Model Curriculum

QP Name: Automotive Assembly Technician

QP Code: ASC/Q3601

QP Version: 2.0

NSQF Level: 4

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

Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Assembly Operation
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/8211.1201
Minimum Educational Qualification and Experience	8th Class + 2 years ITI with 2 years of relevant experience OR 10th Class pass with 2 years of relevant experience OR 10th Class + 2 years ITI OR 12th Class with 1 Year of experience OR Certificate-NSQF (Automotive Assembly Operator) with 2 Years of experience
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 years
Last Reviewed On	20/11/2020
Next Review Date	20/11/2025
NSQC Approval Date	20/11/2020
QP Version	2.0
Model Curriculum Creation Date	20/11/2020
Model Curriculum Valid Up to Date	20/11/2025
Model Curriculum Version	1.0
Minimum Duration of the Course	390 Hours 00 Minutes
Maximum Duration of the Course	390 Hours 00 Minutes

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.

- Interpret engineering drawings for identification of raw material, tools and equipment required for the machining operations.
- Perform pre-assembling activities such as lifting of workpiece, inspection of tools and equipment etc.
- Perform various assembling operations such as bolting, tightening, riveting, fastening, adhesive clamping, crimping etc.
- Perform post-assembly operations such as cleaning and testing of vehicle.
- Work effectively and efficiently as per schedules and timelines.
- Implement safety practices.
- Optimize the use of resources to ensure less wastage and maximum conservation.
- Communicate effectively using 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
Bridge Module	**05:00**	**00:00**			**05:00**
Module 1: Introduction to the role of an Automotive Assembly Technician Bridge Module	05:00	0:00			05:00
ASC/N9803 – Organize work and resources (Manufacturing) NOS Version No. – 1.0 NSQF Level - 3	**15:00**	**30:00**			**45:00**
Module 2: Organize work and resources according to safety and conservation standards	15:00	30:00			45:00
ASC/N9802 – Interact effectively with colleagues, customers and others NOS Version No. – 1.0 NSQF Level - 3	**15:00**	**25:00**			**40:00**
Module 3: Communicate Effectively and Efficiently	15:00	25:00			40:00

ASC/N9805 – Interpret engineering drawing NOS Version No. – 1.0 NSQF Level – 4	**15:00**	**15:00**			**30:00**
Module 4: Interpret engineering drawing	15:00	15:00			30:00
ASC/N3611 – Perform vehicle assembly operations NOS Version No. – 1.0 NSQF Level - 4	**30:00**	**60:00**			**90:00**
Module 5: Prepare for assembling activities	30:00	60:00			90:00
ASC/N3611 – Perform vehicle assembly operations NOS Version No. – 1.0 NSQF Level - 4	**60:00**	**120:00**			**180:00**
Module 6: Perform vehicle component's assembly and post-assembly operations	60:00	150:00			210:00
Total Duration	**140:00**	**280:00**			**390:00**

Module Details

Module 1

Module Name: Introduction to the role of an Automotive Assembly Technician

Bridge module

Terminal Outcomes:

- Discuss the role and responsibilities of an Automotive Assembly Technician.

Duration: *<05:00>*	**Duration**: *<00:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the role and responsibilities of an Automotive Assembly Technician. • List the job opportunities for an Automotive Assembly Technician. • Explain about Indian automotive manufacturing market. • List various automobile Original Equipment Manufacturers (OEMs) and different products/ models manufactured by them. • Discuss the standards and procedures involved in the different processes of assembly. • Identify the standard checklists and schedules recommended by OEM.	
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
• Sample checklist of tools and equipment	

