Model Curriculum

QP Name: Automotive Tool Room Technician

QP Code: ASC/Q4101

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	Tool Room Operation
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7223.0200
Minimum Educational Qualification and Experience	10th Class + 1 year ITI with 3 years of relevant experience OR 10th Class + 2 year ITI with 2 years of relevant experience OR 12th Class with 2 Years of relevant experience OR Certificate-NSQF (Automotive Tool Room Operator Level 3) with 2 years of experience
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 years
Last Reviewed On	29/07/2021
Next Review Date	29/07/2026
NSQC Approval Date	29/07/2021
QP Version	2.0
Model Curriculum Creation Date	29/07/2021
Model Curriculum Valid Up to Date	29/07/2026
Model Curriculum Version	2.0
Minimum Duration of the Course	480 Hours 00 Minutes
Maximum Duration of the Course	480 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 assembly drawing/work instructions/SOPs for identification of raw material, tools and equipment required for the tool and die manufacturing operations.
- Carry out preparatory activities such as lifting of workpiece, inspection of tools and equipment etc.
- Carry out machining, assembling and post-production operations.
- Work effectively and efficiently as per schedules and timelines.
- Implement safety practices.
- Optimize the use of resources to ensure less wastage and maximum conservation.

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					
Module 1: Introduction to the role of an Automotive Tool Room Technician	8:00	0:00			8:00
ASC/N9803 – Organize work and resources (Manufacturing) NOS Version No. – 1.0 NSQF Level – 3	**16:00**	**24:00**			**40:00**
Module 2: Organize work and resources according to safety and conservation standards	16:00	24:00			40:00
ASC/N9802 – Interact effectively with colleagues, customers and others NOS Version No. – 1.0 NSQF Level - 3	**12:00**	**20:00**			**32:00**
Module 3: Communicate effectively and efficiently	12:00	20:00			32:00
ASC/N4101 – Prepare for tool and die manufacturing operations NOS Version No. – 2.0 NSQF Level - 4	**24:00**	**32:00**			**56:00**
Module 4: Prepare for tool and die manufacturing	24:00	32:00			56:00

operations					
ASC/N4102 – Perform tool and die manufacturing operations NOS Version No. – 2.0 NSQF Level - 4	**128:00**	**216:00**			**344:00**
Module 5: Perform machining activities	56:00	96:00			152:00
Module 6: Perform assembly and post-production activities	72:00	120:00			192:00
Total Duration	**188:00**	**292:00**			**480:00**

Module Details

Module 1: Introduction to the role of an Automotive Tool Room Technician

Bridge module

Terminal Outcomes:

- Discuss the role and responsibilities of an Automotive Tool Room Technician.

Duration: *<08:00>*	**Duration**: *<00:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the role and responsibilities of an Automotive Tool Room Technician. • Discuss the job opportunities of an Automotive Tool Room Technician in an automobile industry. • Explain about Indian automotive 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 tool and die manufacturing. • Identify the standard checklists and schedules recommended by OEM.	
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

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. • 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. • Discuss various methods of waste management and its disposal.	• 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 per requirements and report malfunctioning, if observed. • Employ ways for efficient utilization of material and water.

• 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.	
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: 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: *<12:00>*	**Duration**: *<20:00>*
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 4: Prepare for tool and die manufacturing operations

Mapped to ASC/N4101, v2.0

Terminal Outcomes:

- Identify tools and equipment required for tool and die manufacturing operations.
- Perform the steps to carry out preparatory activities such as lifting of workpiece, collection and inspection of tools and equipment etc.

