools and equipment on shop floor within specified TAKT.</li> <li>• Demonstrate ways for using the resources and streamlining the activities effectively on shop floor.</li> <li>• Apply appropriate ways to communicate required information to other departments and resolving production related queries to achieve required production target and quality standards.</li> <li>• Role play a situation on how to implement ways to reduce losses and wastages and increase minimum rejection of components during shift operation.</li> <li>• Prepare MIS reports of daily and monthly production to match the production and target achieved and report to the production Incharge.</li> <li>• Apply appropriate ways to verify the correctness of production and material movement related data entries in the system (manual/ ERP) for the line/ shift.</li> </ul> |

|   |   |
|---|---|
| <p>aware of the new processes, inputs and outputs.</p> <ul style="list-style-type: none"> <li>• Discuss organizational structure to be followed to escalate and resolve issues related to team personal grievances/ complaints etc.</li> <li>• List various grievance and problem solving tools utilized in an organisation.</li> </ul> | <ul style="list-style-type: none"> <li>• Prepare the preventive maintenance schedule for the shop/ line and execute it on time.</li> <li>• Employ ways to analyse the various data sheets and reports related to production, maintenance, manpower deployment etc. to support the In charge/ Engineer/ Shop Head.</li> <li>• Apply ways to analyse improvement areas in the production line and identify corrective measures for the identified gaps.</li> <li>• Show how to audit production process for capability of each operation.</li> <li>• Perform steps to prepare sample report on the non-compliances for the regulatory authorities.</li> <li>• Employ appropriate ways to implement Kaizens, TQM, Poka Yoke etc. in the production line.</li> <li>• Apply ways to analyse breakdown trends and current maintenance process and identify corrective measures for the identified gaps.</li> <li>• Perform steps to monitor and review the effectiveness of process improvement techniques and corrective actions on production and preparing reports for the regulatory authorities.</li> <li>• Role play a situation on how to encourage team members for suggesting process improvement measures and their implementation process.</li> <li>• Apply ways to conduct daily floor meeting/ morning meetings/ staff meetings and share information to team such as production targets, new guidelines, new processes etc.</li> <li>• Show how to organise training sessions for team to enhance their skills and knowledge.</li> <li>• Demonstrate organisational specified procedure to identify, escalate and resolve team problems/ work grievances/ complaints etc.</li> <li>• Role play a situation on how to counsel employees for any work related issues or any personal problems.</li> </ul> |
| <p><b>Classroom Aids:</b></p>   |   |
| <p>Whiteboard, marker pen, projector</p>  |   |
| <p><b>Tools, Equipment and Other Requirements</b></p>   |   |

- Basic tool box, Work bench with vice
- Sampling tools, sample rejection data
- Case studies, shift planning document or software



## Module 7: Liaison with vendors and other departments

### Mapped to ASC/N8312, v1.0

#### Terminal Outcomes:

- Demonstrate organisational procedure of liaison with vendors and other departments.

| <b>Duration: &lt;10:00&gt;</b>  | <b>Duration: &lt;50:00&gt;</b>  |
|---|---|
| <b>Theory – Key Learning Outcomes</b>   | <b>Practical – Key Learning Outcomes</b>  |
| <ul style="list-style-type: none"> <li>• Describe ways to interact with different vendors for developing the robotic automation system.</li> <li>• List the steps to be performed for techno-commercial feasibility analysis.</li> <li>• Describe total cost of ownership and factors associated with it.</li> <li>• Discuss the need of ensuring that concerned department and system engineers are trained about usage and application before the installation.</li> <li>• Elaborate ways to analyse the ratio of automation implementation.</li> <li>• Discuss the need of defining the scope of development and information flow among the team members.</li> </ul> | <ul style="list-style-type: none"> <li>• Role play a situation on how to interact with different vendors for developing the robotic automation system.</li> <li>• Apply appropriate ways to check that integrators/developers incorporate all the necessary requirement.</li> <li>• Perform steps to carry out techno-commercial feasibility analysis with system developer.</li> <li>• Show how to identify total cost of ownership implement robotic system in the organization on the basis of techno-commercial feasibility analysis.</li> <li>• Demonstrate organisational procedure of arranging training for users by system developers for easy access of automation system.</li> <li>• Apply appropriate ways to check that users get level of information access as per their usage requirement-based sensitivity of the information.</li> <li>• Show how to study the process thoroughly.</li> <li>• Show how to define the scope of development for the team in current process and information flow among the team members related to the new technology of robotic automation.</li> </ul> |
| <b>Classroom Aids:</b>  |   |
| Whiteboard, marker pen, projector   |   |
| <b>Tools, Equipment and Other Requirements</b>  |   |
| Case studies, shift planning document or software   |   |