Module 2

Module Name: 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: *<15:00>*	**Duration**: *<30:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the potential workplace related risks and hazards, their causes and preventions. • Identify PPE to be used at workplace. • Identify various warning signs used at the workplace. • Describe appropriate strategies to deal with emergencies and accidents at the workplace. • Outline the organizational structure to be followed to report about health, safety and security breaches to the concerned authorities. • Discuss the importance of keeping work area clean and tidy. • Discuss the significance of conforming to basic hygiene practices such as washing hands, using alcohol based hand sanitizers or soap. • Discuss organizational hygiene and sanitation guidelines and ways of reporting breaches/gaps if any to the concerned authorities. • Discuss the ways of dealing with stress and anxiety. • Discuss how to complete the given work within the stipulated time period. • Explain how to maintain a proper balance between team and individual goals. • Explain 5S guidelines at workplace. • List the various materials used at the workplace. • Explain organisational recommended procedure for storage of tools, equipment and material after completion of work. • Explain the ways to optimize usage of resources.	• Apply appropriate safety practices to ensure safety of people at the workplace • Display the correct way of wearing and removing PPE such as face masks, hand gloves, face shields, PPE suits, etc. • Demonstrate the use of fire extinguisher. • Apply basic first aid procedure in case of emergencies. • Perform routine cleaning of tools, equipment and machines. • Employ various techniques for checking malfunctions in the equipment as per Standard Operating Procedure (SOP). • Show how to sanitize and disinfect one's work area regularly. • Demonstrate the correct way of washing hands using soap and water. • Demonstrate the correct way of sanitizing hands using alcohol-based hand rubs. • Demonstrate how to evacuate the workplace in case of an emergency. • Demonstrate sorting of materials, tools and equipment and spare parts after completion of work. • Demonstrate the steps involved in storage of tools, equipment and material after completion of work. • Perform basic checks to identify any spills and leaks and that need to be plugged /stopped. • Demonstrate different disposal techniques depending upon types of waste. • Employ different ways to check if equipment/machines are functioning as

• Discuss various methods of waste management and its disposal. • List the different categories of waste for the purpose of segregation • Differentiate between recyclable and non-recyclable waste • State the importance of using appropriate colour dustbins for different types of waste. • Discuss common practices for conserving electricity at workplace. • Discuss the common sources of pollution and ways to minimize it.	per requirements and report malfunctioning, if observed. • Employ ways for efficient utilization of material and water.
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 9

Module Name: Communicate Effectively and Efficiently

Mapped to ASC/N9802, v1.0

Terminal Outcomes:

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

Duration: *<15:00>*	**Duration**: *<25:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the organizational structure for communicating with colleagues, seniors and others. • Discuss the ways to adjust the communication styles to reflect sensitivity towards gender and persons with disability (PwD). • Explain the importance of respecting personal space of colleagues. • State the procedure to receive work instructions and report problems to the supervisor. • List the various organizational policies and procedures to be followed at the workplace. • Describe different ways to rectify commonly occurring errors. • Explain the importance of complying with the instructions/guidelines and procedures while performing tasks related to the job specifications. • Discuss the importance of PwD and gender sensitization.	• Employ different means of communication depending upon the requirement while interacting with others. • Demonstrate using new ways to maintain good relationships with colleagues and supervisor. • Prepare a sample report to send the work status to the supervisor. • Demonstrate how to communicate with different genders and persons with disability (PwD) in a sensitive manner.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
Sample of escalation matrix, organisation structure.	

Module

Module Name: Interpret engineering drawing

Mapped to ASC/N9805, v1.0

Terminal Outcomes:

- Describe the basics of engineering drawing.
- Interpret the machine drawings and symbols for understanding the job requirements.

Duration: *<15:00>*	**Duration**: *<15:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Identify uniqueness, dimensioning and important features of 2D and 3D shapes. • Identify types of lines, angles, points and their symmetry in shapes. • Differentiate between first angle and third angle projection. • Interpret 3 axis (x, y and z axis) of projection and machine symbols used in drawing. • Describe GD&T and use of its symbols in the drawings. • Identify required limits and tolerances of component from drawing. • Explain standards used in India for making assembly drawings. • Identify organisational drawing standards for interpreting the work requirements appropriately.	• Read an object in first angle and third angle projection. • Demonstrate appropriate way of reading and interpreting the shapes (cones, cylinder, sphere, cuboid, etc) on to a 2D and 3D projection. • Interpret and read orthographic and isometric views. • Read GD&T symbols in the given drawing. • Employ appropriate ways of storing the drawings in a defined and appropriate place. • Role play a situation on how to communicate the changes in drawing to the concerned authority.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
• Drawing tools • Machine drawing handbook • Machine drawings	

