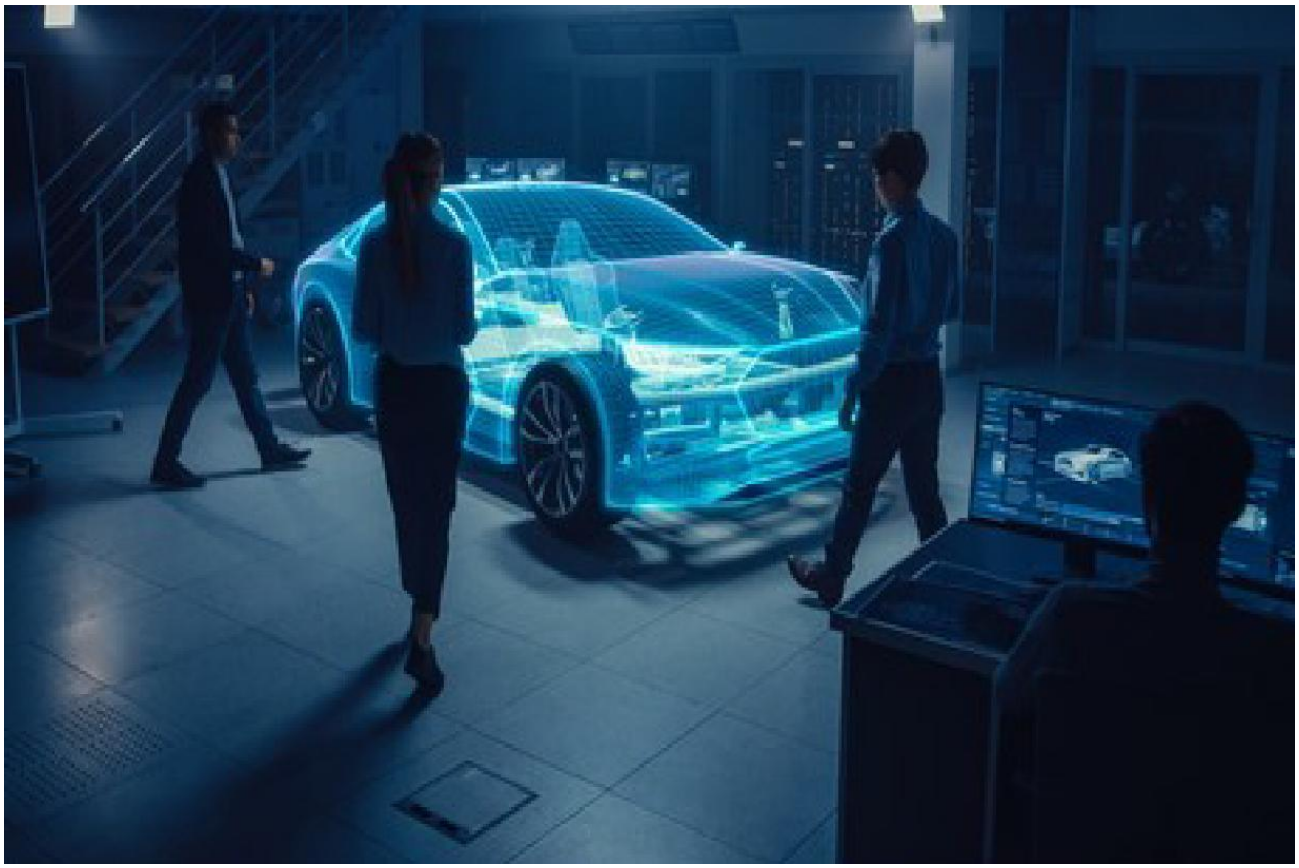

Basics of CAD

MCr Code: ASC/MCr-0002

Version: 1.0

NSQF Level: 3

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

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Training Parameters

Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Product Development
Country	India
NSQF Level	3
Minimum Educational Qualification and Experience	Pursuing 10th Class
Pre-Requisite License or Training	No Minimum age restriction for school education perusing learners. No pervious certification required.
Minimum Job Entry Age	18 Years
Last Reviewed On	18/02/2025
Next Review Date	18/02/2028
NSQC Approval Date	18/02/2025
Model Curriculum Creation Date	18/02/2025
Model Curriculum Valid Up to Date	18/02/2028
Minimum Duration of the Course	30 Hours
Maximum Duration of the Course	30 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 to:

- Understand about CAD software and its applications
- Discuss about various types of CAD software and their comparison
- Discuss about various designing requirements and their impact on product model
- Demonstrate use of CAD software

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	Total Duration
Module 1: Introduction of course and industry	01:00	00:00	01:00
Module 2: About CAD designing and various CAD software	03:00	05:00	08:00
Module 3: Designing on CAD software	04:00	10:00	14:00
Module 4: Simulation and testing of design on CAD software	02:00	05:00	07:00
Total Duration	**10:00**	**20:00**	**30:00**

Module Details

Module 1: Introduction of course and industry

Terminal Outcomes:

- Discuss about course and automobile industry.

