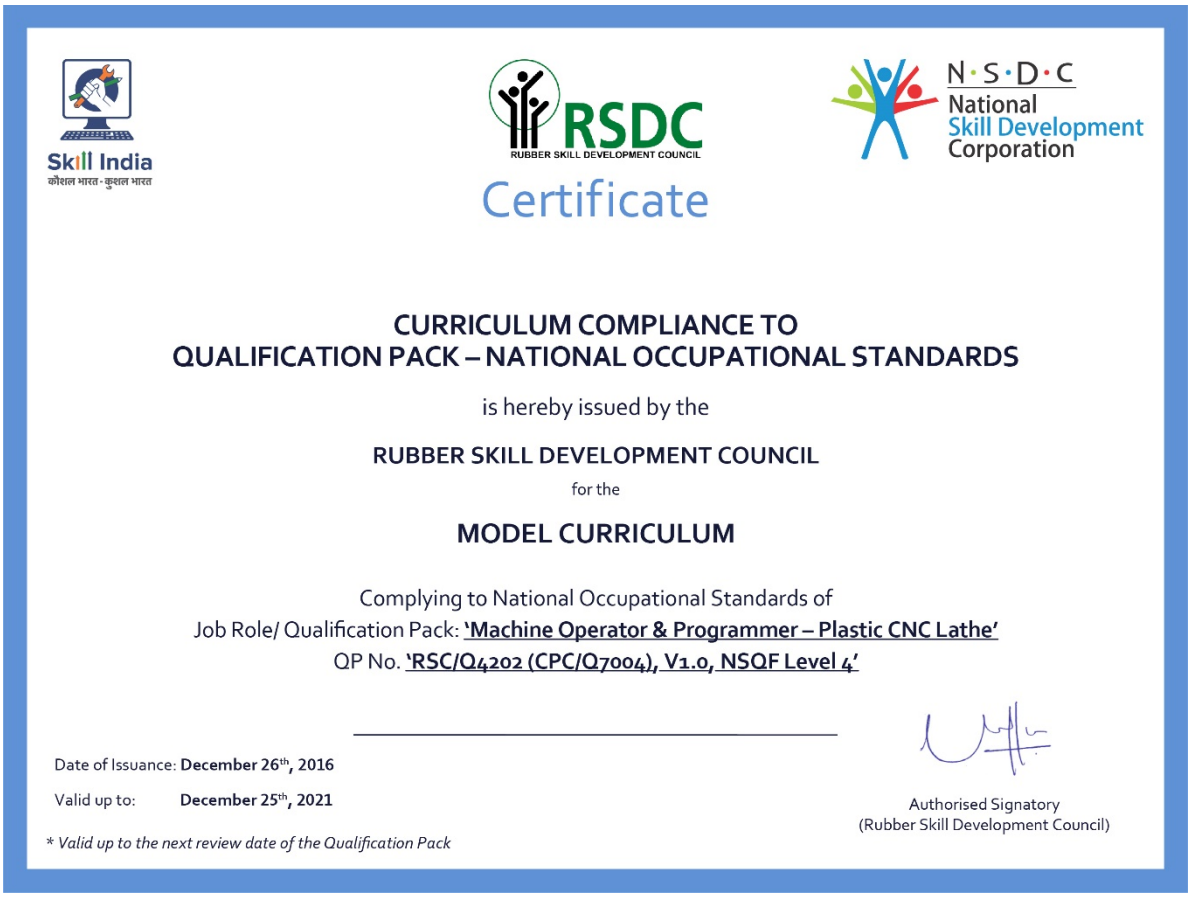
Model Curriculum

Machine Operator & Programmer – Plastic CNC Lathe

SECTOR: RUBBER
SUB-SECTOR: PLASTICS PROCESSING
OCCUPATION: CNC LATHE
REF ID: RSC/Q4202 (CPC/Q7004), V 1.0
NSQF LEVEL: 4



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RSDC
RUBBER SKILL DEVELOPMENT COUNCIL

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National
Skill Development
Corporation

Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

RUBBER SKILL DEVELOPMENT COUNCIL

for the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: **'Machine Operator & Programmer – Plastic CNC Lathe'**
QP No. **'RSC/Q4202 (CPC/Q7004), V1.0, NSQF Level 4'**

Date of Issuance: **December 26th, 2016**

Valid up to: **December 25th, 2021**

** Valid up to the next review date of the Qualification Pack*

Authorised Signatory
(Rubber Skill Development Council)

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Machine Operator & Programmer – Plastic CNC Lathe

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of an "Machine Operator & Programmer – Plastic CNC Lathe", in the "Rubber Skill Development Council" Sector/Industry and aims at building the following key competencies amongst the learners.

Program Name	**Machine Operator & Programmer – Plastic CNC Lathe**		
Qualification Pack Name & Reference ID	RSC/Q4202 (CPC/Q7004), V 1.0		
Version No.	1.0	**Version Update Date**	29/05/2019
Pre-requisites to Training	Xth Standard		
Training Outcomes	**After completing this programme, participants will be able to:** • Explain the process required for different types of plastics • Evaluate the role and responsibilities of a machine operator plastics CNC Lathe • Perform lathe operations on metal or plastic material using lathe machine • Perform turning and other lathe operations on metal or plastic pieces using appropriate software for lathe machines • Program Computer Numerically Controlled (CNC) lathe machines • Evaluate basics of computer and data entry in MS office/office open source software. • Demonstrate basic communication skills. • Demonstrate effective working with others • Maintain basic health and safety practices at the workplace.		

This course encompasses 7 out of 7 National Occupational Standards (NOS) of "Machine Operator & Programmer – Plastic CNC Lathe" Qualification Pack issued by "Rubber Skill Development Council".

