



# Model Curriculum

**QP Name: Operator – Conventional Turning**

**QP Code: CSC/Q0110**

**Version: 3.0**

**NSQF Level: 3**

**Model Curriculum Version: 3.0**

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## Training Parameters

<b>Sector</b>	Capital Goods
<b>Sub-Sector</b>	Machine Tools, Dies, Moulds and Press Tools, Plastics Manufacturing Machinery, Textile Manufacturing Machinery, Process Plant Machinery, Electrical and Power Machinery, Light Engineering Goods
<b>Occupation</b>	Machining
<b>Country</b>	India
<b>NSQF Level</b>	3
<b>Aligned to NCO/ISCO/ISIC Code</b>	NCO-2015/7223.1201
<b>Minimum Educational Qualification and Experience</b>	5th grade pass with 5 years of relevant experience OR 8th grade pass with 2 years of relevant experience OR 9th Grade pass with 1 year of relevant experience OR Grade 8 pass and pursuing continuous schooling in regular school OR Grade 8 pass with two year of (NTC/ NAC) after 8th OR Grade 10 pass
<b>Pre-Requisite License or Training</b>	NA
<b>Minimum Job Entry Age</b>	18 Years
<b>Last Reviewed On</b>	NA
<b>Next Review Date</b>	NA
<b>NSQC Approval Date</b>	NA
<b>QP Version</b>	3.0
<b>Model Curriculum Creation Date</b>	NA
<b>Model Curriculum Valid Up to Date</b>	NA
<b>Model Curriculum Version</b>	3.0
<b>Minimum Duration of the Course</b>	360 Hours
<b>Maximum Duration of the Course</b>	360 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:

- Explain the importance of following the health and safety practices at work.
- Demonstrate ways to coordinate with co-workers to achieve work efficiency.
- Demonstrate the process of operating conventional turning machine to machine a variety of components.

### 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
<b>CSC/N1335 Follow the health and safety practices at work</b> NSQF Level- 3	25:00	35:00	0:00	00:00	60:00
Module 1: Introduction to the role of an Operator – Conventional Turning	05:00	0:00	0:00	00:00	05:00
Module 2: Health and safety practices	20:00	35:00	0:00	00:00	55:00
<b>CSC/N1336 Coordinate with co-workers to achieve work efficiency</b> NSQF Level- 3	10:00	20:00	0:00	00:00	30:00
Module 3: Process of coordinating with co-workers to achieve work efficiency	10:00	20:00	0:00	00:00	30:00
<b>CSC/N0110 Operate conventional turning machine to machine a variety of components</b> NSQF Level- 3	55:00	155:00	0:00	00:00	210:00
Module 4: Process of operating conventional turning machine to machine a variety of components	55:00	155:00	0:00	00:00	210:00

<b>DGT/VSQ/N0101 - Employability Skills (30 hours) NSQF Level – 2</b>	<b>12:00</b>	<b>18:00</b>	<b>0:00</b>	<b>00:00</b>	<b>30:00</b>
Module 5: Introduction to Employability Skills	0.5:00	0.5:00	0:00	00:00	1:00
Module 6: Constitutional values - Citizenship	0.5:00	0.5:00	0:00	00:00	1:00
Module 7: Becoming a Professional in the 21st Century	0.5:00	0.5:00	0:00	00:00	1:00
Module 8: Basic English Skills	1:00	1:00	0:00	00:00	2:00
Module 9: Communication Skills	1.5:00	2.5:00	0:00	00:00	4:00
Module 10: Diversity & Inclusion	0.5:00	0.5:00	0:00	00:00	1:00
Module 11: Financial and Legal Literacy	1.5:00	2.5:00	0:00	00:00	4:00
Module 12: Essential Digital Skills	1:00	2:00	0:00	00:00	3:00
Module 13: Entrepreneurship	2.5:00	4.5:00	0:00	00:00	7:00
Module 14: Customer Service	1.5:00	2.5:00	0:00	00:00	4:00
Module 15: Getting ready for apprenticeship & Jobs	1:00	1:00	0:00	00:00	2:00
<b>Total Duration</b>	<b>102:00</b>	<b>228:00</b>	<b>30:00</b>	<b>00:00</b>	<b>360:00</b>

# Module Details

## Module 1: Introduction to the role of an Operator - Conventional Turning

### Bridge Module

#### Terminal Outcomes:

- Discuss the job role of an Operator – Conventional Turning.

