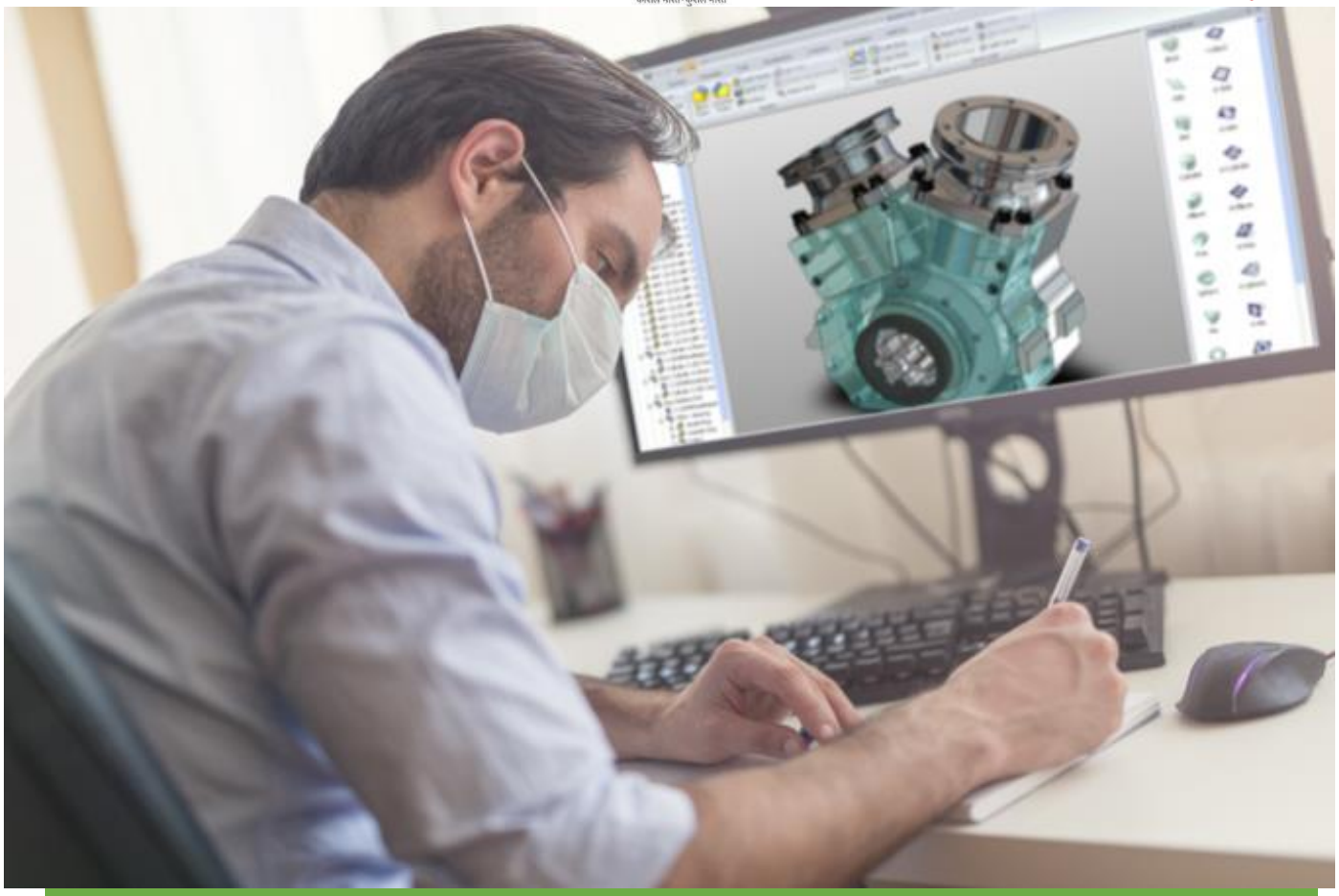

Model Curriculum

QP Name: Mechanical Engineering CAD

QP Code: CSC/Q0419

Version: 1.0

NSQF Level: 4.5

Model Curriculum Version: 1.0

Capital Goods & Strategic Skill Council || 39, 1st Floor, Samyak Tower, Pusa Rd, Block 9A, WEA Karol Bagh, New Delhi – 110001 || email: ceo@cgssc.org

