RSDC
RUBBER SKILL DEVELOPMENT COUNCIL

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

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National
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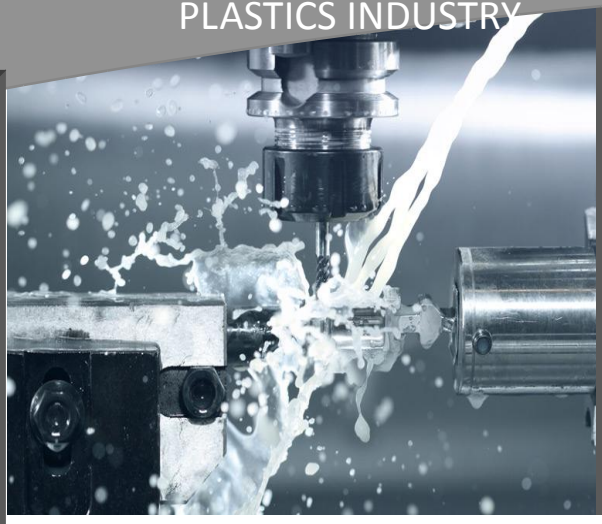
Transforming the skill landscape

QUALIFICATIONS PACK- OCCUPATIONAL STANDARDS FOR PLASTICS INDUSTRY



Contents

What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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Introduction

Qualifications Pack- Machine Operator & Programmer – Plastic CNC Milling

SECTOR: RUBBER

SUB SECTOR: PLASTICS PROCESSING

OCCUPATION: CNC MILLING

REFERENCE ID: RSC/Q4302 **(**CPC/Q7104)

ALIGNED TO:

Brief Job Description:
To prepare the program for machining using manual data input or by using appropriate software and saving the prepared program on the machine controller from the computer. It involves removal of material by machining as per the program and involves periodical measuring of the components and continuously monitoring of the machining operations and taking corrective actions in order to ensure that the component is made to the desired quality and tolerance as per drawing.

Personal Attributes:
The individual shall have an ability to work long hours, shall have basic communication, capability to understand engineering drawings and simple computations. Sensitivity towards safety for self and equipment.

Qualifications Pack for Machine Operator & Programmer – Plastic CNC Milling

Job Details

Qualifications Pack Code	**RSC/Q4302 (CPC/Q 7104)**		
Job Role	**Machine Operator & Programmer –Plastic CNC Milling**		
Credits (NSQF)	**48**	**Version number**	**1.0**
Sector	**Rubber**	**Drafted on**	**18/05/2016**
Sub Sector	**Plastics Processing**	**Last reviewed on**	**26/12/2016**
Occupation	**CNC Milling**	**Next review date**	**31/12/2021**
NSQC Clearance on	**21/07/2016**		

Job Role	**Machine Operator & Programmer – Plastic CNC Milling**
Role Description	To prepare the program for machining using manual data input or by using appropriate software and saving the prepared program on the machine controller from the computer. It involves removal of material by machining as per the program and involves periodical measuring of the components and continuously monitoring of the machining operations and taking corrective actions in order to ensure that the component is made to the desired quality and tolerance as per drawing.
NSQF level	4
Minimum Educational Qualifications*	10th Standard
Maximum Educational Qualifications*	N.A.
Training (Suggested but not mandatory)	No previous training required
Minimum Job Entry Age	18 Years
Experience	No previous experience required
Applicable National Occupational Standards (NOS)	**Compulsory:** 1. RSC/N4301 (CPC/ N7111) (Perform machining operations on metal or plastic material using Conventional Milling machine) 2. RSC/N4302 (CPC/ N7112) (Perform machining operations on metal or plastic workpieces using Computer Numerically Controlled Milling machines) 3. RSC/N4303 (CPC/N 7121) (Programming of Computer Numerically Controlled (CNC) Milling Machines) 4. RSC/N4101 (CPC/N0411) (Maintain basic health and safety practices at the Workplace,5S) 5. RSC/N4203 (CPC/N7014) Effective working with others 6. RSC/N4504 (CPC/N0219) (Basics of computer and data entry in MS OFFICE/office open source software.) 7. RSC/N4108 (CPC/N0418) (Basic knowledge of communication/ Soft Skills) **Optional:** N.A.
Performance Criteria	As described in the relevant OS units