Module

Module Name: Prepare for assembling activities

Mapped to ASC/N3611, v1.0

Terminal Outcomes:

- Identify tools and equipment required for assembling activity.
- Perform pre-assembling activities such as lifting of workpiece, inspection of tools and equipment etc.

Duration: *<30:00>*	**Duration**: *<60:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List various components and systems of a vehicle. • Discuss the information derived from the workorder, wiring diagrams and engineering drawings. • Explain various assembling operations such as bolting, tightening, riveting, fastening, adhesive clamping, crimping etc. • Discuss the impact of various assembly operations on the vehicle. • Illustrate the process flow of assembly operations. • List tools, measuring instruments and accessories required during assembling work. • Describe how to fill CLRI sheet. • List the steps for setting up the equipment required for assembling work. • Describe importance of selecting right program in case of robotic assembly method as per the work instructions. • Discuss the process of lifting and placing the auto component on the designated place. • Recall various types of defects such as paint, dents, grooves, cracks etc. and their impact on the auto components body. • List the steps to be performed for checking the semi-precision mechanical, pneumatic, hydraulic and electrical parts in the auto components as per the work instructions. • List the steps to be performed for checking the adhesion of roof-lining, insulation material, roof-rail etc. of the auto component.	• Select the appropriate assembling processes on the basis of information derived from workorder, wiring diagrams and engineering drawings. • Demonstrate the standard operating procedure to use tools, equipment and measuring instruments required during job. • Apply appropriate ways for cleaning the assembling equipment before use. • Display the procedure of setting up the equipment required for assembling work. • Perform the steps of placing auto component on the designated place by using lifting tools. • Employ appropriate ways of inspecting and marking the defects on the physical body of auto components. • Show how to check the semi-precision mechanical, pneumatic, hydraulic and electrical parts in the auto components. • Apply appropriate techniques to check the adhesion of roof-lining, insulation material, roof-rail etc. of the auto component.
Classroom Aids:	
Whiteboard, marker pen, projector	

Tools, Equipment and Other Requirements
• PPT's, teaching aids, torqueing charts, assembly drawing / blue print, component assembly plan • **Measuring and marking tools**: Steel tape, steel rule, vernier calliper, micrometre, compass, divider, scriber, T Square, bevel protractor, pin set, torque meter etc. • **Assembly tools and equipment:** Riveting machine, drilling machine, riveting guns, pneumatic guns, fasteners, rubber seals, soldering iron, jigs, fixtures, adhesives • **Components:** Bolts, nuts, screws, wires, fasteners, connectors, sealants, adhesive bonding material etc. • **Lifting devices:** Hoists, cranes, bins, part trolleys, pallet trucks • **Safety materials**: Fire extinguisher, portable welding curtains, leather safety gloves, leather aprons, safety glasses, helmet, safety shoe 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

Module Name: Perform vehicle component's assembly and post-assembly operations

Mapped to ASC/N3611, v1.0

Terminal Outcomes:

- Perform assembly of components of vehicle.
- Perform post-assembly operations.