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1.	**Introduction to the Job Role** **Theory Duration** (hh:mm) 20:00 **Practical Duration** (hh:mm) 10:00 **Corresponding NOS Code** Bridge Module	• Explain the history of development of plastic products • Describe current industrial scenario of plastics • Identify types of plastic • List major industrial associations related to lathe • Identify equipment used for CNC lathe • Describe the roles and responsibilities of a machine operator – plastic CNC lathe	**Class Room equipment:** LCD Projector/Screen, Computer, charts, Black / White board and Duster.
2.	**Perform lathe operations on metal or plastic material** **Theory Duration** (hh:mm) 25:00 **Practical Duration** (hh:mm) 60:00 **Corresponding NOS Code** RSC/N4201 (CPC/N7011)	• Practice safety, environmental and other relevant regulations and guidelines • Ensure safety guards of machine are in place and in working condition • Ensure tools and equipment are in a safe and usable conditions • Confirm availability of job specification i.e. approved drawings, sketches, instructions from the supervisor, job instruction sheet / job card. • Evaluate the job requirement from the job specification list with attention to geometric tolerances • Examine the dimensions of work piece material and ensure that it is free from foreign objects, dirt or other contamination • Perform the turning and other lathe operations as per the required specifications • Assemble all the appropriate tools and measuring instruments / gauges required for the job • Ensure that the lathe machine is ready for operation • Prepare the lathe machine for the operations by mounting and setting the required work holding devices and cutting tools • Check necessary instruction / training on the operation of the	**Measuring equipment:** Steel Ruler, Micrometer, Vernier Caliper, Radius gauge, Feeler gauge, Hight gauge, Thread gauge, Steel measuring tape, Weighing Balance (1 No.) **Hand Tools:** Hammer, screw driver set with Multiple heads, Allen key hexagonal, Twist drills bit, File triangular, Hacksaw adjustable, Spanner set double side, Adjustable spanner, Crimping tools, Calculator, wrenches, pliers, cutters, striking tools, struck or hammered tools, vises, clamps, snips, saws, drills and knives **Personal Protective equipment**: Safety Goggles, Rubber Gloves, Asbestos gloves, Fire Extinguisher, Apron, Helmet, First Aid Box with Medicines

		machine • Practise holding the work piece securely and correctly, without distortion • Adjust the machine settings as per job requirement to maintain desired accuracy	
3.	**Apply lathe operations on metal or plastic material** **Theory Duration** (hh:mm) 27:00 **Practical Duration** (hh:mm) 56:00 **Corresponding NOS Code** RSC/N4201 (CPC/N7011)	• Adjust the speed and feed of the lathe machine to achieve the job specifications • Operate the tool controls of the machine safely and correctly • Demonstrate how to stop the lathe machine, both in normal and emergency situations, correctly • Demonstrate proper use of the lathe machine accessories and attachments such as steady and follower rests, tail stock, taper turning attachments, profile attachments etc. • Perform lathe operations using different tools to produce various components • Assemble components as per the required quality standards • Apply roughing and finishing cuts on the work piece, considering the effect on tool life, surface finish and dimensional accuracy • Demonstrate the use of coolants/ cutting fluids for different combinations of work piece and tool • Evaluate any difficulties/ discrepancies that may arise during the machine operation • Perform troubleshooting as per the instructions laid down in SOP • Demonstrate proper shut down of the machine, on completion of the operations • Practise removing and disposing of the chips/ waste to appropriate places • Apply measuring instruments/gauges to check critical parameters • Demonstrate corrective action, in case of deviation from the required specifications • Demonstrate the process of escalation of problem to the	**Measuring equipment:** Steel Ruler, Micrometer, Vernier Caliper, Radius gauge, Feeler gauge, Hight gauge, Thread gauge, Steel measuring tape, Weighing Balance (1 No.) **Hand Tools:** Hammer, screw driver set with Multiple heads, Allen key hexagonal, Twist drills bit, File triangular, Hacksaw adjustable, Spanner set double side, Adjustable spanner, Crimping tools, Calculator, wrenches, pliers, cutters, striking tools, struck or hammered tools, vises, clamps, snips, saws, drills and knives **Personal Protective equipment**: Safety Goggles, Rubber Gloves, Asbestos gloves, Fire Extinguisher, Apron, Helmet, First Aid Box with Medicines

		supervisor.	
4.	**Pre-requisites to computer controlled lathe machine** **Theory Duration** (hh:mm) 30:00 **Practical Duration** (hh:mm) 65:00 **Corresponding NOS Code** RSC/N4202 (CPC/N7012)	• Examine the safety guards of machine and ensure that they are in place and are in working condition • Ensure that all tools and equipment are in a safe and working condition • Ensure the availability of job specification i.e. approved drawings, sketches, instructions from the supervisor, job instruction sheet/ job card. • Evaluate the requirements from the job specifications with attention to the geometric tolerances • Ensure that the work pieces are free from foreign objects, dirt or other contamination. • Analyze information from engineering drawings, dimensions and tolerances • Analyze information from reference charts, tables, graphs and Engineering standards	**Personal Protective equipment**: Safety Goggles, Rubber Gloves, Asbestos gloves, Fire Extinguisher, Apron, Helmet, First Aid Box with Medicines **Raw material:** Mild Steel, Stainless Steel, Aluminium, Brass, Wood CNC Lathe Machine Lathe Machine CNC Simulator 3-Jaw and 4-Jaw Chuck, Cutting Tools (Single Point) Both HSS and Carbide Inserts types CAM software, CNC controller.
5.	**Practice on computer numerically controlled lathe machine** **Theory Duration** (hh:mm) 30:00 **Practical Duration** (hh:mm) 65:00 **Corresponding NOS Code** RSC/N4202 (CPC/N7012)	• Demonstrate loading and unloading of component(s) using pre-determined fixtures or work holding devices • Prepare basic program and carry out dry run,to check the correctness of the program • Adjust the speed and feed of the CNC lathe machine to achieve the job specifications • Operate the tool controls of the machine safely and correctly • Demonstrate how to stop the CNC lathe machine following the set procedure, both in normal and emergency situations • Perform cutting of first part by setting tool offsets to get oversize part • Categorize the critical parameters of the machined component (without removing from the machine), during the trial run • Check the component after unloading, for accuracy in the critical parameters • Prepare machined components that includes different turning operations and have a range of features • Comply with the specified machining	**Personal Protective equipment**: Safety Goggles, Rubber Gloves, Asbestos gloves, Fire Extinguisher, Apron, Helmet, First Aid Box with Medicines **Raw material:** Mild Steel, Stainless Steel, Aluminium, Brass, Wood CNC Lathe Machine Lathe Machine CNC Simulator 3-Jaw and 4-Jaw Chuck, Cutting Tools (Single Point) Both HSS and Carbide Inserts types CAM software, CNC controller **Class Room equipment:** LCD Projector/Screen, Computer, charts, Black / White board and Duster.