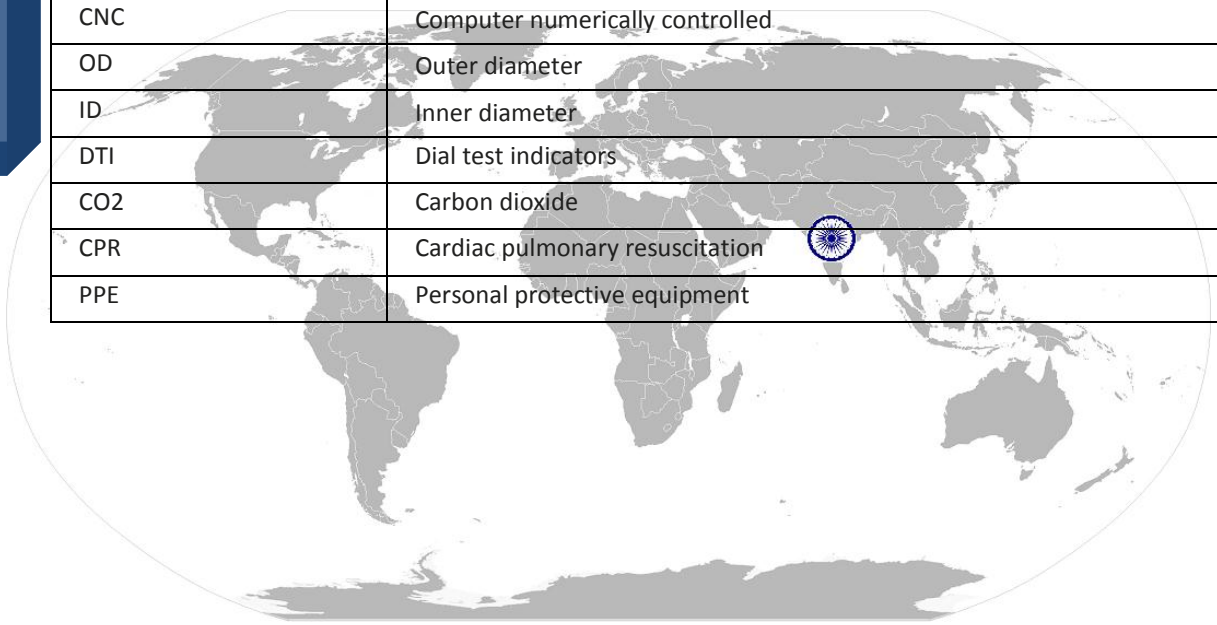
Definitions

Keywords /Terms	Description
Core Skills/Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of OS.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Occupational Standards (OS)	OS are Occupational Standards which apply uniquely in the Indian context
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
Qualifications Pack(QP)	Qualifications Pack comprises the set of NOS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Scope	Scope is the set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on the quality of performance required.
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-Sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Sub-functions	Sub-functions are sub-activities essential to fulfil the achieving the objectives of the function.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to

	accomplish specific designated responsibilities.
Unit Code	Unit Code is a unique identifier for a OS unit, which can be denoted with an '**N**'
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Vertical	Vertical may exist within a sub-sector representing different domain areas or the client industries served by the industry.

