Model Curriculum

QP Name: Automotive CAD Technician

QP Code: ASC/Q8201

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

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Training Parameters

Sector	Automotive
Sub-Sector	Research & Development
Occupation	Automotive Product Designing
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3118.0301
Minimum Educational Qualification and Experience	10th Class + 2 years I.T.I (Fitter/Draughtsman (Mechanical)) OR 12th Class Pass with 1 year relevant experience OR 3 years Diploma (Mechanical/Automobile) from recognized regulatory body after Class 10th
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 years
Last Reviewed On	30/09/2021
Next Review Date	30/09/2024
NSQC Approval Date	30/09/2021
QP Version	2.0
Model Curriculum Creation Date	30/09/2021
Model Curriculum Valid Up to Date	30/09/2024
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.

- Identify product specifications and requirements for CAD designing.
- Carry out designing of product on CAD software.
- 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
Bridge Module					
Module 1: Introduction to the role of an Automotive CAD Technician	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/N8201 – Create design of component/ aggregate NOS Version No. – 2.0 NSQF Level - 4	**90:00**	**210:00**			**300:00**
Module 4: Prepare for designing of component/ aggregate	30:00	90:00			120:00
Module 5: Create component/ aggregate design on CAD software	60:00	120:00			180:00
Total Duration	**125:00**	**265:00**			**390:00**

Module Details

Module 1: Introduction to the role of an Automotive CAD Technician

Bridge module

Terminal Outcomes:

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

Duration: *<05:00>*	**Duration**: *<00:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the role and responsibilities of an Automotive CAD Technician. • Discuss the job opportunities for an Automotive CAD Technician in the automobile industry. • Explain about Indian automobile manufacturing market. • List various automobile Original Equipment Manufacturers (OEMs) and different products/ models manufactured by them. • Discuss the CAD designing standards and procedures involved in industry.	
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: *<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. • 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: *<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 4: Prepare for designing of component/ aggregate

Mapped to ASC/N8201, v2.0

Terminal Outcomes:

- Identify requirements and specifications for the product designing process.
- Perform preparatory activities to carry out product designing process.

Duration: *<30:00>*	**Duration**: *<90:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the information needed to collect from the work order, process manuals and instructions from internal design team and supervisor about the customer requirements and work to be done. • List various designing software like CATIA, Auto- CAD, Unigraphics etc. required during the designing process. • List the design requirement in terms of material used for making the component, packaging and other requirements to decide the dimensions, measurements and tolerances of the aggregate/ component. • Describe internal systems of design records i.e. Manual /PLM, Change notes (ECN). • Elaborate draughting standards and techniques- e.g. ANSI series IS/ ISO. • List technical drawing practices as per the company standards. • Describe drawings and modelling techniques like 2D and 3D. • Elaborate different type of views generated in engineering drawings. • Describe limits, fits, GD&T etc. • Identify the reporting hierarchy and procedure for escalating faults and issues related to design concept clarity, dimensions and practicality.	• Demonstrate how to interpret the work order, process manuals, instructions etc. to obtain the design requirements. • Show how to select the designing software like CATIA, Auto-CAD, Unigraphics etc. for creating the designs and models. • Demonstrate the use of designing software.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
• Drafting tools, MS office, designing software like CATIA, Auto-CAD, Unigraphics • Handbook, job orders and Technical Reference Books. • Safety materials: Fire extinguisher, safety gloves, aprons, safety glasses, ear plug, safety shoes and first-aid kit.	

Module 5: Create component/ aggregate design on CAD software

Mapped to ASC/N8201, v2.0

Terminal Outcomes:

- Perform the steps to carry out 3D modelling of product in CAD software.
- Perform the steps to prepare 2D drawing of product in CAD software.