Table of Contents

Training Parameters

Sector	Capital Goods
Sub-Sector	Machine Tools, Dies, Moulds and Press Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery, Process Plant Machinery, Electrical and Power Machinery, Light Engineering Goods, Defence Equipment, Fire Fighting & Safety Equipment
Occupation	Design
Country	India
NSQF Level	4.5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/NIL
Minimum Educational Qualification and Experience	Completed 1st year of UG OR Pursuing 1st year of UG and continuous education OR Pursuing 3rd year of 3-year diploma after 10th and continuous education OR Pursuing 2nd year of 2- year diploma after 12 and continuous education OR 10th Grade pass with 1 year NTC plus 1 year NAC plus 1 year CITS OR 10th grade pass with 1 year NTC plus CITS with 1 year of relevant experience OR 8th Grade pass with 2 year NTC plus 1 year NAC plus 1 year CITS with 1 year of relevant experience OR Previous relevant Qualification of NSQF Level 3.5 and with minimum education as 8th Grade pass with 3 year relevant experience OR Previous relevant Qualification of NSQF Level 4 and with minimum education as 8th Grade pass with 1.5 year relevant experience
Pre-Requisite License or Training	NA
Minimum Job Entry Age	22 Years
Last Reviewed On	

Next Review Date	
NSQC Approval Date	
QP Version	1.0
Model Curriculum Creation Date	
Model Curriculum Valid Up to Date	
Model Curriculum Version	1.0
Minimum Duration of the Course	510 Hours
Maximum Duration of the Course	510 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:

- Demonstrate proficiency in using industry-standard Computer-Aided Design (CAD) software such as AutoCAD, SolidWorks, or CATIA.
- Carry Engineering Drawing Interpretation.
- Communicate and work within a multidisciplinary team.
- Demonstrate the use of parameters and constraints to control dimensions, relationships, and features within the CAD models.
- Provide training on incorporating material properties into CAD designs and using simulation tools to analyze the structural integrity, thermal performance, and other relevant aspects of the proposed designs.
- Emphasize the importance of quality control by training individuals to perform design reviews, identify potential issues, and adhere to industry standards and regulations.

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
CSC/N0459 **Work organization and management** **NOS Version- 1.0** **NSQF Level- 4.5**	**20:00**	**40:00**	**0:00**	**00:00**	**60:00**
Module 1: Introduction to the role of Mechanical Engineering CAD	02:00	00:00	0:00	00:00	02:00
Module 2: Work organization and management	18:00	40:00	0:00	00:00	58:00
CSC/N0447 **Materials, software, and hardware** **NOS Version-1.0** **NSQF Level- 4.5**	**25:00**	**35:00**	**0:00**	**00:00**	**60:00**
Module 3: Materials, software, and hardware	25:00	35:00	0:00	00:00	60:00

CSC/N0448: **Perform 3D modelling NOS Version- 1.0** **NSQF Level- 4.5**	**30:00**	**60:00**	**0:00**	**00:00**	**90:00**
Module 4: Perform 3D modelling	20:00	40:00	0:00	00:00	60:00
CSC/N0449: **Create photo rendered images (2D) and creation of animations** **NOS Version- 1.0** **NSQF Level- 4.5**	**25:00**	**35:00**	**0:00**	**00:00**	**60:00**
Module 5: Create photo rendered images (2D) and creation of animations	25:00	35:00	0:00	00:00	60:00
CSC/N0450: **Reverse engineering of physical models** **NOS Version- 1.0** **NSQF Level- 4.5**	**20:00**	**40:00**	**0:00**	**00:00**	**60:00**
Module 6: Reverse engineering of physical models	20:00	40:00	0:00	00:00	60:00
CSC/N0451: **Technical drawing and measuring** **NOS Version- 1.0** **NSQF Level- 4.5**	**30:00**	**60:00**	**0:00**	**00:00**	**90:00**
Module 7: Technical drawing and measuring	30:00	60:00	0:00	00:00	90:00
Total Duration	**150:00**	**270:00**	**90:00**	**00:00**	**510:00**