		sequence and procedure • Demonstrate responding to the machine alarm as per operating manual • Identify inconsistency in dimensions arising due to wearing of tool and correct the offsets • Ensure that machine settings are adjusted as and when required, to maintain the required accuracy • Identify when tools need replacement and replace worn-out tools • Produce components as per the required standards	
6.	**Proper functioning and maintenance of computer controlled lathe machine** **Theory Duration** (hh:mm) 20:00 **Practical Duration** (hh:mm) 58:00 **Corresponding NOS Code** RSC/N4202 (CPC/N7012)	• Perform turning or other lathe operations as per the required job specifications on CNC lathe • Check the functioning of CNC lathe machine and ensure that it is ready for operation • Prepare the CNC lathe machine for operation by mounting and setting the required work holding devices and cutting tools • Practise to hold the work piece securely and correctly, without distortion • Modify the settings of CNC lathe machine as per the requirement of job, to maintain desired accuracy • Ensure daily maintenance of the machine according to the defined checklist • Demonstrate how to report problems and seek appropriate assistance • Practise documentation during and post operations as per procedures laid down by the organisation	**Personal Protective equipment**: Safety Goggles, Rubber Gloves, Asbestos gloves, Fire Extinguisher, Apron, Helmet, First Aid Box with Medicines **Raw material:** Mild Steel, Stainless Steel, Aluminium, Brass, Wood CNC Lathe Machine Lathe Machine CNC Simulator 3-Jaw and 4-Jaw Chuck, Cutting Tools (Single Point) Both HSS and Carbide Inserts types CAM software, CNC controller
7.	**Programming of computer numerically controlled (CNC) lathe machines** **Theory Duration** (hh:mm) 20:00 **Practical Duration** (hh:mm) 75:00	• Perform programming according to the procedures and instructions laid down for the job • Ensure that the machine guards are in place and are correctly adjusted • Identify safety instructions, warning signs on the machine • Ensure that the work area is clean and safe from hazards • Ensure that all tools, equipment, power tool cables, extension leads are in a safe and usable condition • Analyze requirements of the job	**Personal Protective equipment**: Safety Goggles, Rubber Gloves, Asbestos gloves, Fire Extinguisher, Apron, Helmet, First Aid Box with Medicines **Raw material:** Mild Steel, Stainless Steel, Aluminium, Brass, Wood CNC Lathe Machine Lathe Machine

	Corresponding NOS Code RSC/N4204 (CPC/N7021)	from the job specification mentioned in the document • Comply with the correct procedures for stopping the program and dealing with any faults • Manage typical problems that can occur with the programming, loading and editing activities, effectively, using approved procedures • Save the program in an appropriate storage medium – paper, computer hard disk, etc. - and location • Prepare relevant documentation as per the procedure laid down by the organization • Assemble appropriate equipment or tools required for the program • Ensure all measuring equipment is calibrated and approved, for usage • Ensure that the tools and fixtures are in usable condition (e.g. free from breakage, damage, calibration, etc.) • Demonstrate methods to appropriately pre-set the tools, using setting jigs/fixtures • Plan any necessary instruction/training required for the operating the machine	CNC Simulator 3-Jaw and 4-Jaw Chuck, Cutting Tools (Single Point) Both HSS and Carbide Inserts types CAM software, CNC controller **Class Room equipment:** LCD Projector/Screen, Computer, charts, Black / White board and Duster.
8.	**Evaluate operations of CNC lathe machines** **Theory Duration** (hh:mm) 20:00 **Practical Duration** (hh:mm) 75:00 **Corresponding NOS Code** RSC/N4204 (CPC/N7021)	• Rectify incorrect and inconsistent information in the document having job specification • Evaluate information from the reference charts, tables, graphs and standards • Prepare work area as per the procedure or operational specification • Conduct a preliminary check for the readiness of the program so that the CNC lathe machine operates correctly • Determine the operational objectives for the achievement of targets and ensuring the best way to programme the machine to achieve the desired output • Analyse information from engineering drawings and related specifications • Identify tool requirements from tooling layout • Identify suitable work holding or	**Class Room equipment:** LCD Projector/Screen, Computer, charts, Black / White board and Duster. **Measuring equipment:** Steel Ruler, Micrometer, Vernier Caliper, Radius gauge, Feeler gauge, Hight gauge, Thread gauge, Steel measuring tape, Weighing Balance (1 No.) **Hand Tools:** Hammer, screw driver set with Multiple heads, Allen key hexagonal, Twist drills bit, File triangular, Hacksaw adjustable, Spanner set double side, Adjustable spanner, Crimping tools, Calculator, wrenches, pliers, cutters, striking tools, struck or hammered tools, vices,