<b>Duration: 05:00</b>	<b>Duration: 0:00</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Describe the size and scope of the capital good industry and its sub-sectors.</li> <li>• Discuss the role and responsibilities of an Operator – Conventional Turning.</li> <li>• Identify various employment opportunities for an Operator – Conventional Turning.</li> </ul>	
<b>Classroom Aids</b>	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
<b>Tools, Equipment and Other Requirements</b>	
NA	

## Module 2: Health and safety Practices

### Mapped to CSC/N1335 v2.0

#### Terminal Outcomes:

- Demonstrate ways to maintain personal health and safety.
- Describe the process of assisting in hazard management.
- Explain how to check the first aid box, firefighting and safety equipment.
- Describe the process of assisting in waste management.
- Explain the importance of following the fire safety guidelines.
- Explain the importance of following the emergency and first-aid procedures.
- Demonstrate the process of carrying out relevant documentation and review.

<b>Duration: 20:00</b>	<b>Duration: 35:00</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Explain the recommended practices to be followed to ensure protection from infections and transmission to others, such as the use of hand sanitizer and face mask.</li> <li>• Explain the importance and process of checking the work conditions, assessing the potential health and safety risks, and take appropriate measures to mitigate them.</li> <li>• Explain the importance and process of selecting and using the appropriate PPE relevant to the task and work conditions.</li> <li>• Explain the recommended techniques to be followed while lifting and moving heavy objects to avoid injury.</li> <li>• Explain the importance of following the manufacturer's instructions and workplace safety guidelines while working on heavy machinery, tools and equipment.</li> <li>• Explain the importance and process of identifying existing and potential hazards at work.</li> <li>• Describe the process of assessing the potential risks and injuries associated with the various hazards.</li> <li>• Explain how to prevent or minimise different types of hazards.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the use of appropriate Personal Protective Equipment (PPE) relevant to the task and work conditions.</li> <li>• Demonstrate how to handle hazardous materials safely.</li> <li>• Demonstrate the process of testing the firefighting and various safety equipment to ensure they are in usable condition.</li> <li>• Demonstrate the process of recycling and disposing different types of waste appropriately.</li> <li>• Demonstrate how to use the appropriate type of fire extinguisher to extinguish different types of fires safely.</li> <li>• Demonstrate how to administer appropriate first aid to the injured personnel.</li> <li>• Demonstrate the process of performing Cardiopulmonary Resuscitation (CPR) on a potential victim of cardiac arrest.</li> <li>• Demonstrate the process of carrying out appropriate documentation following a health and safety incident at work, including all the required information.</li> </ul>

- Explain how to handle and store hazardous materials safely.
- Explain the importance of ensuring the first aid box is updated with the relevant first aid supplies.
- Describe the process of checking and testing the firefighting and various safety equipment to ensure they are in a usable condition.
- Explain the criteria for segregating waste into appropriate categories.
- Describe the appropriate methods for recycling the recyclable waste.
- Describe the process of disposing of the non-recyclable waste safely and the applicable regulations.
- Explain the use of different types of fire extinguishers to extinguish different types of fires.
- State the recommended practices to be followed for a safe rescue during a fire emergency.
- Explain how to request assistance from the fire department to extinguish a serious fire.
- Explain the appropriate practices to be followed during workplace emergencies to ensure safety and minimise loss to organisational property.
- State the common health and safety hazards present in a work environment, associated risks, and how to mitigate them.
- State the safe working practices to be followed while working at various hazardous sites and using electrical equipment.
- Explain the importance of ensuring easy access to firefighting and safety equipment.
- Explain the appropriate preventative and remedial actions to be taken in the case of exposure to toxic materials, such as poisonous



chemicals and gases.