Module Details

Module 1: Introduction to the role of Mechanical Engineering CAD

Bridge Module, aligned to CSC/N0459 V1.0

Terminal Outcomes:

- Discuss the job role of Mechanical Engineering CAD.

Duration: 02:00	**Duration: 0:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the size and scope of the capital good industry and its sub-sectors. • Discuss the role and responsibilities of Mechanical Engineering CAD. • Identify various employment opportunities for Mechanical Engineering CAD.	
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
NA	

Module 2: Work organization and management

Bridge Module, aligned to CSC/N0459 V1.0

Terminal Outcomes:

- Demonstrate the ability to develop comprehensive project plans for mechanical engineering CAD projects, outlining clear timelines, milestones, and resource requirements.
- Collaborate with cross-functional teams, including design engineers, drafters, and other stakeholders, fostering a culture of open communication.
- Implement strategies for resource optimization, balancing workload distribution, and identifying opportunities for cost savings without compromising project quality or timelines.
- Implement feedback mechanisms, analyze project performance metrics, and initiate improvements to enhance overall efficiency, reduce errors, and elevate the quality of deliverables.

Duration: 18:00	**Duration**: 40:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the relevance of ISO standards in mechanical engineering CAD. • Explain and apply industry-specific standards to ensure design compliance. • Describe the importance of health and safety regulations relevant to CAD work in mechanical engineering. • Describe the use of mathematical, physical, and geometric principles in mechanical engineering CAD. • Explain advanced mathematical concepts to solve complex engineering problems in CAD projects. • Describe and effectively utilize standard component libraries for mechanical engineering CAD. • Discuss and interpret symbols commonly used in the industry for accurate representation in designs. • Define technical terminologies used to convey precise information in CAD drawings. • Discuss and apply industry-specific symbols accurately in CAD presentations. • Describe the use of CAD software	• Demonstrate the ability to simplify and communicate complex technical concepts to both technical and non-technical audiences. • Use visual aids effectively to convey key elements in technical images. • Engage in ongoing professional development to stay updated on emerging CAD technologies and practices in mechanical engineering. • Apply newly acquired knowledge and skills to enhance CAD processes. • Generate innovative solutions to overcome technical challenges in CAD projects. • Apply creative thinking to enhance the design process and outcomes. • Demonstrate the ability to conceptualize and visualize client requirements in CAD designs. • Ensure that CAD designs align with and fulfill the specific requirements outlined in client briefs. • Adhere to ISO standards consistently throughout the CAD design process. • Ensure that CAD designs comply with industry-specific standards.

proficiently to create detailed and accurate mechanical engineering designs. • Discuss the importance of troubleshooting and optimizing CAD software performance. • Discuss how to diagnose and resolve technical issues related to CAD systems effectively.	• Implement and promote health and safety practices in all CAD activities. • Regularly review and update safety protocols in accordance with legislation and best practices. • Use mathematical and physical principles to solve real-world engineering problems in CAD projects. • Apply geometric concepts to ensure accurate and functional CAD designs. • Efficiently locate and use standard component libraries to streamline the design process. • Recognize and incorporate industry-standard symbols seamlessly into CAD drawings. • Demonstrate fluency in technical language to enhance communication in CAD projects. • Interpret technical symbols accurately to convey precise information in CAD drawings.
Classroom Aids	
Computer, Projection Equipment, PowerPoint Presentation and Software, Facilitator's Guide, Participant's Handbook.	
Tools, Equipment and Other Requirements	
Computer Hardware, CAD Software, Input Devices, Storage, Printer/Plotter, 3D Scanner, Simulation and Analysis Tools (optional), Collaboration Tools, Training Resources, Backup Solutions, CAD Workstation/Desk	