		fixturing device • Ensure that the correct and latest program is uploaded on the CNC system • Prepare the CNC program with commands for tool motions, spindle motions, miscellaneous functions and tool change, corresponding to the machine and control system • Identify various ways for developing a CNC program, either by writing it on the paper or in a text editor, or using CAM software or controllers on machine • Ensure that the part program is efficient and results in minimal cycle time • Design subprograms and canned cycles, to reduce program size and input time to ensure enough memory space in the machine • Demonstrate how to transfer the program to the machine by entering it at the console or transmitting it through a wired link.	clamps, snips, saws, drills and knives **Model Mould:** Two Plate mould, Three plate mould, Compression mould, Blow mould and transfer mould, CNC Machine, Mould Polishing and Assembly kit, Computer Hardware with Auto-CAD/CAE / Creo / NX
9.	**Analyze aspects of computer numerically controlled (CNC) lathe machines** **Theory Duration** (hh:mm) 28:00 **Practical Duration** (hh:mm) 70:00 **Corresponding NOS Code** RSC/N4204 (CPC/N7021)	• Demonstrate mounting of tools on the tool turret or magazine, in correct position • Verify the tools mounted in are corresponding to the tool numbers • Demonstrate mounting of the part, is done firmly in the specified work holding devices of the machine, using the appropriate clamping forces • Prepare work offset and tool data on the machine – x and z offsets • Prepare tool orientation and loe radius for lathes; length offsets and tool radius for machining centers • Compare the tool data entered in offset number with the tool offset numbers in the part program • Identify error messages and faults on the program or equipment • Practise to cut a trial part using single block run, dry run to monitor feed and speed override controls • Adjust tool and wear offsets to correct any dimensional errors in the part • Ensure that the trial part conforms to	**Measuring equipment:** Steel Ruler, Micrometer, Vernier Caliper, Radius gauge, Feeler gauge, Hight gauge, Thread gauge, Steel measuring tape, Weighing Balance (1 No.) **Hand Tools:** Hammer, screw driver set with Multiple heads, Allen key hexagonal, Twist drills bit, File triangular, Hacksaw adjustable, Spanner set double side, Adjustable spanner, Crimping tools, Calculator, wrenches, pliers, cutters, striking tools, struck or hammered tools, vices, clamps, snips, saws, drills and knives **Personal Protective equipment:** Safety Goggles, Rubber Gloves, Asbestos gloves, Fire Extinguisher, Apron, Helmet, First Aid Box with

		the drawing specifications in terms of dimensions, surface finishes and geometrical parameters like concentricity, parallelism, runout etc. • Inspect that the tool wear offsets are in working condition • Demonstrate how to replace worn out tools and index able inserts • Assemble worn out cutting tools, work holding device / fixtures / instruments /drawings ,for storage • Ensure that there is no damage to the tool/fixture while doing the prove-out • Practise shut down of the equipment to a safe condition post conclusion of the activities • Escalate the problems and grievances to the appropriate authority	Medicines **Model Mould:** Two Plate mould, Three plate mould, Compression mould, Blow mould and transfer mould, CNC Machine, Mould Polishing and Assembly kit, Computer Hardware with Auto-CAD/CAE / Creo / NX
10.	**Basics of computer and data entry** **Theory Duration** (hh.mm) 18:00 **Practical Duration** (hh.mm) 30:00 **Corresponding NOS Code** RSC/N4504 (CPC/N0219)	• Demonstrate managing documents in the computer • Perform scan operations on source documents in accordance with specific instructions • Check for compliance and correct all typographical errors in the data entered • Manage files of source documents or other information related to data entered • Modify database to reflect most current source information • Assist in the filing and storage of security and back up files	**Class Room equipment:** LCD Projector/Screen, Computer, charts, Black / White board and Duster.
11.	**Basic knowledge of communication / soft skills** **Theory Duration** (hh.mm) 18:00 **Practical Duration** (hh.mm) 40:00 **Corresponding NOS Code** RSC/N4108 (CPC/N0418)	• Define the basic functions of a computer • Perform basic computer operations • Practise accurate receipt of information and instructions from the supervisor/operator • Demonstrate accurate delivery of information to authorized persons who require it • Demonstrate helpful behaviour by assisting others in performing tasks in a positive manner • Assist others to maximize the effectiveness and efficiency in carrying out tasks • Demonstrate active listening skills	**Class Room equipment:** LCD Projector/Screen, Computer, charts, Black / White board and Duster.

		while interacting with others at work • Demonstrate appropriate tone, pitch and language to convey professionalism	
12.	**Maintain basic health and safety practices at the workplace** **Theory Duration** (hh:mm) 20:00 **Practical Duration** (hh:mm) 42:00 **Corresponding NOS Code** RSC/N4101 (CPC/N0411)	• Comply with the environmental and safety policies of the organisation • Comply with personal safety, job safety and machine safety procedures • Coordinate with other resources at the workplace to achieve healthy, safe and secure environment for all • Identify and take corrective measures for any hazards like illness, accidents, fires or any other natural calamity. • Demonstrate safe working practices while dealing with hazards • Practise good housekeeping standards at all times • Demonstrate rescue techniques applied during fire hazard • Demonstrate the usage of a fire extinguisher. • Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals, loud noise • Conduct regular checks with the support of the maintenance team on machine health to identify potential hazards • Ensure that the tools, fixtures and jigs that are required for the job are only available on the workstation, rest of the items are stored properly • Categorize the types of wastes • Demonstrate the technique of waste disposal and waste storage in proper bins as per the SOP • Segregate the items which are labelled as red tag items for the process area and keep them in the appropriate places • Categorize the tools/ equipment/ fasteners/ spare parts as per specifications/ utility into proper trays, cabinets, lockers • Practise stacking of various types of boxes and containers as per the size/ utility	**Class Room equipment:** LCD Projector/Screen, Computer, charts, Black / White board and Duster. **Measuring equipment:** Steel Ruler, Micrometer, Vernier Caliper, Radius gauge, Feeler gauge, Hight gauge, Thread gauge, Steel measuring tape, Weighing Balance (1 No.) **Hand Tools:** Hammer, screw driver set with Multiple heads, Allen key hexagonal, Twist drills bit, File triangular, Hacksaw adjustable, Spanner set double side, Adjustable spanner, Crimping tools, Calculator, wrenches, pliers, cutters, striking tools, struck or hammered tools, vices, clamps, snips, saws, drills and knives **Personal Protective equipment:** Safety Goggles, Rubber Gloves, Asbestos gloves, Fire Extinguisher, Apron, Helmet, First Aid Box with Medicines **Model Mould:** Two Plate mould, Three plate mould, Compression mould, Blow mould and transfer mould, CNC Machine, Mould Polishing and Assembly kit, Computer Hardware with Auto-CAD/CAE / Creo / NX