Duration: *<24:00>*	**Duration**: *<32:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe basic process followed for tool and die manufacturing. • Discuss the information derived from the engineering drawings, work order, SOPs and instructions from supervisor. • List the input material, tools, equipment, machines and consumables required during tool and die manufacturing work. • Describe the selection criteria of input material, tools, equipment, machines and consumables required for tool and die manufacturing work. • Discuss the organisational process of collecting and arranging the input material, tools, equipment, machines and consumables from the store. • Summarise the steps to be performed for checking the input material, tools, equipment, machines and consumables before use. • Discuss various assembling and machining parameters and their impact on output. • Discuss the necessary precautions to avoid any hazard and accident during tool and die manufacturing activities.	• Read the drawing and work orders for identifying work requirements, selecting and planning sequence of assembling and machining operations. • Demonstrate the standard operating procedure to use tools, equipment, machines and consumables required during tool and die manufacturing work. • Show how to select and arrange the required input material, tools, equipment, machines and consumables from the store. • Apply appropriate ways to check the input material, tools, equipment, machines and consumables before use. • Show how to calibrate the tool and equipment before use. • Apply appropriate ways to check that machines and equipment are clean and free from dust and unwanted material. • Show how to set the assembling and machining equipment and their parameters as per the work instructions.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
• PPT's, teaching aids, drawing / blue print, work order • **Raw Materials:** Metal blocks • Work Table With Bench Vice • **Machining tools/ equipment**: Surface marking plate, cutting tools, threading, dies & guides, etc. • **Machines:** Conventional lathe and vertical milling machine with standard accessories and Production CNC machining center with ATC • **Measuring equipment**: Vernier calipers, micrometre, feeler gauges, bore gauge, slip gauge, thickness gauge, steel ruler, measuring tape, height, gauge, dial gauge, angle plate, set square compass, divider, scriber, T Square, bevel protractor, pin set, torque meter etc. • **Consumables:** Oil stones, Emery, Dressing stone, File cord, Tool post packing, Spares for	

cutting tools, Carbide inserts, Grinding Wheels 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
- **Hand book**, job orders, work order, completion material requests, and Technical Reference Books.
- **Safety materials**: Fire extinguisher, portable welding curtains, leather safety gloves, leather aprons, safety glasses, helmet, safety shoe and first-aid kit
- **Cleaning material**: Wire brush (M.S.), cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel

Module 5: Perform machining activities

Mapped to ASC/N4102, v2.0

Terminal Outcomes:

- Demonstrate various machining operations such as drilling, boring, turning etc.
- Demonstrate EDM process.

Duration: *<56:00>*	**Duration**: *<96:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain different types of machining processes. • Discuss operational fundamentals of conventional and CNC machine. • List jigs and fixtures, tools, cutting tools, equipment and measuring instruments required during the machining work. • Discuss the process of lifting and placing the workpieces on working platform as per the work instructions. • Elaborate ways for cutting the workpieces as per the work requirement. • Describe importance of selecting correct program in the CNC machine for machining operation as per the work instructions. • Discuss how to cut, shape and trim the workpiece by using CNC machine. • Discuss the importance of monitoring process parameters during the machining process and correcting them as per the requirements. • List the steps to be performed for checking the machine operations for any defects in its component and informing the supervisor. • Discuss the importance of uniform flow of dielectric liquid during EDM process. • List steps to be performed for flushing process. • Describe EDM machining process for making through holes. • Discuss need of changing electrodes in case of deviation in specifications of metal plate from the required specifications.	• Apply appropriate ways to measure and mark the reference points/ cutting lines on the work pieces by using measuring instruments. • Perform the steps of lifting and placing the workpieces on working platform by using lifting tools. • Demonstrate use of power operated/ manual/ automatic cutting tools to cut the workpieces as per the work requirement. • Demonstrate organisational specified procedure of rough machining to get required size of work piece. • Demonstrate organizational specified procedure of performing machining operations on the workpiece. • Apply appropriate ways to cut, shape and trim the workpiece to achieve specified lengths and shapes. • Read the measurement gauges and monitor the process parameters to maintain the quality standards. • Employ appropriate ways for checking the machine operations for any defects in the component. • Prepare a sample report about any problems faced during the machining process. • Employ appropriate ways of measuring and comparing the final workpiece dimensions with the specified dimensions in the work order and engineering drawing. • Show how to set the EDM machine and its parameters as per the work instructions. • Show how to load the workpiece on EDM machine. • Perform steps of flushing process for maintaining the follow of dielectric and removing any debris during EDM process.