Module 3: Materials, software, and hardware

Bridge Module, aligned to CSC/N0447 V1.0

Terminal Outcomes:

- Demonstrate the ability to select appropriate materials for mechanical components based on their mechanical properties, durability, and cost-effectiveness.
- Conduct thorough testing and analysis of materials to ensure they meet engineering specifications and standards, providing detailed reports on material performance under various conditions.
- Implement sustainable and environmentally friendly material choices, considering life cycle assessments and recycling methods to contribute to the overall eco-friendliness of engineering projects.

Duration: 25:00	**Duration: 35:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the process of powering up the computer and activating relevant modeling software. • Explain the importance of a proper startup sequence for both hardware and software in a CAD environment. • Discuss the essential peripheral devices used in a Mechanical Engineering CAD setup. • Explain the steps involved in setting up and checking peripheral devices, including keyboard, mouse, 3D mouse, plotter, and printer. • Explain the importance of file organization and naming conventions in a CAD environment. • Discuss the various drawing packages available in CAD software. • Discuss and justify the selection of specific drawing packages based on project requirements. • Differentiate between various techniques for accessing and using CAD software, such as mouse interactions, menu navigation, and toolbar utilization. • Explain the efficiency and appropriateness of different techniques in different design scenarios. • Explain the significance of configuring software parameters in CAD. • Discuss the process to configure software parameters based on specific project needs. • Describe the importance of effective	• Demonstrate how to power up computer equipment following the correct sequence. • Demonstrate steps to activate relevant modeling software ensuring a smooth start-up process. • Demonstrate the steps to set up and check peripheral devices, including keyboard, mouse, 3D mouse, plotter, and printer. • Troubleshoot and resolve any issues related to peripheral devices. • Create, save, and organize CAD files proficiently. • Show how to retrieve and modify existing CAD files as needed. • Demonstrate steps to navigate through on-screen menus to select appropriate drawing packages. • Utilize selected drawing packages for specific design tasks. • Demonstrate proficiency in using a mouse, menu navigation, and toolbar interactions for CAD software. • Select and apply appropriate techniques based on the design requirements. • Configure software parameters for a given CAD project. • Adapt software configurations based on changing project needs. • Demonstrate steps to plan and organize production processes effectively for a CAD project. • Identify potential bottlenecks and optimize the workflow. • Use plotters and printers to print and plot

production process planning in Mechanical Engineering CAD. • Discuss strategies for planning and organizing CAD projects to ensure efficiency and accuracy in work processes. • Explain the role of plotters and printers in the CAD workflow. • Describe the use of plotters and printers to produce high-quality prints and plots of CAD work.	CAD work accurately. • Troubleshoot and address any issues related to plotting and printing processes.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Computer Hardware, CAD Software, Input Devices, Storage, Printer/Plotter, 3D Scanner, Simulation and Analysis Tools (optional), Collaboration Tools, Training Resources, Backup Solutions, CAD Workstation/Desk	

Module 4: Perform 3D modelling

Bridge Module, aligned to CSC/N0448 V1.0

Terminal Outcomes:

- Demonstrate the ability to create precise and accurate 3D models of mechanical components and systems using CAD software.
- Effectively collaborate with cross-functional teams by sharing 3D models in a standardized format.
- Develop 3D models that are optimized for manufacturing processes, considering factors such as material efficiency, cost-effectiveness, and ease of production.
- Ensure that 3D models comply with relevant industry standards, codes, and regulations.