		• Identify the floor markings/ area markings used for demarcating the various sections in the plant • Comply with the given instructions and check for labelling of fluids, oils, lubricants, solvents, chemicals etc. and proper storage of the same to avoid spillage, leakage, fire etc. • Ensure storage of the material and tools in the designated places • Demonstrate the correct use of personal protective equipment (PPE) like safety glasses, apron, no loose cloths / hair, safety shoes while performing lathe operations	
13.	**Effective working with others** **Theory Duration** (hh:mm) 12:00 **Practical Duration** (hh:mm) 26:00 **Corresponding NOS Code** RSC/N4203 (CPC/N7014)	• Practise appropriate communication etiquette while working • Demonstrate active listening skills while interacting with others • Demonstrate responsible and disciplined behaviour at the workplace • Practise accurate receipt of information and instructions from the supervisor and fellow workers • Demonstrate ways to accurately pass on information to authorized persons • Assist others to maximize effectiveness and efficiency in carrying out tasks • Escalate grievances and problems to appropriate authority.	**Class Room equipment:** LCD Projector/Screen, Computer, charts, Black / White board and Duster.
	Total Duration **Theory Duration** **288:00** **Practical Duration** **672:00**	**Unique Equipment Required:** 1. **Class Room equipment:** LCD Projector/Screen, Computer, charts, Black / White board and Duster. 2. **Measuring equipment:** Steel Ruler, Micrometer, Vernier Caliper, Radius gauge, Feeler gauge, Hight gauge, Thread gauge, Steel measuring tape, Weighing Balance (1 No.) 3. **Hand Tools:** Hammer, screw driver set with Multiple heads, Allen key hexagonal, Twist drills bit, File triangular, Hacksaw adjustable, Spanner set double side, Adjustable spanner, Crimping tools, Calculator, wrenches, pliers, cutters, striking tools, struck or hammered tools, vices, clamps, snips, saws, drills and knives 4. **Personal Protective equipment:** Safety Goggles, Rubber Gloves, Asbestos gloves, Fire Extinguisher, Apron, Helmet, First Aid Box with Medicines 5. **Raw material:** Mild Steel, Stainless Steel, Aluminium, Brass, Wood, CNC Lathe Machine , Lathe Machine, CNC Simulator, 3-Jaw and 4-Jaw Chuck, Cutting Tools (Single Point) Both HSS and Carbide Inserts types, CAM software, CNC controller	

Grand Total Course Duration: **960 Hours 0 Minutes**
(This syllabus/ curriculum has been approved by ***Rubber Skill Development Council)***

Trainer Prerequisites for Job role: "Machine Operator & Programmer – Plastic CNC Lathe" mapped to Qualification Pack: "RSC/Q4202 (CPC/Q7004)" Version 1.0

Sr. No.	Area	Details
1	**Description**	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack "RSC/Q4202 (CPC/Q7004), V 1.0".
2	**Personal Attributes**	A Trainer should be free from socio-economic preferences and prejudice. He/ she should be safety conscious and proficient in handling and use security/ safety equipment. Besides being knowledgeable, he/ she should be energetic, motivating, innovative and good at communication. The trainer should be able to establish rapport with the trainees and employ innovative methods to impart instructions.
3	**Minimum Educational Qualification**	10th Standard
4a	**Domain Certification**	Certified for Job Role "Machine Operator & Programmer – Plastic CNC Lathe" mapped to the Qualification Pack "RSC/Q4202 (CPC/Q7004), V 1.0" issued by RSDC
4b	**Platform Certification**	Recommended that the Trainer is certified for the Job Role: "Trainer", mapped to the Qualification Pack: "MEP/Q2601" with scoring of minimum 80%.
5	**Experience**	As per the standards set by relevant SSC to practice in different industry sectors.

Annexure: Assessment Criteria

CRITERIA FOR ASSESSMENT OF TRAINEES
Job Role: Machine Operator & Programmer – Plastic CNC Lathe **Qualification Pack Code: RSC/Q4202 (CPC/Q7004), V 1.0** **Sector Skill Council: Rubber Skill Development Council**

Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also laydown proportion of marks for Theory and Skills Practical for each PC.
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below).
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on these criteria.
5. To pass the Qualification Pack, every trainee should score a minimum of 70% in every NOS.
6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.

Assessable Outcome		Marks Allocation		
NOS	**Performance Criteria**	**Total**	**Theory**	**Practical**
RSC/N4201 (CPC/N7011) Perform lathe operations on metal or plastic material using Conventional Centre lathe machine	PC1. Understand and comply with safety, environmental & other relevant regulations and guidelines	5.5	0.5	5
	PC2. Wear personal protective equipment (PPE) like safety glasses, apron, no loose cloths/ hair, safety shoes while performing lathe operations regulations while performing CNC turning operations	6	1	5
	PC3. Ensure work area is clean and safe	5	1	4
	PC4. Ensure that machine safety guards are in place and are in correctly working condition	5	1	4
	PC5. Ensure that all tools, equipment are in a safe and usable conditions	5	1	4
	PC6. Ensure availability of job specification i.e. approved drawings, sketches, instructions from the supervisor, job instruction sheet/ job card.	5	1	4
	PC7. Read and understand the Job requirements from the job specifications and attention shall be given to the geometric tolerances	5.5	0.5	5
	PC8. Check the work piece material for the dimensions and ensure that it is free from foreign objects, dirt or other contamination and is within the required size	6	1	5
	PC9. Plan to perform the turning or other lathe operations and the sequence of operations as per required job specifications	6	1	5
	PC10. Obtain all the appropriate tools and measuring instruments/ gauges required for the job	6	1	5
	PC11. Check the lathe machine for its functioning and ensure that it is ready for operation	4	0.5	3.5
	PC12. Prepare the lathe machine for the operations by mounting and setting the required work holding devices and cutting tools	3.5	0.5	3
	PC13. Clarify any doubt, if any and see necessary instruction /training on the operation of the machine whenever required	5	1	4
	PC14. Hold the work piece securely and correctly, without distortion	5	1	4