Acronyms

Keywords /Terms	Description
OS	Occupational Standard(s)
NVEQF	National Vocational Education Qualifications Framework
NVQF	National Vocational Qualifications Framework
NSQF	National Skills Qualifications Framework
OEM	Original Equipment Manufacturer
OS	Occupational Standard(s)
QP	Qualifications Pack
CNC	Computer numerically controlled
OD	Outer diameter
ID	Inner diameter
DTI	Dial test indicators
CO2	Carbon dioxide
CPR	Cardiac pulmonary resuscitation
PPE	Personal protective equipment



National Occupational Standards

Overview

This unit covers the operation of conventional milling machines, in order to perform machining operations on metal or plastic work pieces as per specifications provided.

RSC/N4301 (CPC/ N7111) Perform machining operations on metal or plastic material using Conventional Milling Machine

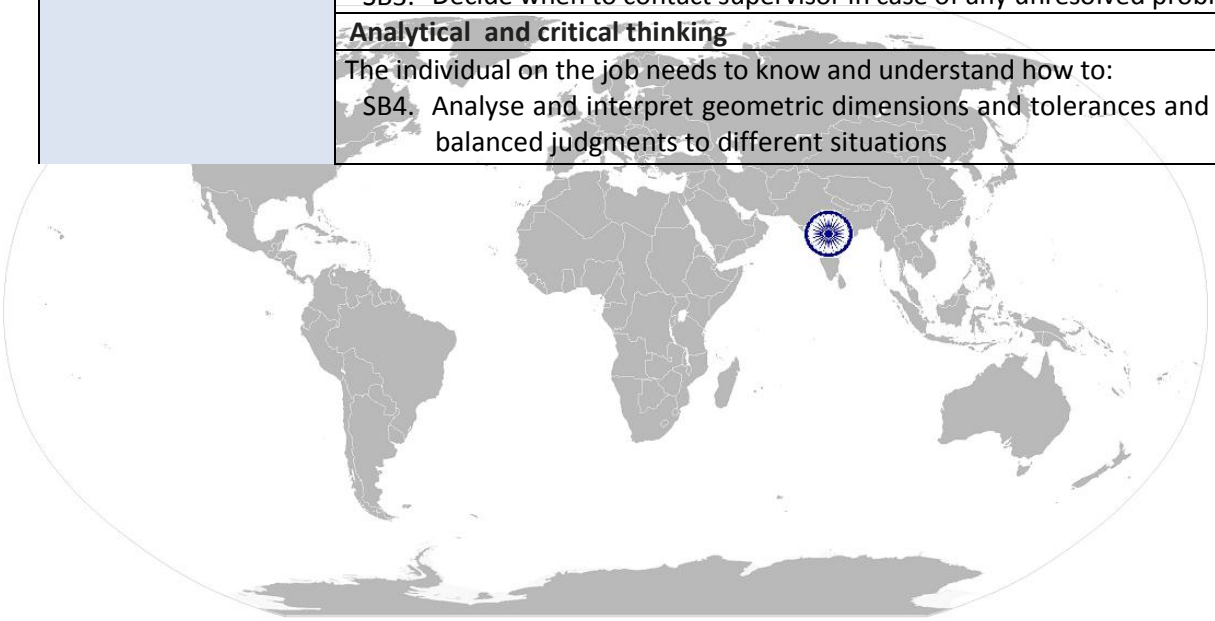
National Occupational Standard

Unit Code	**RSC/N4301 (CPC/N7111)**
Unit Title	**Perform machining operations on metal or plastic material using Conventional Milling machine**
Description	This unit covers performing milling operations such as Plain Milling, Face Milling, Side Milling, Angular Milling, Profile Milling, End Milling etc.
Scope	This unit covers the following: • Understanding the working principle & construction of milling machine • Working safely • Carrying out operations on conventional milling machine • Measuring and checking the work piece as per specification
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Working safely	The individual on the job should be able to: PC1. Comply with safety, environmental & other relevant regulations and guidelines PC2. Wear personal protective equipment (ppe) like safety glasses, apron, no loose cloths/ hair, safety shoes while performing milling operations PC3. Ensure work area is clean and safe PC4. Ensure that machine safety guards are in place and are in correctly working condition PC5. Ensure that all tools, equipments are in a safe and usable conditions
Prerequisite for operating Conventional milling machine	PC6. Ensure availability of job specification i.e. Approved drawings, sketches, instructions from the supervisor, job instruction sheet/ job card. PC7. Read and understand the Job requirements from the job specifications and attention shall be given to the geometric tolerances 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 PC9. Plan to perform the machining operations and the sequence of operations as per required job specifications on milling machine PC10. Obtain all the appropriate tools and measuring instruments/ gauges required for the job PC11. Check the milling machine for its functioning and ensure that it is ready for operation