- Explain various causes of fire in different work environments and the recommended precautions to be taken to prevent fire accidents.
- Describe different methods of extinguishing fire.
- List different materials used for extinguishing fire.
- Explain the applicable rescue techniques to be followed during a fire emergency.
- Explain the importance of placing safety signs and instructions at strategic locations in a workplace and following them.
- Explain different types of first aid treatment to be provided for different types of injuries.
- State the potential injuries associated with incorrect manual handling.
- Explain how to move an injured person safely.
- State various hazards associated with the use of various machinery, tools, implements, equipment and materials.
- Explain the importance of ensuring no obstruction and free access to fire exits.
- Explain how to free a person from electrocution safely.
- Explain how to administer appropriate first aid to an injured person.
- Explain how to perform Cardiopulmonary Resuscitation (CPR).
- Explain the importance of coordinating with the emergency services to request urgent medical assistance for persons requiring professional medical attention or hospitalisation.
- State the appropriate documentation

<p>to be carried out following a health and safety incident at work, and the relevant information to be included.</p> <ul style="list-style-type: none"> <li>• Explain the importance and process of reviewing the health and safety conditions at work regularly or following an incident.</li> <li>• Explain the importance and process of implementing appropriate changes to improve the health and safety conditions at work.</li> </ul>	
<p><b>Classroom Aids</b></p>	
<p>Computer, Projection Equipment, PowerPoint Presentation and Software, Facilitator’s Guide, Participant’s Handbook.</p>	
<p><b>Tools, Equipment and Other Requirements</b></p>	
<p>Personal Protective Equipment, Cleaning Equipment and Materials like Sanitizer, Soap, Mask</p>	

## Module 3: Process of coordinating with co-workers to achieve work efficiency

*Mapped to NOS CSC/N1336 v2.0*

### Terminal Outcomes:

- Demonstrate ways to Work and communicate effectively with co-workers.
- Discuss ways to promote diversity and inclusion at the workplace.

Duration: 10:00	Duration: 20:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> <li>• Explain the importance and process of effective communication in the workplace.</li> <li>• Explain the barriers to effective communication and how to overcome them.</li> <li>• Explain the importance of teamwork in an organisation’s and individual’s success.</li> <li>• Explain the importance of active listening in the work environment.</li> <li>• State the appropriate techniques to be followed for active listening.</li> <li>• Explain the importance of tone and pitch ineffective communication.</li> <li>• Explain the importance of avoiding casual expletives and unpleasant terms while communicating professional circles.</li> <li>• Explain the importance of maintaining discipline and ethical behaviour at work.</li> <li>• <b>State</b> the common reasons for interpersonal conflict and how to resolve them.</li> <li>• Explain the importance of developing effective working relationships for professional success.</li> <li>• Describe the process of expressing and addressing grievances appropriately and effectively.</li> <li>• Explain the importance and process of planning daily tasks to ensure their timely completion and efficient use of</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the process of preparing the relevant documents and reports as per the supervisor’s instructions, providing appropriate information clearly and systematically.</li> <li>• Demonstrate how to mentor and assist subordinates in the execution of their work responsibilities.</li> <li>• Demonstrate the process of using various resources efficiently to ensure maximum utilisation and minimum wastage.</li> <li>• Demonstrate how to communicate clearly and politely to ensure effective communication with co-workers.</li> <li>• Demonstrate appropriate verbal and non-verbal communication that is respectful of genders and disability.</li> </ul>