	PC15. Adjust the machine settings as per job requirement to maintain desired accuracy	4	1	3
	PC16. Adjust and set the speed and feed of the lathe machine to achieve the job specifications	4	1	3
	PC17. Operate the machine tool controls safely and correctly, in line with operational procedures both in manual and power modes.	5	1	4
	PC18. Stop the lathe machine, both in normal and emergency situations correctly by following the right procedure and should be able to restart the machine after & emergency	4	1	3
	PC19. Should be able to use the lathe machine accessories and attachments such as steady and follower rests, tail stock, taper turning attachments, profile attachments etc.	4	1	3
	PC20. Perform various lathe operations using different tools to produce components with various features.	4	1	3
	PC21. Produce components as per required quality standards and free from burrs & sharp edges	4	1	3
	PC22. Shall achieve given production targets	4	1	3
	PC23. Shall be able to apply roughing and finishing cuts, considering the effect on tool life, surface finish and dimensional accuracy	4	1	3
	PC24. Shall be able to use coolants/ cutting fluids for different combinations of work piece and tool as per different locations	4	1	3
	PC25. Shall be able to observe and report any difficulties/ discrepancies that may arise during the machine operation and carry out the corrective actions as per instructions	4	1	3
	PC26. Correctly shutting down the machine on completion of the machining operations, removing and disposing of the chips/ waste and critical parameters different locations	4	1	3
	PC27. Use of measuring instruments/ gauges to check the critical parameters	4	1	3
	PC28. Shall be able to carry out the corrective action, in the case of deviation from the required	4	1	3

	specifications			
	PC29. Report the problem to the supervisor, if it cannot be resolved	4	1	3
	PC30. Seek guidance from the supervisor/ specialist of the problem is outside his/her area of competence	4	1	3
	Subtotal	**137.5**	**28**	**109.5**
RSC/N4202 (CPC/N7012) Perform turning and other lathe operations on metal or plastic work pieces using Computer Numerically Controlled Lathe Machines	PC1. Understand and comply with safety, environmental & other relevant regulations and guidelines	4.5	0.5	4
	PC2. Wear personal protective equipment (PPE) like safety glasses, apron, no loose cloths/ hair, safety shoes while performing lathe operations while performing CNC turning operations	4.5	0.5	4
	PC3. Ensure work area is clean and safe	4.5	0.5	4
	PC4. Ensure that machine safety guards are in place and are in correctly working condition	4.5	0.5	4
	PC5. Ensure that all tools, equipment are in a safe and usable conditions	3.5	0.5	3
	PC6. Ensure availability of job specification i.e. approved drawings, sketches, instructions from the supervisor, job instruction sheet/ job card.	3.5	0.5	3
	PC7. Read and understand the Job requirements from the job specifications and attention shall be given to the geometric tolerances	3.5	0.5	3
	PC8. Check the work piece material for the dimensions and ensure that it is free from foreign objects, dirt or other contamination and is within the required size	3.5	0.5	3
	PC9. Plan to perform the turning or other lathe operations and the sequence of operations as per required job specifications on CNC lathe machine	3.5	0.5	3
	PC10. Obtain all the appropriate tools and measuring instruments/ gauges required for the job	3.5	0.5	3
	PC11. Check the CNC lathe machine for its functioning and ensure that it is ready for operation	3.5	0.5	3
	PC12. Prepare the CNC lathe machine for the operations by mounting and setting the required work holding devices and cutting tools	3.5	0.5	3
	PC13. Clarify any doubt, if any and see necessary instruction /training on the	3.5	0.5	3

	operation of the CNC Lathe machine whenever required			
	PC14. Hold the work piece securely and correctly, without distortion	3.5	0.5	3
	PC15. Adjust the CNC Lathe machine settings as per job requirement to maintain desired accuracy	3.5	0.5	3
	PC16. Perform daily maintenance of machine according to defined checklist, at the beginning of day's shifts.	4	1	3
	PC17. Use and extract information from engineering drawings, dimensioning and tolerances	4	1	3
	PC18. Use and extract information from reference charts, tables, graphs and Engineering standards	4	1	3
	PC19. Load and unload component(s) using pre-determined fixtures or work holding devices as per work instructions	4	1	3
	PC20. Make basic program and check correctness of program through dry run and single block check	4	1	3
	PC21. Adjust and set the speed and feed of the CNC lathe machine to achieve the job specifications	4	1	3
	PC22. Operate the machine tool controls safely and correctly, in line with operational procedures.	4	1	3
	PC23. Stop the CNC lathe machine, both in normal and emergency situations correctly by following the right procedure and should be able to restart the machine after the emergency	4	1	3
	PC24. Do first part cutting trial by setting tool offsets to get oversize part	4	1	3
	PC25. Measure the critical parameters of the machined component on the machine (without removing from the machine), after the trial run	4	1	3
	PC26. Correct the offsets based on the measurements by accessing program edit facility in order to enter tooling data	4	1	3
	PC27. Measure the component after unloading to check for accuracy in the critical parameters as per job specifications	4	1	3
	PC28. Produce machined components that combine different turning operations	4	1	3

