

Model Curriculum

CNC OPERATOR TURNING

CNC Operator Turning

SECTOR: **CGSC**
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
OCCUPATION: **Machining**
REFERENCE ID: **CSC/Q 0115**
NSQF LEVEL: **3**



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CNC Operator Turning

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “CNC Operator Turning”, in the “Capital Goods” Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	CNC Operator Turning		
Qualification Pack Name & Reference ID.	CSC/Q 0115		
Version No.	1.0	Version Update Date	25 – 12 – 2015
Pre-requisites to Training	Minimum qualification – 10 th Standard		
Training Outcomes	<p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> • Carry out preparations for performing turning operations using CNC Machine: read and establish requirements of raw material, dimensions, limits & tolerances, finish requirements etc. Be able to perform daily maintenance, carry out preliminary checks, obtain and identify correct and calibrated tools. • Carry out turning operations using CNC Machine: use and extract information from engineering drawings, labelling data etc, load and unload components, produce machined components, measure critical parameters of machined components, observe inconsistencies, replace worn out tools and store finished products etc • Work safely following health and safety standards: read and understand the safety signs and instructions on the CNC machine, use of PPE, identify job –site hazards and apply good housekeeping practices etc 		

This course encompasses 3 out of 3 National Occupational Standards (NOS) of “CSC/Q 0115” Qualification Pack issued by “Capital Goods Skill Council”.

Sr. No.	Module	Theory Duration (hh:mm)	Practical Duration (hh:mm)	Key Learning Outcomes	Corresponding NOS Code	Equipment Required
1	Perform turning operations on metal components using Computer Numerically controlled (CNC) machines	70:00	130:00	<ul style="list-style-type: none"> • Understand main features and working parts of CNC machine and accessories that can be used. • Identify and obtain job specifications from valid 	CSC/N 0115	CNC Turning Machines(2-axis CNC lathe machine) , Cutting tools measuring tools , Hand Tools , Power



			<p>sources like Operational drawings, blue print, approved sketches / illustrations, and identify raw material, measuring and cutting tools and their calibration, dimensions, limits and tolerances, surface finish, shapes, cycle time and production rates. Understand types of measurements and dimensions like lengths, depths, flatness, surface finish, squareness,, parallelism, hole size/fit, angles, recesses, thread fit, runout and roundness,</p> <ul style="list-style-type: none"> • Preparation of work areas for turning (OD,ID) facing, grooving, threading, drilling, boring and tapping) • Basic daily maintenance of machine and good housekeeping activities like removing and disposing swarf, keeping work areas free from foreign objects and dirt, machine lubrication and maintaining coolant levels. • Understand the different work holding devices like chucks with hard jaws, chucks with soft jaws, fixtures, drive centres, collet chucks, faceplates, magnetic/pneumatic devices and other tools like hammer (ball peen, 		<p>tools , PPE , Drawing Tools , Drilling Machines , Cutting Machines , Hand Grinders , GD&T , Etc.</p>
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				<p>mallet), magnifying glass, allen keys, spanner, wrenches and deburring tools, turning tools, grooving tools parting tools, threading tools, form tools, centre drills, twist / insert drills and reamers. Measuring tools like steel rulers, micrometers, verniers, gauges, dial test indicators, surface finish equipment and height masters.</p> <ul style="list-style-type: none"> • Load and unload the components using predetermined fixtures or work holding devises and measure the critical parameters of machined component after trial run. Correct the offsets. • Produce machines components combining different turning operations like turning (OD,ID) facing, grooving, face grooving, thread cutting, drilling, boring and tapping with range of features like diameters, profiles, holes, parting off and threads. • Preform turning operations using different materials like stainless steel, steel, aluminum/aluminum alloys, copper/copper alloys, cast iron, plastic etc, 		
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				<ul style="list-style-type: none"> Produce quality components free false tool cuts, burrs and sharp edges, general dimensional tolerances +/-0.02mm, specific tolerances within +/- 0.1mm, surface finish within 1.6µm, reamed holes with H8, screw threads 6G/6H, angles / tapers within +/- 15 sec, flatness and squareness 0.025mm. 		
2	Use basic health and safety practices at the workplace	30	70	<ul style="list-style-type: none"> Understand importance of complying health safety and environmental regulation at work place. Understand hazards associated with use of CNC machines operations, revolving and moving parts, hot metal particles, sharp cutting tools, lifting and holding work holding devises, burrs and sharp edges on the component. Be able to identify job site hazards like sharp edged heavy tools, gas cylinders, welding radiations, chemicals, fumes, obstructions in corridors, naked wires / cables etc Understand: Different types of fire; use of appropriate fire extinguishers risk and accidents; safe working practices and methods 	CSC/ N 1335	Helmet, gloves, earplugs, goggles, Shoes, node mask, Apron Etc.