Duration: 30:00	Duration: 60:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the principles of Constructive Solid Geometry (CSG) in 3D modeling. • Discuss and optimize components using CSG techniques. • Describe the concept of component families in 3D modeling. • Explain the process to create and organize families of components for efficient project management. • Explain the importance of material characteristics in engineering design. • Describe density values to materials within 3D models. • Explain the role of color and texture in enhancing 3D models. • Explain how to apply colors and textures to components in a way that reflects real-world materials. • Discuss how to produce assemblies from 3D models. • Explain how to structure assemblies, including the creation of sub-assemblies for complex projects. • Discuss the need and importance of developing strategies for efficient project execution based on the given information. • Discuss engineering principles to ensure accuracy and functionality of	• Optimize 3D models using Constructive Solid Geometry techniques. • Create and organize families of components for a given mechanical engineering project. • Ascribe density values to materials used in 3D models. • Apply colors and textures to components to enhance realism in 3D models. • Produce assemblies from 3D models of individual components. • Structure assemblies by creating and incorporating sub-assemblies. • Review base information and plan 3D modeling work effectively. • Access information from data files and utilize it in the modeling process. • Model and assemble base components of mechanical engineering projects accurately. • Estimate approximate values for any missing dimensions within a 3D model. • Assemble modeled parts into sub-assemblies as required by project specifications.

the modeled components. • Explain how to assemble modeled parts into sub-assemblies as required by engineering design. • Describe the hierarchy and relationships between sub-assemblies within a larger project. • Explain the importance of branding and labeling in mechanical engineering.	• Apply graphics decals, such as logos or labels, onto 3D models. • Save 3D modeling work in a structured and accessible manner for future reference and modifications.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Computer Hardware, CAD Software, Input Devices, Storage, Printer/Plotter, 3D Scanner, Simulation and Analysis Tools (optional), Collaboration Tools, Training Resources, Backup Solutions, CAD Workstation/Desk	

Module 5: Create photo rendered images (2D) and creation of animations

Bridge Module, aligned to CSC/N0449 V1.0

Terminal Outcomes:

- Utilize advanced CAD software to create highly detailed 2D photo-rendered images that offer an intricate visual representation of mechanical components and systems.
- Develop dynamic animations that bring mechanical designs to life, showcasing the functionality and movement of various components.
- Employ photo-rendered images and animations as tools for iterative design improvement.
- Facilitate better communication between different project stakeholders, including engineers, project managers, and clients, by providing visually appealing and informative 2D images and animations.

Duration: 25:00	Duration: 35:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the importance of saving and labeling images. • Describe how to maintain a structured image database. • Explain and interpret technical information from source drawings. • Discuss how to apply source information accurately to computer-generated images. • Discuss the material properties as per the provided source information. • Describe the material properties effectively to enhance the realism of computer-generated images. • Describe the impact of material properties on the visual representation of components. • Explain the process of creating photo-realistic images for components or assemblies. • Discuss how to utilize industry-standard software for rendering with proficiency. • Describe the need and importance of producing high-quality rendered images. • Describe how to adjust colors, shading, and backgrounds to accurately represent design aspects. • Elaborate techniques to highlight key features in rendered images. • Discuss and manipulate camera settings for effective presentation.	• Navigate and utilize industry-standard CAD software proficiently. • Develop hands-on skills in using rendering tools and features. • Independently create photo-rendered images of mechanical components. • Incorporate learned techniques to enhance the realism and accuracy of images. • Apply color theory and shading techniques to achieve realistic representations. • Adjust colors and shading to match design specifications. • Utilize camera settings to experiment with different angles for optimal visual impact. • Demonstrate the ability to choose angles that effectively communicate design details. • Integrate functions relevant to the operation of the system being designed. • Use industry programs to incorporate realistic functionality into rendered images. • Develop animations that showcase the assembly and operation of mechanical components. • Apply principles of motion to effectively communicate the working principles of the designed system. • Conduct self-assessment for the quality and accuracy of rendered images. • Implement iterative improvements based on

• Explain the use of camera angles to showcase mechanical components from advantageous perspectives. • Describe how to optimize camera settings to enhance the overall visual appeal of the project. • Discuss the importance of printed images in presentation.	feedback to enhance the overall quality of work. • Practice presenting images in various formats, including printed and digital. • Demonstrate effective communication of design concepts during presentations.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Computer Hardware, CAD Software, Input Devices, Storage, Printer/Plotter, 3D Scanner, Simulation and Analysis Tools (optional), Collaboration Tools, Training Resources, Backup Solutions, CAD Workstation/Desk	