	and have a range of features			
	PC29. Follow the specified machining sequence and procedure as per job specifications	4	1	3
	PC30. Interpret in-built machine alarms and respond to the same as per operating manual or specified instructions	4	1	3
	PC31. Observe for inconsistency in dimensions due to tool wear and correct the offsets accordingly	4	1	3
	PC32. Ensure that machine settings are adjusted as and when required, either by self or the setter, to maintain the required accuracy	4	1	3
	PC33. Identify when tools need replacement and replace worn tool with new tool	4	1	3
	PC34. Produce components as per required standards	4	1	3
	PC35. Report problems and seek appropriate assistance in a timely manner	3.5	1	2.5
	PC36. Complete documentation during and post operations as per organizational procedures and applicable quality management system	3	1	2
	PC37. Return the machine and all tools and equipment to the correct location on completion of activities	2	1	1
	PC38. Leave the work area in a safe and tidy condition on completion of job activities as per 5S practices	2	1	1
	PC39. Report the problem to the supervisor, if it cannot be resolved	2	1	1
	PC40. Seek guidance from the supervisor/ specialist of the problem is outside his/her area of competence	2	1	1
	Subtotal	**147**	**32.5**	**114.5**
RSC/N4204 (CPC/N7021) Programming of Computer Numerically Controlled (CNC) Lathe Machines	PC1. comply with health and safety, environmental and other relevant regulations and guidelines at work	4	1	3
	PC2. adhere to procedures and guidelines for personal protective equipment (PPE) and other relevant safety regulations while programming CNC Lathe machines	4	1	3
	PC3. work following laid down procedures and instructions	4	1	3
	PC4. ensure that machine guards are in place and are correctly adjusted	4	1	3

	PC5. read and understand safety instructions, warning signs on the machine	4	1	3
	PC6. ensure work area is clean and safe from hazards	4	1	3
	PC7. ensure that all tools, equipment, power tool cables, extension leads are in a safe and usable condition	4	1	3
	PC8. Ensure availability of job specification i.e. approved drawings, sketches, instructions from the supervisor, job instruction sheet/ job card.	4	1	3
	PC9. read and establish job requirements from the job specification documentaccurately	4	1	3
	PC10. follow job instructions, assembly drawings and laid down procedures at all times	4	1	3
	PC11. report and rectify incorrect and inconsistent information in job specification documents as per organization procedures	4	1	3
	PC12. use and extract information from reference charts, tables, graphs and standards	4	1	3
	PC13. prepare the work area as per procedure or operational specification	4	1	3
	PC14. conduct a preliminary check of the readiness of the program so that the CNC machine operates correctly	4	1	3
	PC15. determine what operational objectives and targets need to be achieved and how best the machine needs to be programmed to achieve this	4	1	3
	PC16. extract and use information from engineering drawings and related specifications in relation to work undertaken	4	1	3
	PC17. identify tool requirements from tooling layout and assess their suitability	4	1	3
	PC18. identify suitable work holding or fixturing device as per the job requirement	4	1	3
	PC19. ensure the correct and latest part-program is uploaded onto the CNC system	4	1	3
	PC20. make CNC program with commands for tool motions, spindle motions, miscellaneous functions & tool change, in syntax corresponding to machine and control system on which	4	1	3

	the component will be machined.			
	PC21. various ways to make CNC program are by writing it on paper or in computer's text editor, or using CAM software or controllers on machine **Ways**: written, directly entered into machine controller, using computer software- CAM software	4	1	3
	PC22. ensure that part program is efficient & results in minimal cycle time, with optimal cutting parameters and no unnecessary tool motions	4	1	3
	PC23. use subprograms and canned cycles, to reduce program size and input time and avoid memory overflow on the machine	4	1	3
	PC24. transfer the program to the machine by entering it at the console or transmitting it through a wired link or through a data transfer device	4	1	3
	PC25. follow the correct procedures for calling up the program and dealing with any error messages or faults	4	1	3
	PC26. handle the typical problems that can occur with the programming, loading and editing activities effectively using approved procedures	4	1	3
	PC27. save the proven program in the appropriate storage medium – paper, computer hard disk, etc. and location	4	1	3
	PC28. complete relevant documentation as per organizational procedure	4	1	3
	PC29. leave the work area in a safe and tidy condition on completion of the activities	4	1	3
	PC30. obtain appropriate equipment or tools needed as per job requirements	4	1	3
	PC31. ensure that all measuring equipment is calibrated and approved for usage	4	1	3
	PC32. Ensure that the tools and fixtures are in usable condition (e.g. free from breakage, damage, calibration, etc.)	4	1	3
	PC33. pre-set tooling appropriately using setting jigs/ fixtures	4	1	3
	PC34. seek any necessary instruction/training on operation of the machine where required	4	1	3
	PC35. mount tools in the correct positions in the tool turret or magazine	4	1	3
	PC36. check that the tools have been	4	1	3

	mounted in positions corresponding to tool numbers in the part program			
	PC37. Mount the part on machine firmly in the specified work holding devices, with the appropriate clamping forces.	4	1	3
	PC38. Enter work offset and tool data on the machine – X and Z offsets, tool orientation and LOe radius for lathes; length offsets and tool radius for machining centers.	4	1	3
	PC39. ensure that tool data has been entered in offset number corresponding to tool offset numbers in part program	4	1	3
	PC40. deal with error messages and faults on the program or equipment	4	1	3
	PC41. cut a trial part using single block run, dry run and feed and speed override controls	4	1	3
	PC42. edit the program and adjust tool and wear offsets to correct any dimensional errors on the part	4	1	3
	PC43. ensure that trial part conforms to drawing specifications in terms of dimensions, surface finishes & geometrical parameters like concentricity, parallelism, run out, etc.	4	1	3
	PC44 correct the tool wear offsets whenever required, based on the results of the period inspection	4	1	3
	PC45. change worn out tools and indexable inserts whenever required	4	1	3
	PC46. after every change of a worn out tool or insert, cut a trial part and correct any dimensional inaccuracies by adjusting the tool offsets or wear offsets	4	1	3
	PC47. return worn out cutting tools, work holding device / fixtures / instruments / drawings to store	4	1	3
	PC48. ensure that there is no damage to the tool/fixture while doing the prove-out	4	1	3
	PC49. shut down the equipment to a safe condition on conclusion of the activities	4	1	3
	PC50. deal promptly and effectively with problems within span of responsibility and control and report those that cannot be solved	4	1	3
	Subtotal	**200**	**50**	**150**