# Annexure

## Trainer Requirements

| Trainer Prerequisites             |  |                              |  |                     |  |         |
|-----------------------------------|--|------------------------------|--|---------------------|--|---------|
| Minimum Educational Qualification | Specialization                                 | Relevant Industry Experience |  | Training Experience |  | Remarks |
|                                   |  | Years                        | Specialization                                       | Years               | Specialization                                       |         |
| B.E/B.Tech                        | Mechanical/Automobile/ Electrical/ Electronics | 4                            | Mechanical/ Automobile/ Electronics/ Instrumentation | 1                   | Mechanical/ Automobile/ Electronics/ Instrumentation | NA      |
| B.E/B.Tech                        | Mechanical/Automobile/ Electrical/ Electronics | 5                            | Mechanical/ Automobile/ Electronics/ Instrumentation | 0                   | Mechanical/ Automobile/ Electronics/ Instrumentation | NA      |
| Diploma                           | Mechanical/Automobile/ Electrical/ Electronics | 3                            | Mechanical/ Automobile/ Electronics                  | 1                   | Mechanical/ Automobile/ Electronics                  | NA      |
| Diploma                           | Mechanical/Automobile/ Electrical/ Electronics | 4                            | Mechanical/ Automobile/ Electronics                  | 0                   | Mechanical/ Automobile/ Electronics                  | NA      |
| M.E/M.Tech                        | Mechanical/Automobile/ Electrical/ Electronics | 2                            | Mechanical/Automobile/ Electrical/ Electronics       | 1                   | Mechanical/Automobile/ Electrical/ Electronics       | NA      |
| M.E/M.Tech                        | Mechanical/Automobile/ Electrical/ Electronics | 3                            | Mechanical/Automobile/ Electrical/ Electronics       | 0                   | Mechanical/Automobile/ Electrical/ Electronics       | NA      |

| Trainer Certification  |  |
|--|--|
| Domain Certification   | Platform Certification                                   |
| “Automotive Robotics and Automation Manager, ASC/Q8306, version 1.0”. Minimum accepted score is 80%. | “Trainer, MEP/Q2601 v1.0” Minimum accepted score is 80%. |

## Assessor Requirements

| Assessor Prerequisites            |  |                              |  |                     |  |         |
|-----------------------------------|--|------------------------------|--|---------------------|--|---------|
| Minimum Educational Qualification | Specialization                                 | Relevant Industry Experience |  | Training Experience |  | Remarks |
|                                   |  | Years                        | Specialization                                       | Years               | Specialization                                       |         |
| B.E/B.Tech                        | Mechanical/Automobile/ Electrical/ Electronics | 5                            | Mechanical/ Automobile/ Electronics/ Instrumentation | 1                   | Mechanical/ Automobile/ Electronics/ Instrumentation | NA      |
| B.E/B.Tech                        | Mechanical/Automobile/ Electrical/ Electronics | 6                            | Mechanical/ Automobile/ Electronics/ Instrumentation | 0                   | Mechanical/ Automobile/ Electronics/ Instrumentation | NA      |
| Diploma                           | Mechanical/Automobile/ Electrical/ Electronics | 4                            | Mechanical/ Automobile/ Electronics                  | 1                   | Mechanical/ Automobile/ Electronics                  | NA      |
| Diploma                           | Mechanical/Automobile/ Electrical/ Electronics | 5                            | Mechanical/ Automobile/ Electronics                  | 0                   | Mechanical/ Automobile/ Electronics                  | NA      |
| M.E/M.Tech                        | Mechanical/Automobile/ Electrical/ Electronics | 3                            | Mechanical/Automobile/ Electrical/ Electronics       | 1                   | Mechanical/Automobile/ Electrical/ Electronics       | NA      |
| M.E/M.Tech                        | Mechanical/Automobile/ Electrical/ Electronics | 4                            | Mechanical/Automobile/ Electrical/ Electronics       | 0                   | Mechanical/Automobile/ Electrical/ Electronics       | NA      |

| Assessor Certification   |   |
|--|---|
| Domain Certification   | Platform Certification                                    |
| “Automotive Robotics and Automation Manager, ASC/Q8306, version 1.0”. Minimum accepted score is 80%. | “Assessor; MEP/Q2701 v1.0” Minimum accepted score is 80%. |

## 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   |
|------------------------------|---|
| <b>Declarative Knowledge</b> | 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.   |
| <b>Key Learning Outcome</b>  | 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). |
| <b>OJT (M)</b>               | On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site  |
| <b>OJT (R)</b>               | On-the-job training (Recommended); trainees are recommended the specified hours of training on site   |
| <b>Procedural Knowledge</b>  | 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.  |
| <b>Training Outcome</b>      | Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training.  |
| <b>Terminal Outcome</b>      | 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

|             |   |
|-------------|---|
| <b>NOS</b>  | National Occupational Standard(s)               |
| <b>NSQF</b> | National Skills Qualifications Framework        |
| <b>QP</b>   | Qualifications Pack                             |
| <b>TVET</b> | Technical and Vocational Education and Training |
| <b>SOP</b>  | Standard Operating Procedure                    |
| <b>WI</b>   | Work Instructions                               |
| <b>PPE</b>  | Personal Protective equipment                   |