Duration: *<60:00>*	**Duration**: *<120:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe CAD programming and drafting. • Describe Geometric and Trigonometric rules/ formula for developing the specifications of the component. • List the steps to be performed for creating 3D model of product in CAD software. • Describe various CAD techniques available in the CAD software and required or designing of product 3D model. • List the steps to be performed for testing the feasibility of product with the customer requirements by conducting simulation/ packaging study. • List the steps to be performed for creating 2D drawing of product in CAD software. • Describe overall dimensions or other manufacturing specifications like assembly sequence, surface texture etc. of design in the drawing. • Discuss the records, documents, files and reports to be maintained related to the product design. • Describe Tolerance Analysis sheet and how to interpret it. • Discuss ways to check the various dimensional mismatches which may happen on the actual product assembly. • Discuss the process of inspecting the drawing as different tolerance levels. • Discuss the process of tagging and storing the drawings properly.	• Show how to visualise the customer requirements and prepare a rough sketch of product according to it. • Demonstrate use of the Geometric and Trigonometric rules/ formula for developing the specifications of the component. • Apply appropriate procedure of setting required units and dimension parameters in the CAD file. • Demonstrate how to insert sketches, scanned images, diagrams, signs or symbols etc. in a CAD file. • Prepare a sample 3D model of product by applying appropriate CAD techniques. • Demonstrate how to draw layouts and various views of drawing in CAD software as per the relationship between components and assemblies. • Apply appropriate way of filling colours symbols etc. to highlight areas in the drawing. • Perform steps to test the 3D model through simulation/ packaging study and check the feasibility of product with the customer requirements. • Prepare a sample 2D drawing of product in CAD software. • Prepare notes related to design in terms of overall dimensions or other manufacturing specifications. • Apply appropriate ways for maintaining and taking backup of CAD files and records of related information by following organisational guidelines. • Role play how to co-ordinate with product design team and other departments for design review and their feedback on the correctness and validity of the drawing.

	• Employ appropriate ways to check the quality of drawings and sketches for various tolerances levels. • Demonstrate procedure of delivering CAD design files to other department for next process. • Show how to modify the 2D drawings of design according to the feedback shared by the product design team. • Show how to tag and store the drawings properly as per the organisational guidelines.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
• Drafting tools, MS office, designing software like CATIA, Auto-CAD, Unigraphics • Handbook, job orders and Technical Reference Books. • Safety materials: Fire extinguisher, safety gloves, aprons, safety glasses, ear plug, safety shoes and first-aid kit	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
B.E/B.Tech	Mechanical/Electrical/Automobile	2	Mechanical/Electrical/ Automobile	1	Mechanical/ Automobile /Electrical	NA
B.E/B.Tech	Mechanical/Electrical/Automobile	3	Mechanical/Electrical/ Automobile	0	Mechanical/ Electrical/ Automobile	NA
Diploma	Mechanical/Electrical/Automobile	3	Mechanical/Electrical/ Automobile	1	Mechanical/ Electrical/ Automobile	NA
Diploma	Mechanical/Electrical/Automobile	4	Mechanical/Electrical/ Automobile	0	Mechanical/ Electrical/ Automobile	NA

Trainer Certification	
Domain Certification	**Platform Certification**
"Automotive CAD Technician, ASC/Q8201, 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 Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
B.E/B.Tech	Mechanical/Electrical/Automobile	3	Mechanical/ Electrical/ Automobile	1	Mechanical/ Electrical/ Automobile	NA
B.E/B.Tech	Mechanical/Electrical/Automobile	4	Mechanical/ Electrical/ Automobile	0	Mechanical/ Electrical/ Automobile	NA
Diploma	Mechanical/Electrical/Automobile	4	Mechanical/ Electrical/ Automobile	1	Mechanical/ Electrical/ Automobile	NA
Diploma	Mechanical/Electrical/Automobile	5	Mechanical/ Electrical/ Automobile	0	Mechanical/ Electrical/ Automobile	NA

Assessor Certification	
Domain Certification	**Platform Certification**
"Automotive CAD Technician, ASC/Q8201, version 2.0".Minimum accepted score is 80%.	"Assessor; MEP/Q2701 v1.0" Minimum accepted score is 80%.

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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