Duration: 01:00	**Duration: 00:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss about course structure and its objective. • Discuss about automobile industry and career opportunities in it. • Explain about Indian automotive market. • List various automobile Original Equipment Manufacturers (OEMs) and different products/ models manufactured by them.	
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	

Module 2: About CAD designing and various CAD software

Terminal Outcomes:

- Understand about CAD designing and its standards.
- Understand about various CAD software.

Duration: 03:00	**Duration: 05:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe CAD sketching and drafting. • Describe importance and need of CAD designing in industry. • Discuss applications of CAD designing in various industries. • List various designing software like CATIA, AutoCAD, Solidworks, Unigraphics etc. required during the designing process. • Differentiate between features of various software • Describe selection criteria of CAD software based on requirements • Discuss the CAD designing standards and procedures involved in industry. • Elaborate draughting standards and techniques e.g. ANSI series IS/ ISO.	• Show comparison between various designing software. • Demonstrate the use of designing software.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Various CAD designing software	

Module 3: Designing on CAD software

Terminal Outcomes:

- Demonstrate process of designing of product 3D model on CAD software

Duration: 4:00	**Duration: 10:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe drawings and modelling techniques like 2D and 3D. • Elaborate different type of views generated in engineering drawings. • Describe the design requirements for creating a product model in CAD software. • Elaborate technical drawing practices as per the defined standards. • Describe the features of software used for creating 3D models. • Describe drawings and modelling techniques like 2D and 3D. • Describe various CAD techniques available in the CAD software and required or designing of product 3D model.	• Create 2D/3D model using CAD software along with engineering inputs. • Prepare layouts and various views of drawing in CAD software. • Show how to fill colors, symbols etc. to highlight areas in the drawing • Use the software features like tools modeling, sculpting, generative design, simulation, collaboration, tool validation
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Various CAD designing software	

Module 4: Simulation and testing of design on CAD software

Terminal Outcomes:

- Demonstrate process of simulation and testing of product model on CAD software.

Duration: 2:00	**Duration: 05:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List types of files format such as STL or AMF etc. generated in the various steps of the process. • 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 checking and correcting the common errors in object model file.	• Examine product model to validate the design • Perform testing by applying product design parameters to CAD • Perform the simulation, analyse results and make changes and perform simulation again • Generate 3D printable file from design & modeling software packages
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Different types of vehicle engine and its components	

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	3	CAD designing	1	CAD designing	NA

Trainer Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "Basics of CAD" mapped to QP: "ASC/MCr-0002", v1.0. Minimum accepted score as per SSC guideline is 80%	MEP/Q2601, v2.0 Trainer (VET and Skills). Minimum accepted score as per SSC guideline is 80%

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training/Assessment Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
B.E./B.Tech	Mechanical/ Automobile	4	CAD designing	1	CAD designing	NA

Assessor Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "Basics of CAD" mapped to QP: " ASC/MCr-0002", v1.0. Minimum accepted score as per SSC guideline is 80%	MEP/Q2701, v2.0 Assessor (VET and Skills). Minimum accepted score as per SSC guideline is 80%.

Assessment Strategy

1. Assessment System Overview:

- Batches assigned to the assessment agencies for conducting the assessment on SDSM/SIP or email.
- Assessment agencies send the assessment confirmation to VTP/TC looping SSC.
- The 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.
- An assessor must be ToA certified & the trainer must be ToT Certified.
- The 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.
- Center photographs with signboards and scheme-specific branding.
- Biometric or manual attendance sheet (stamped by TP) of the trainees during the trainingperiod.
- Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos.

5. Method of verification or validation:

- A surprise visit to the assessment location.
- A 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 / accessedfrom Cloud Storage.
- Soft copies of the documents & photographs of the assessment are stored in the HardDrives.

References

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need tobe known and/or understood in order to accomplish a task or to solve a problem.
Key Learning Outcome	A key learning outcome is a statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. Aset 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 completespecified hours of training on-site
OJT (R)	On-the-job training (Recommended); trainees are recommended thespecified hours of training on-site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform atask. 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, understandand be able to do upon the completion of the training.
Terminal Outcome	The 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 ofterminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
NOS	National Occupational Standard (s)
NSQF	National Skills Qualifications Framework
OJT	On-the-job Training
QP	Qualifications Pack
PwD	People with Disability
PPE	Personal Protective Equipment