PC12. Prepare the milling machine for the operations by mounting and setting the required work holding devices, tool holding devices and cutting tools PC13. Clarify any doubt, if any and see necessary instruction /training on the operation of the machine whenever required PC14. Hold the work piece securely and correctly, without distortion PC15. Adjust the machine settings as per job requirement to maintain desired accuracy

	PC16. Adjust and set the speed and feed of the milling machine to achieve the job specifications PC17. Operate the machine tool controls safely and correctly, in line with operational procedures both in manual and power modes. PC18. Stop the milling machine, both in normal and emergency situations correctly by following the right procedure and should be able to restart the machine after and emergency PC19. Use the milling machine accessories and attachments such as Universal Milling attachment, Slotting attachment, Circular milling attachment, dividing head etc. PC20. Perform various milling operations using different tools to produce components with various features. PC21. Produce components as per required quality standards and free from burrs & sharp edges PC22. Achieve given production targets PC23. Apply roughing and finishing cuts, considering the effect on tool life, surface finish and dimensional accuracy PC24. Use coolants/ cutting fluids for different combinations of work piece and tool as per different locations PC25. Observe and report any difficulties/ discrepancies that may arise during the machine operation and carry out the corrective actions as per instructions PC26. Shut down the machine on completion of the machining operations, removing and disposing of the chips / waste and critical parameters different locations PC27. Use the measuring instruments/ gauges to check the critical parameters PC28. Carry out the corrective action, in the case of deviation from the required specifications
Seeking Guidance for unresolved Problems	PC29. Report the problem to the supervisor, if it cannot be resolved. PC30. Seek guidance from the supervisor/ specialist of the problem is outside his/her area of competence
Knowledge and Understanding (K)	
A. Organization	The individual on the job needs to know and understand: KA1. General policies, procedures rules and regulations followed in the company KA2. Employment terms & conditions, entitlements, job role and responsibilities KA3. Do's and Don'ts to be followed in the company KA4. Reporting structure, inter-dependent functions, lines and procedures in the work area KA5. Relevant people and their responsibilities within the work area KA6. Work related procedures and documentation and their importance