Module 6: Reverse engineering of physical models

Bridge Module, aligned to CSC/N0450 V1.0

Terminal Outcomes:

- Employ reverse engineering techniques to create precise and detailed 3D digital models of existing physical components.
- Demonstrate the ability to efficiently use CAD software to convert acquired point cloud or scanned data into editable and parametric 3D models.
- Employ reverse engineering methodologies to conduct thorough quality control assessments on physical models.
- Collaborate with cross-functional teams, including design engineers and manufacturing professionals, by integrating reverse-engineered models into the overall product development lifecycle.

Duration: 20:00	**Duration: 40:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the principles of dimensional analysis and its importance in reverse engineering. • Identify and interpret industry-standard units of measurement. • Describe various industry-accepted instruments used for measuring physical dimensions in mechanical engineering. • Demonstrate the appropriate selection and use of instruments for specific measurement tasks. • Explain the fundamentals of freehand sketching and its role in documenting physical models. • Explain the techniques for using measuring instruments to obtain precise and reliable measurements. • Discuss potential sources of error in measurements and strategies to minimize them. • Explain the principles behind 3D scanning technology. • Describe the advantages and limitations of 3D scanning in the context of reverse engineering. • Describe how to document and report dimensional information accurately and comprehensively. • Explain the importance of clear and standardized documentation in the field of mechanical engineering.	• Demonstrate proficiency in using industry-standard measuring instruments such as calipers, micrometers, and gauges. • Practice taking accurate measurements of various physical parts. • Develop freehand sketching skills through practical exercises. • Produce detailed sketches of physical components, capturing both overall form and intricate details. • Apply measurement techniques to produce accurate replicas of physical models. • Verify the precision and accuracy of replicated parts through comparative analysis. • Gain hands-on experience with 3D scanning equipment. • Perform 3D scans of physical models, considering factors such as resolution and scanning angles. • Process and analyze data obtained from measurements and 3D scans. • Validate the accuracy of reverse-engineered models by comparing them to original design specifications. • Integrate measured data and 3D scan results into Computer-Aided Design (CAD) software. • Learn to manipulate and refine the digital models to match the physical counterparts. • Engage in real-world projects involving reverse engineering tasks.

	• Apply theoretical knowledge and practical skills to solve challenges encountered in the reverse engineering process.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Computer Hardware, CAD Software, Input Devices, Storage, Printer/Plotter, 3D Scanner, Simulation and Analysis Tools (optional), Collaboration Tools, Training Resources, Backup Solutions, CAD Workstation/Desk	

Module 7: Technical drawing and measuring

Bridge Module, aligned to CSC/N0451 V1.0

Terminal Outcomes:

- Demonstrate the ability to accurately interpret complex engineering drawings, including geometric dimensioning and tolerancing (GD&T), to ensure precise communication of design specifications.
- Utilize CAD software proficiently to create detailed and accurate 2D and 3D technical drawings, ensuring compliance with industry standards and organizational guidelines.
- Apply precise measurement techniques using appropriate tools and instruments, ensuring accuracy in capturing dimensions and tolerances during the design and manufacturing processes.
- Implement rigorous quality assurance measures in technical documentation, verifying that drawings adhere to design specifications, standards, and regulatory requirements, contributing to the overall quality of the engineering and manufacturing processes.