				<p>of accident prevention at work place</p> <ul style="list-style-type: none"> Importance of using protective clothing like leather or asbestos gloves, flame proof aprons, flame proof overalls buttoned to neck, cuffless (without folds), trousers, reinforced footwear, helmets/hard hats, cap and shoulder covers, ear defenders/plugs, safety boots, knee pads, particle masks, glasses/goggles/visors, hand shields, machine guards, residual current devices, shields, dust sheets, respirator etc. 		
3	Work effectively with others	40	60	<ul style="list-style-type: none"> Able to receive and pass information from and to authorised persons and seeking clarification from authorized persons where required. Able to communicate by avoiding use of abusive language; display respect to others. Respect others time by completing given task in time, avoiding gossip and avoid conflict. Understand and practices active listening, teamwork, effective communication; understands the barriers to effective communication and 	CSC/N 1336	



				common reasons for interpersonal conflict.		
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Total Duration: 400	Theory <u>140</u>	Practical <u>260</u>	Unique Equipment Required: CNC Turning Machines(2-axis CNC lathe machine) , Cutting tools measuring tools , Hand Tools , Power tools , PPE , Drawing Tools , Drilling Machines , Cutting Machines , Hand Grinders , GD&T , Etc. Helmet, gloves, earplugs, goggles, Shoes, node mask, Apron Etc.
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Grand Total Course Duration: **400 Hours 00 Minutes**

(This syllabus/ curriculum has been approved by Capital Goods Skill Council)



Annexure1: Assessment Criteria

Assessment Criteria for CNC Operator Turning	
Job Role	CNC Operator Turning
Qualification Pack	CSC/Q 0115
Sector Skill Council	Capital Goods Skill Council (CGSC)

Sr. No.	Guidelines for Assessment
1	Criteria for assessment for Qualification Pack has been created based on the NOSs and performance criteria by CGSC. Each Performance Criteria (PC) has been assigned marks proportional to its importance within NOS and weightages have also been given among the NOSs accordingly. CGSC has laid down the proportion of marks for Skills (Practical), Theory/Knowledge and Behaviour for each PC.
2	The assessment of the theory/knowledge will be based on written test/viva-voce or both while skill test shall be hands on practical.
3	The assessment shall be done as per the assessment guides devised by CGSC in coordination with the assessment agencies. Assessment guides consists of a unique question papers for theory/knowledge and the method of assessments and evidence collection and detailed marking.
4	To pass the Qualification Pack, every trainee should score a minimum of 70% in Skill, 60% in Knowledge OR as per guidelines applicable from time to time.
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Sr. No.	NOS No.	NOS Name	Total Marks	Marks Allocation: Skills	Marks Allocation: Knowledge	Marks Allocation: Behaviour
1	CSC/ N 0115	Perform turning operations on metal components using CNC machines	100	70	30	..
2	CSC/N 1335	Use basic health and safety practices at the workplace	100	64	36	..
3	CSC/N 1336	Work effectively with others	100		30	70
	Total:		300	134	96	70
	Percentage Weightage:			70%	20%	10%
	Minimum Pass% to qualify:			70%	60%	60%



Annexure2: Trainer Prerequisites for Job role: “CNC Operator Turning ” mapped to Qualification Pack: “CSC /Q 0115”

Sr. No.	Area	Details
1	Job Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “ <u>CSC/Q 0115</u> ”.
2	Personal Attributes	Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field.
3	Minimum Educational Qualifications	Preferably Diploma/Degree in Mechanical Engineering
4a	Domain Certification	Certified for Job Role: “CNC Operator Turning” mapped to QP: “ <u>CSC /Q 0115</u> ” with Minimum acceptance score of 85 %.
4b	Platform Certification	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “SSC/1402” with Minimum accepted score of 85%. Alternatively, must have successfully undergone a CGSC organized TOT workshop on “How to Trainer”.
5	Experience	Minimum 3 to 4 years of industry experience in relevant job role and a Minimum of 3 to 4 years and Training experience in relevant job role.



Capital Goods Skill Council

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