<p>time.</p> <ul style="list-style-type: none"> <li>• Explain the importance of adhering to the limits of authority at work.</li> <li>• Explain the importance of following the applicable quality standards and timescales at work.</li> <li>• Explain the importance of coordinating with co-workers to achieve the work objectives efficiently.</li> <li>• Explain the relevant documentation requirements.</li> <li>• Explain the importance of providing appropriate information clearly and systematically in work documents.</li> <li>• State the escalation matrix to be followed to deal with out of authority tasks and concerns.</li> <li>• Explain the importance and process of mentoring and assisting subordinates in the execution of their work responsibilities.</li> <li>• Explain how to identify possible disruptions to work prevent them.</li> <li>• Explain how to use various resources efficiently to ensure maximum utilisation and minimum wastage.</li> <li>• Explain the recommended practices to be followed at work to avoid and resolve conflicts at work.</li> <li>• Explain the importance and process of efficient and timely dissemination of information to the authorised personnel.</li> <li>• Explain the procedure to report inappropriate behaviour e.g., harassment.</li> </ul>	
<p><b>Classroom Aids:</b></p>	
<p>Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop</p>	
<p><b>Tools, Equipment and Other Requirements</b></p>	
<p>NA</p>	

## Module 4: Process of operating conventional turning machine to machine a variety of components

*Mapped to CSC/N0110 v2.0*

### Terminal Outcomes:

- Describe the process of preparing for carrying out turning operations.
- Demonstrate the process of carrying out turning operations.
- Explain the importance of using resources optimally.

Duration: 55:00	Duration: 155:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> <li>• List the symbols and conventions appropriate to ISO standards.</li> <li>• Explain various costs, such as production cost, machine hour rate, raw material cost, tool cost, coolant cost, overheads, cycle time, idle time, cost of machine idling, part rejection cost, etc.</li> <li>• Describe the process of selecting cutting tools, tool materials, chip breaker geometry, cutting parameters, etc.</li> <li>• Explain the effect of tool nose radius, speed and feed rate on surface finish.</li> <li>• Explain the impact of depth of cut on chatter and surface finish.</li> <li>• Explain the use of the relevant Personal Protective Equipment.</li> <li>• Explain the concepts and benefits of Industry 4.0 and Industrial Internet of Things (IIoT).</li> <li>• Explain how to interpret the component drawings to determine the specifications required to achieve after machining components.</li> <li>• Explain various hazards associated with carrying out turning operations and how to minimise them.</li> <li>• Describe the purpose and process of carrying out turning.</li> <li>• Describe the process of checking various safety mechanisms available on a conventional turning machine for the correct functioning and using</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate how to position and secure the work holding devices to the machine spindle.</li> <li>• Demonstrate the process of setting the machine tool speeds and feeds to achieve the given component specifications.</li> <li>• Demonstrate how to operate the machine tool controls safely as per the manufacturer’s instructions, both in hand and power modes.</li> <li>• Demonstrate the process of carrying out turning operations using various equipment such as solid high-speed tooling, brazed tip tooling, interchangeable tipped tooling to produce components with various features such as surface texture and finish, breadth, width, length, etc.</li> <li>• Demonstrate the process of carrying out roughing and finishing appropriately to achieve the required surface finish and dimensional accuracy.</li> <li>• Demonstrate the process of performing the relevant quality checks using the appropriate equipment on the machined components before removing them from the machine.</li> <li>• Demonstrate the use of various industry 4.0 manufacturing technologies.</li> <li>• Demonstrate the process of carrying out regular maintenance of the</li> </ul>