Duration: 30:00	**Duration: 60:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the key principles and components of ISO standards related to technical drawing and measuring. • Discuss how ISO standards influence the creation of working drawings in Mechanical Engineering CAD. • Discuss and apply conventional dimensioning and tolerancing techniques according to ISO standards. • Differentiate between various tolerance types and their significance in mechanical engineering design. • Explain the principles and applications of GD&T in technical drawings. • Discuss the application of GD&T symbols and notations appropriately according to ISO standards. • Describe the rules governing technical drawing. • Discuss the need to cross-reference information from different sources to ensure compliance with ISO standards. • Discuss the guidelines for adding explanation balloons and parts lists with more than one column in technical drawings.	• Produce accurate and detailed working drawings in ISO standard for mechanical components using CAD software. • Incorporate written instructions effectively to enhance the clarity of the drawings. • Apply conventional dimensioning and tolerancing to create precise and manufacturable technical drawings. • Validate and justify dimensioning choices based on ISO standards. • Implement GD&T principles in practical technical drawings. • Validate the functional requirements of components using GD&T symbols. • Demonstrate proficiency in applying the latest ISO standards to ensure compliance with industry regulations. • Evaluate and adapt drawings based on revisions in ISO standards. • Efficiently use manuals, tables, lists of standards, and product catalogues to gather relevant data for technical drawings. • Demonstrate the ability to integrate information from various sources into CAD designs. • Insert written information, explanation balloons, and parts lists with multiple columns in technical drawings using annotation styles in adherence to ISO standards.

	• Ensure clarity and precision in conveying information through annotations. • Develop 2D detailed technical drawings for mechanical components considering ISO standards. • Create exploded isometric views to illustrate the assembly and disassembly of complex mechanical structures.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Computer Hardware, CAD Software, Input Devices, Storage, Printer/Plotter, 3D Scanner, Simulation and Analysis Tools (optional), Collaboration Tools, Training Resources, Backup Solutions, CAD Workstation/Desk	

Trainer Requirements

Annexure

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Degree	Degree in Mechanical/ Electronics/ Mechatronics Engineering	7				knowledge required in the relevant field

Trainer Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "**Mechanical Engineering CAD**"mapped to QP: "CSC/Q0419, v1.0". Minimum accepted score is 80%	Recommended that the Trainer is certified for the Job Role: "Trainer", mapped to the Qualification Pack: "MEP/Q2601,V3.0". Minimum accepted as per respective SSC guidelines is 80%.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training/Assessment Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Degree	Degree in Mechanical/ Electronics/ Mechatronics Engineering	7		0		Practical skills and knowledge required in the relevant field

Assessor Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "**Mechanical Engineering CAD**"mapped to QP: "CSC/Q0419, v1.0". Minimum accepted score is 80%	Certified for the Job Role: "Assessor(VETS and skills), mapped to the Qualification Pack: "MEP/Q2701, V3.0", with a minimum score of 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
    - The assessment agency deploys the ToA certified Assessor for executing the assessment
    - SSC monitors the assessment process & records
2. Testing Environment

    To ensure a conducive environment for conducting a test, the trainer will:
    - 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 10 a.m. and 5 p.m. respectively
    - Ensure there are 2 Assessors if the batch size is more than 30.
    - 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 levels 1 to 3 are for the unskilled & semi-skilled individuals, and levels 4 and above are for the skilled, supervisor & higher management
    - The assessor must be ToA certified and 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
    - 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:

    To verify the details submitted by the training centre, the assessor will undertake:
    - A surprise visit to the assessment location
    - A random audit of the batch
    - A random audit of any candidate
6. Method for assessment documentation, archiving, and access

    To protect the assessment papers and information, the assessor will ensure:
    - 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 on the Hard drive

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	The key learning outcome is the statement of what a learner needs to know, Explain 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, Explaining (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
Training Outcome	Training outcome is a statement of what a learner will know, Explainand be able to do **upon the completion of the training**.
Terminal Outcome	The terminal outcome is a statement of what a learner will know, Explain 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 Skills Qualification Committee
NSQF	National Skills Qualification Framework
OJT	On-the-Job Training
OMR	Optical Mark Recognition
PC	Performance Criteria
PwD	Persons with Disabilities
QP	Qualification Pack
SDMS	Skill Development & Management System
SIP	Skill India Portal
SSC	Sector Skill Council
TC	Trainer Certificate
ToA	Training of Assessors
ToT	Training of Trainers
TP	Training Provider