



Model Curriculum

NOS Name: Computer Aided Product Design

NOS Code: ASC/N8114

NOS Version: 1.0

NSQF Level: 5.5

Model Curriculum Version: 1.0

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Training Parameters

Sector	Automotive
Sub-Sector	Research & Development
Occupation	Automotive Product Designing
Country	India
NSQF Level	5.5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3118.0301
Minimum Educational Qualification and Experience	Completed 3rd year of UG (In Relevant Trade) or Pursuing 3rd year of UG (In relevant trade) and continuous education or Completed 2nd year diploma after 12th or 12th Grade Pass with 1 year NAC plus 1 year CITS with 1 year of relevant experience or 12th grade pass with 1 year NTC plus 1year NAC/CITS with 2 years of relevant experience or Completed 3-year diploma (after 10th) with 2 Years of relevant experience or 12th Grade pass with 3 Years of relevant experience
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 years
Last Reviewed On	29/09/2023
Next Review Date	29/09/2026
NSQC Approval Date	29/09/2023
QP Version	1.0
Model Curriculum Creation Date	29/09/2023
Model Curriculum Valid Up to Date	29/09/2026
Model Curriculum Version	1.0

Minimum Duration of the Course	60 Hours 00 Minutes
Maximum Duration of the Course	60 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.

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
ASC/N8114 – Computer Aided Product Design NOS Version No. – 1.0 NSQF Level – 5.5	15:00	45:00			60:00
Module 1: Introduction to CAD Software	01:00	01:00			02:00
Module 2: Pre-designing activities	05:00	14:00			19:00
Module 3: Designing of products and parts on CAD software	05:00	15:00			20:00
Module 4: Post-designing activities	04:00	15:00			19:00
Total Duration	15:00	45:00			60:00

Module Details

Module 1: Introduction to the CAD Software

Mapped to ASC/N8114, v1.0

Terminal Outcomes:

- Discuss about various CAD Softwares.

Duration: <01:00>	Duration: <01:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List various designing software like CATIA, AutoCAD, Unigraphics etc. required during the designing process. • Discuss the CAD designing standards and procedures involved in industry. • Elaborate draughting standards and techniques e.g. ANSI series IS/ISO. 	<ul style="list-style-type: none"> • Show comparison between various designing software. • Demonstrate the use of designing software.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
<ul style="list-style-type: none"> • Drafting tools, MS office, designing software like CATIA, Auto-CAD, Unigraphics 	

Module 2: Pre- designing activities

Mapped to ASC/N8114, v1.0

Terminal Outcomes:

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

Duration: <05:00>	Duration: <14:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe drawings and modelling techniques like 2D and 3D. • Elaborate different type of views generated in engineering drawings. • Describe limits, fits, GD&T etc. • Discuss the information such as requirements, specifications and instructions received from design team or supervisor related to product design. • 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. • List technical drawing practices as per the company standards. 	<ul style="list-style-type: none"> • Prepare sample 2D and 3D engineering drawings. • Demonstrate how to interpret the vehicle component design requirements and specifications, instructions etc. • Show how to select the designing software like CATIA, AutoCAD, Unigraphics etc. for creating the designs and models based on the requirement.
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 3: Designing of products and parts on CAD software

Mapped to ASC/N8114, v1.0

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: <05:00>	Duration: <15:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe CAD sketching and drafting. • 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. • Describe Tolerance Analysis sheet and how to interpret it. • 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. 	<ul style="list-style-type: none"> • Apply appropriate procedure of setting required specifications and dimension parameters of product design in a 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.

	<ul style="list-style-type: none"> Apply appropriate ways for maintaining and taking backup of CAD files, notes and records of related information by following organisational guidelines.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
<ul style="list-style-type: none"> Drafting tools, MS office, designing software like CATIA, Auto-CAD, Unigraphics Handbook, job orders and Technical Reference Books. 	

Module 4: Post-designing activities

Mapped to ASC/N8114, v1.0

Terminal Outcomes:

- Perform post-designing activities

Duration: <04:00>	Duration: <15:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> Discuss the records, documents, files and reports to be maintained related to the product design. Discuss the process of tagging and storing the drawings properly. Discuss problems and issues faced during the designing of product. 	<ul style="list-style-type: none"> Follow ethical practices for finalising and submitting the prepared design. Apply appropriate ways to submit the product design for review and feedback to appropriate person. Show how to modify the 2D drawings of design according to the feedback received. Show how to tag and store the drawings properly as per the organisational guidelines. Prepare project on designing of 3D model of a vehicle component by using CAD software.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
<ul style="list-style-type: none"> Drafting tools, MS office, designing software like CATIA, Auto-CAD, Unigraphics 	

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	Mechanical/Automobile	1	Mechanical/Automobile	NA
B.E/B.Tech	Mechanical/Automobile	4	Designing	0	Assessment	NA
Diploma	Mechanical/Automobile	5	Designing	1	Assessment	NA
Diploma	Mechanical/Automobile	6	Designing	0	Assessment	NA

Trainer Certification	
Domain Certification	Platform Certification
“Computer Aided Product Design, ASC/N8114, version 1.0”. Minimum accepted score is 80%.	Recommended that the trainer is certified for the job role “Trainer (VET and Skills)”, Mapped to Qualification Pack: MEP/Q2601, V2.0” 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	4	Mechanical/ Electrical/ Automobile	1	Mechanical/ Electrical/ Automobile	NA	
B.E/B.Tech	Mechanical/Electrical/Automobile	5	Designing	0	Assessment	NA	
Diploma	Mechanical/Electrical/Automobile	6	Designing	1	Assessment	NA	
Diploma	Mechanical/Electrical/Automobile	7	Designing	0	Assessment	NA	

Assessor Certification	
Domain Certification	Platform Certification
“Computer Aided Product Design, ASC/N8114, version 1.0”. Minimum accepted score is 80%.	Recommended that the Assessor is certified for the job role “Assessor (VET and Skills)”, Mapped to Qualification Pack: MEP/Q2701, V2.0” 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