<p>them.</p> <ul style="list-style-type: none"> <li>• Explain how to tighten cam locks or other securing devices appropriately.</li> <li>• Explain the importance of keeping the work area clean and hazard-free.</li> <li>• Explain how to use the metric system of measurement.</li> <li>• Explain various features of lathes and use of relevant accessories such as saddle, compound slide, tailstock, taper turning attachments, profile attachments, fixed and travelling stays, etc.</li> <li>• Explain the classification and properties of various tool materials.</li> <li>• List the factors that affect the selection of cutting feeds and speed and the depth of cut.</li> <li>• Explain the use of different types of tooling, such as solid high-speed tooling, brazed tip tooling, interchangeable tipped tooling, indexable insert tooling.</li> <li>• Explain the use of different types of cutting tools such as recess/groove, chamfer, centre drill, twist/core drill, reamer, thread tool, etc.</li> <li>• List various component features that can be produced on metal and non-metal components through turning operations.</li> <li>• Explain the effects of backlash in machine slides and screws, and how to resolve this.</li> <li>• Explain the importance of following the safety instructions and warning signs on the machine.</li> <li>• Explain different types of cutting fluids and their properties.</li> <li>• Explain the effects of clamping the workpiece in a chuck/work holding device, and how incorrect clamping can cause distortion in the finished components.</li> <li>• List the relevant equipment to be</li> </ul>	<p>machine after use, such as cleaning and oiling.</p> <ul style="list-style-type: none"> <li>• Demonstrate the process of disposing the industrial waste appropriately as per the applicable environmental regulation and organisational procedures.</li> <li>• Show how to optimise the usage of electricity and other resources in various tasks and processes.</li> </ul>
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<p>used for checking critical quality parameters.</p> <ul style="list-style-type: none"> <li>• List various critical parameters to be checked, such as external and internal diameters, eccentricity, parallelism, bore/hole size/fit, angle/taper, surface finish, length, depth, position, width, concentricity, ovality, straightness, squareness, etc.</li> <li>• Explain the benefits and methods of resource optimisation.</li> </ul>	
<p><b>Classroom Aids</b></p>	
<p>Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop</p>	
<p><b>Tools, Equipment and Other Requirements</b></p>	
<p>Lathe Machines, Cutting Tools Measuring Tools, Hand Tools, Power Tools, PPE, Drawing Tools, Drilling Machines, Cutting Machines, Hand Grinders, GD&amp;T, Etc</p>	

# Annexure

## Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Diploma /Degree	Diploma /Degree in Mechanical Engineering	4	Operator – Conventional Turning	0		Practical skills and knowledge required in the relevant field

Trainer Certification	
Domain Certification	Platform Certification
Certified for Job Role: “ <b>Operator – Conventional Turning</b> ” mapped to QP: “CSC/Q0110, 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”. 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	
Diploma /Degree	Diploma /Degree in Mechanical Engineering	4	Operator – Conventional Training	0		Practical skills and knowledge required in the relevant field

Assessor Certification	
Domain Certification	Platform Certification
Certified for Job Role: <b>“Operator –Conventional Turning”</b> mapped to QP: <b>“CSC/Q0110, v1.0”</b> . Minimum accepted score is 80%	Certified for the Job Role: <b>“Assessor”</b> (VET and skills, mapped to the Qualification Pack: <b>“MEP/Q2701, v2.0”</b> , 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
<b>Declarative knowledge</b>	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.
<b>Key Learning</b>	The 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).
<b>OJT (M)</b>	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on-site
<b>OJT (R)</b>	On-the-job training (Recommended); trainees are recommended the specified hours of training on-site
<b>Procedural Knowledge</b>	Procedural knowledge addresses how to do something, or how to perform a
<b>Training Outcome</b>	Training outcome is a statement of what a learner will know, understand and be able to do <b>upon the completion of the training.</b>
<b>Terminal Outcome</b>	The terminal outcome is a statement of what a learner will know, understand and be able to do <b>upon the completion of a module.</b> A set of terminal outcomes help to achieve the training outcome.

## Acronyms and Abbreviations

Term	Description
<b>NOS</b>	National Skills Qualification Committee
<b>NSQF</b>	National Skills Qualification Framework
<b>OJT</b>	On-the-Job Training
<b>OMR</b>	Optical Mark Recognition
<b>PC</b>	Performance Criteria
<b>PwD</b>	Persons with Disabilities
<b>QP</b>	Qualification Pack
<b>SDMS</b>	Skill Development & Management System
<b>SIP</b>	Skill India Portal
<b>SSC</b>	Sector Skill Council
<b>TC</b>	Trainer Certificate
<b>ToA</b>	Training of Assessors
<b>ToT</b>	Training of Trainers
<b>TP</b>	Training Provider