RSC/N4101 (CPC/N0411) Maintain basic health and safety practices at the workplace, 5S	PC1. Wear protective clothing/equipment for specific tasks and work conditions	2.5	0.5	2
	PC2. Carry out safe working practices while dealing with hazards to ensure the safety of self and others.	2.5	0.5	2
	PC3. Apply good housekeeping practices at all times	2.5	0.5	2
	PC4. Use the various appropriate fire extinguishers on different types of fires correctly	2.5	0.5	2
	PC5. Demonstrate rescue techniques applied during fire hazard, demonstrate good housekeeping in order to prevent fire hazards, demonstrate the correct use of a fire extinguisher.	2.5	0.5	2
	PC6. Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals, loud noise, and Identify areas in the plant which are potentially hazardous/ unhygienic in nature. Conduct regular checks with support of the maintenance team on machine health to identify potential hazards due to wear and tear of machine.	2.5	0.5	2
	PC7. Inform the concerned authorities on the potential risks identified in the processes, workplace area/ layout, materials used etc, Inform the concerned authorities about machine breakdowns, damages which can potentially harm man/ machine during operations.	2.5	0.5	2
	PC8. Create awareness amongst other by sharing information on the identified risks.	2.5	0.5	2
	PC9. Follow the sorting process and check that the tools, fixtures & jigs that are lying on workstations are the ones in use and un- necessary items are not cluttering the workbenches or work surfaces.	2.5	0.5	2
	PC10. Ensure segregation of waste in hazardous/ non Hazardous waste as per the sorting work instructions	2.5	0.5	2
	PC11. Follow the technique of waste disposal and waste storage in the proper bins as per SOP	1.5	0.5	1
	PC12. Segregate the items which are labeled as red tag items for the process area and keep them in the correct places	1.5	0.5	1

	PC13. Sort the tools/ equipment/ fasteners/ spare parts as per specifications/ utility into proper trays, cabinets, lockers as mentioned in the 5S guidelines/ work instructions	1.5	0.5	1
	PC14. Ensure that areas of material storage areas are not overflowing PC15. Properly stack the various types of boxes and containers as per the size/ utility to avoid any fall of items/ breakage and also enable easy sorting when required	1.5	0.5	1
	PC16. Return the extra material and tools to the designated sections and make sure that no additional material/ tool is lying near the work area	1.5	0.5	1
	PC17. Follow the floor markings/ area markings used for demarcating the various sections in the plant as per the prescribed instructions and standards.	1.5	0.5	1
	PC18. Follow the proper labelling mechanism of instruments/ boxes/ containers and maintaining reference files/ documents with the codes and the lists	1.5	0.5	1
	PC19. Check that the items in the respective areas have been identified as broken or damaged	1.5	0.5	1
	PC20. Follow the given instructions and check for levelling of fluids, oils, lubricants, solvents, chemicals etc. and proper storage of the same To avoid spillage, leakage, fire etc.	1.5	0.5	1
	PC21. Make sure that all material and tools are stored in the designated places and in the manner indicated in the 5S instructions.	1.5	0.5	1
	Subtotal	**40**	**10**	**30**
RSC/N4203 (CPC/N7014) Effective working with others	PC1. Display appropriate communication etiquette while working.	2	1	1
	PC2. Display active listening skills while interacting with others at work	2	1	1
	PC3. Demonstrate responsible and disciplined behaviours at the workplace	2	1	1
	PC4. Accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required	1.5	0.5	1
	PC5. Accurately pass on information to	1.5	0.5	1

	authorized persons who require it and within agreed timescale and confirm its receipt			
	PC6. Display helpful behaviour by assisting others in performing tasks in a positive manner, where required and possible	1.5	0.5	1
	PC7. Consult with and assist others to maximize effectiveness and efficiency in carrying out tasks	1.5	0.5	1
	PC8. Escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict.	1.5	0.5	1
	Subtotal	**13.5**	**5.5**	**8**
RSC/N4504 (CPC/N0219) Basics of computer and data entry in MS Office/Office open source suite Software	PC1. Fill and process mandated forms for receiving, processing, or tracking data, enter data from source documents in to Computer application having MS OFFICE software	4	2	2
	PC2. Verify data entered with source documents, checks for compliance and corrects all typographical errors and missing or repeated data.	4	2	2
	PC3. Maintain files of source documents or other information related to data entered.	4	3	1
	PC4. Update database information to reflect most current source information	4	3	1
	PC5. Assist in the filing and storage of security and back up data files	4	3	1
	PC6. Respond to requests for information and access relevant files	2	1	1
	Subtotal	**22**	**14**	**8**
RSC/N4108 (CPC/N0418) Basic Knowledge of Communicatio n/ soft skills	PC1. Accurately receive information and instructions from the supervisor/operator and fellow workers, getting clarification where required PC2. Accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt	8	2	6
	PC3. Display helpful behaviour by assisting others in performing tasks in a positive manner, where required and possible	4	1	3
	PC4. Basic Knowledge of consult with and assist others to maximize effectiveness and efficiency in carrying out tasks.	4	1	3

	PC5. Basic Study of Fundamental of Computers.	4	1	3
	PC6. Components of Computer: - Hardware and the software	4	1	3
	PC7. Display active listening skills while interacting with others at work	4	1	3
	PC8. Use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism	4	1	3
	PC9. Demonstrate responsible and disciplined behaviours at the workplace	4	1	3
	PC10. Escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict.	4	1	3
	Subtotal	**40**	**10**	**30**
	Total	**600**	**150**	**450**