Duration: *<60:00>*	**Duration**: *<120:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Outline the process of various mechanical components assembly operations such as bolting, riveting, tightening etc. and electrical components assembly operations such as wire connections, wire color identification, wire routing, wire stripping, crimping, soldering, high frequency welding etc. • List various sealing compounds and their applications in a vehicle assembly. • List the steps to be performed for labelling the auto components. • Discuss the information needed to be mentioned on the labels of the auto components. • Recall the tasks to be performed post-assembly. • Discuss the importance of selecting correct lubricant. • Explain properties and specifications of lubricant required for lubricating the required component. • Summarise the commonly occurring defects in the assembled vehicle. • Discuss the impact of defects on the quality of assembled vehicle. • Explain the inspection and testing methods for identifying the defects and checking the quality of assembled vehicle as per the control plan. • Identify different methods for disposing off waste material such as waste oil, scrap, etc. • Discuss the necessary precautions to avoid any hazard and accident during assembly and post-assembly activities.	• Demonstrate organizational specified procedure of all assembly operations such as bolting, riveting, tightening, wire stripping, crimping, soldering, high frequency welding etc. • Employ appropriate assembly method for assembling of mechanical components such as bearings, shafts etc. and electrical components such as electric wire harness, Electronic Control Unit (ECU) etc. in vehicle. • Apply appropriate ways for routing wire and making electrical connections in the vehicle according to circuit diagram. • Demonstrate the organizational specified procedure of installing the various components of oil and lube system in the vehicle. • Apply appropriate ways for sealing to prevent water leakage in vehicle components. • Demonstrate the organizational specified procedure for labelling the auto components. • Display/show how to lubricate the vehicle components. • Employ appropriate ways for checking the volume and type of water, diesel or petrol, brake oil, gear oil, engine oil etc. in the vehicle. • Perform the steps involved in process of quality checks of assembled components under supervision. • Apply appropriate inspection and testing methods for identifying the defects and

	checking the quality of assembled vehicle as per the control plan.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
• PPT's, teaching aids, assembly drawing / blue print, component assembly plan • **Measuring and marking tools**: Steel tape, steel rule, vernier calliper, micrometre, compass, divider, scriber, T Square, bevel protractor, pin set, torque meter etc. • **Assembly tools and equipment:** Riveting machine, drilling machine, riveting guns, pneumatic guns, fasteners, rubber seals, soldering iron, jigs, fixtures, adhesives • **Components:** Bolts, nuts, screws, wires, fasteners, connectors, sealants, adhesive bonding material etc. • **Lifting devices:** Hoists, cranes, bins, part trolleys, pallet trucks • **Cleaning material**: Tip cleaner, wire brush (M.S.), cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
ITI	Mechanic/Turner/Fitter	5	Automotive Assembly	1	Automotive Assembly	NA
ITI	Mechanic/Turner/Fitter	6	Automotive Assembly	0	Automotive Assembly	**NA**
Certificate NSQF- Level 6	Automotive Assembly Master Technician	3	Automotive Assembly	1	Automotive Assembly	**NA**
Diploma	Mechanical/Automobile	3	Automotive Assembly	1	Automotive Assembly	**NA**
Diploma	Mechanical/Automobile	4	Automotive Assembly	0	Automotive Assembly	**NA**

Trainer Certification	
Domain Certification	**Platform Certification**
"Automotive Assembly Technician, ASC/ Q3601, version 2.0". Minimum accepted score is 80%.	"Trainer, MEP/Q2601" Minimum accepted score is 80%.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training/Assessment Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
ITI	Turner/Fitter	6	Automotive Assembly	1	Automotive Assembly	NA
ITI	Turner/Fitter	7	Automotive Assembly	0	Automotive Assembly	**NA**
Certificate NSQF- Level 6	Automotive Assembly Master Technician	4	Automotive Assembly	1	Automotive Assembly	**NA**
Diploma	Mechanical/Automobile	4	Automotive Assembly	1	Automotive Assembly	**NA**
Diploma	Mechanical/Automobile	5	Automotive Assembly	0	Automotive Assembly	**NA**

Assessor Certification	
Domain Certification	**Platform Certification**
"Automotive Assembly Technician, ASC/ Q3601, version 2.0". Minimum accepted score is 80%.	"Assessor; MEP/Q2701" 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
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

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training
SOP	Standard Operating Procedure
GD&T	Geometric Dimensioning & Tolerancing
CAD	Computer-Aided Drafting
CAM	Computer-Aided Manufacturing
CNC	Computerized Numerical Control
WI	Work Instructions
PPE	Personal Protective equipment