	• Demonstrate organizational specified procedure of starting the EDM machine and making the blind spots and holes the die formation plate/metal work plate.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
• PPT's, teaching aids, drawing / blue print, work order • **Raw Materials:** Metal blocks • Work Table With Bench Vice • **Machining tools/ equipment**: Surface marking plate, cutting tools, threading, dies & guides, etc. • **Machines:** Conventional lathe and vertical milling machine with standard accessories and Production CNC machining center with ATC • **Measuring equipment**: Vernier calipers, micrometre, feeler gauges, bore gauge, slip gauge, thickness gauge, steel ruler, measuring tape, height, gauge, dial gauge, angle plate, set square compass etc. • **Consumables:** Oil stones, Emery, Dressing stone, File cord, Tool post packing, Spares for cutting tools, Carbide inserts, Grinding Wheels etc. • **Hand book**, job orders, work order, completion material requests, and Technical Reference Books. • **Safety materials**: Fire extinguisher, portable welding curtains, leather safety gloves, leather aprons, safety glasses, helmet, safety shoe and first-aid kit • **Cleaning material**: Wire brush (M.S.), cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel	

Module 6: Perform assembly and post-production activities

Mapped to ASC/N4102, v2.0

Terminal Outcomes:

- Demonstrate various assembly operations such as bolting, torqueing, tightening, fitting, greasing, hammering, sealing, clamping etc.
- Perform steps to carry out post-production activities.

Duration: *<72:00>*	**Duration**: *<120:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the process of lifting and placing the workpieces on designated slot/space as per the work instructions. • Outline the process of assembly operations such as bolting, riveting, tightening, wire stripping, crimping, etc. • Discuss the impact of various assembly operations on the final output. • Describe finishing operations such as filing, shimming, grinding and polishing. • List various sealing compounds and their applications in assembled parts. • Discuss post-casting activities like inspection, cleaning, maintenance etc. • Summarise the commonly occurring defects in the assembled tools and dies. • Discuss the impact of defects on the quality of assembled tools and dies. • Explain the inspection and testing methods for identifying the defects and checking the quality of tools and dies as per the control plan. • List the steps to be performed for spotting press operation and nitriding operation. • Explain the process of evaluating the equipment specified parameters for no abnormalities. • Discuss the process of segregating, the damaged and ok workpieces as per organisational guidelines. • Summarise the documents, records and information to be maintained and updated related to production of tools and die. • List different methods for disposing off waste material and scrap.	• Perform the steps of lifting and placing the workpieces on designated slot/space by using lifting tools. • Demonstrate organizational specified procedure of all assembly operations such as bolting, riveting, tightening, wire stripping, crimping, etc. • Employ appropriate assembly method for assembling of machined parts and sub-assemblies as per the drawing/work order. • Demonstrate the use of screws, nuts, clamps, rivets join the parts and assemblies of tool and die. • Apply appropriate ways to remove extra material on the tool and die. • Demonstrate organizational specified procedure of all finishing operations to get flat and contoured surface on assembled tools and dies. • Apply appropriate ways for sealing to prevent water leakage during the usage of the tool and die. • Apply appropriate inspection and testing methods for identifying the defects and checking the quality of assembled tools and dies. • Demonstrate organizational specified procedure of spotting press operation and nitriding operation. • Employ appropriate ways for conducting trials of tools and dies for checking any abnormalities in functioning. • Show how to segregate the damaged and ok workpieces as per organisational guidelines. • Show how to dispose scrap or waste as per organisational guidelines.
Classroom Aids:	

Whiteboard, marker pen, projector
Tools, Equipment and Other Requirements
• PPT's, teaching aids, drawing / blue print, work order • **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**: 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	Turner/Fitter/ Electrician	3	Tool Room	1	Tool Room	NA
ITI	Turner/Fitter/ Electrician	4	Tool Room	0	NA	NA
Diploma	Mechanical/Electrical/ Automobile	2	Tool Room	1	Tool Room	NA
Diploma	Mechanical/Electrical/ Automobile	3	Tool Room	0	NA	NA

Trainer Certification	
Domain Certification	**Platform Certification**
"Automotive Tool Room Technician, ASC/Q4101, version 2.0". 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/Assessment Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
ITI	Turner/Fitter/Electrician	4	Tool Room	1	Tool Room	NA
ITI	Turner/Fitter/Electrician	5	Tool Room	0	NA	NA
Diploma	Mechanical/Electrical/ Automobile	3	Tool Room	1	Tool Room	NA
Diploma	Mechanical/Electrical/ Automobile	4	Tool Room	0	NA	NA

Assessor Certification	
Domain Certification	**Platform Certification**
"Automotive Tool Room Technician, ASC/Q4101, version 2.0". 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
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
WI	Work Instructions
PPE	Personal Protective equipment