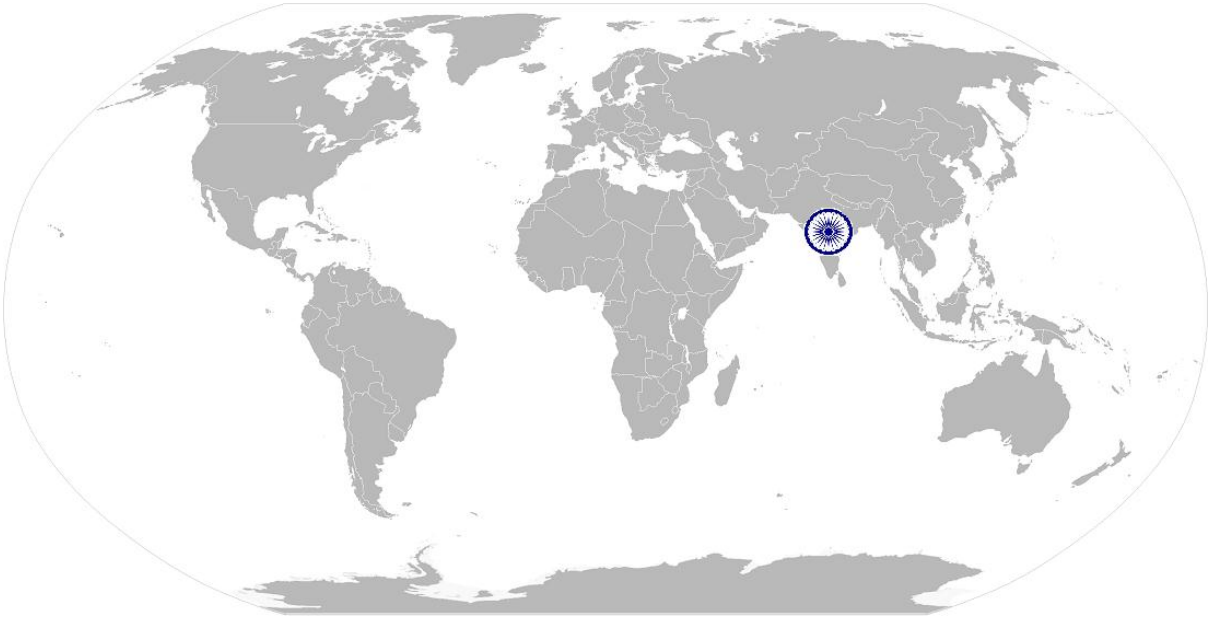
	KA7. Quality management related documentation, if any and their importance
B. Technical Knowledge	The individual on the job needs to know and understand: KB1. Working principle and construction of the conventional milling machine KB2. Start, stop, emergency buttons and machine controls KB3. Safety mechanisms on the machine, safety guards and procedure to check their functionality KB4. Hazards associated with the milling operations and safety to be observed KB5. Meaning and purpose of machining operations on milling machine KB6. Understanding and use of the metric system of measurements KB7. Concept of engineering drawing, isometric and orthographic projection, sectional views, auxiliary views, dimensioning KB8. Understanding the geometric tolerances, Hole and shaft basis of ISO tolerance, straightness, flatness, circularity, ovality, surface finish and their symbols. KB9. The types of tools for various milling machine operations Plain Milling, Face Milling, Side Milling, Angular Milling, Profile Milling, End Milling etc. KB10. The types of tool materials- classification, properties and their application KB11. The cutting parameters and their selection i.e. Cutting speed, feed, depth of cut and their effect on tool life and surface finish KB12. The types of coolants/ cutting fluids, classification, application and effect on ton life and surface finish KB13. The milling machine accessories, attachments and their uses KB14. The types of various work holding & tool holding devices and their application KB15. Error messages on machine and taking appropriate corrective action KB16. Importance of securing the work-piece/raw material correctly using appropriate devices and mechanisms KB17. The quality of machined components against the specified quality standards
Skills (s) [optional]	
A. Core Skills/ Generic Skills	**Communication** The individual on the job needs to know and understand how to: SA1. Read and interpret correctly the job specifications from drawing/ job card, manuals, safety instructions etc. In English and/ or local language SA2. Able to fill up the required formats/ documents in English and / or local language SA3. Interact and communicate with supervisor or other company personnel as per requirement

	Numerical and computational skills
	The individual on the job needs to know and understand how to: SA4. Perform simple numerical computation such as addition, subtraction, multiplication, division, fractions and decimal, percentages and proportions, simple ratios and average SA5. Check and clarify task-related information
B. Professional Skills	**Plan and Organize**
	The individual on the job needs to know and understand how to: SB1. Plan, prioritize and sequence work operations as per job requirements SB2. Detect out of tolerance limit of component or any malfunctioning of the machine and take corrective action
	Decision making
	The individual on the job needs to know and understand how to: SB3. Decide when to contact supervisor in case of any unresolved problems
	Analytical and critical thinking
	The individual on the job needs to know and understand how to: SB4. Analyse and interpret geometric dimensions and tolerances and apply balanced judgments to different situations



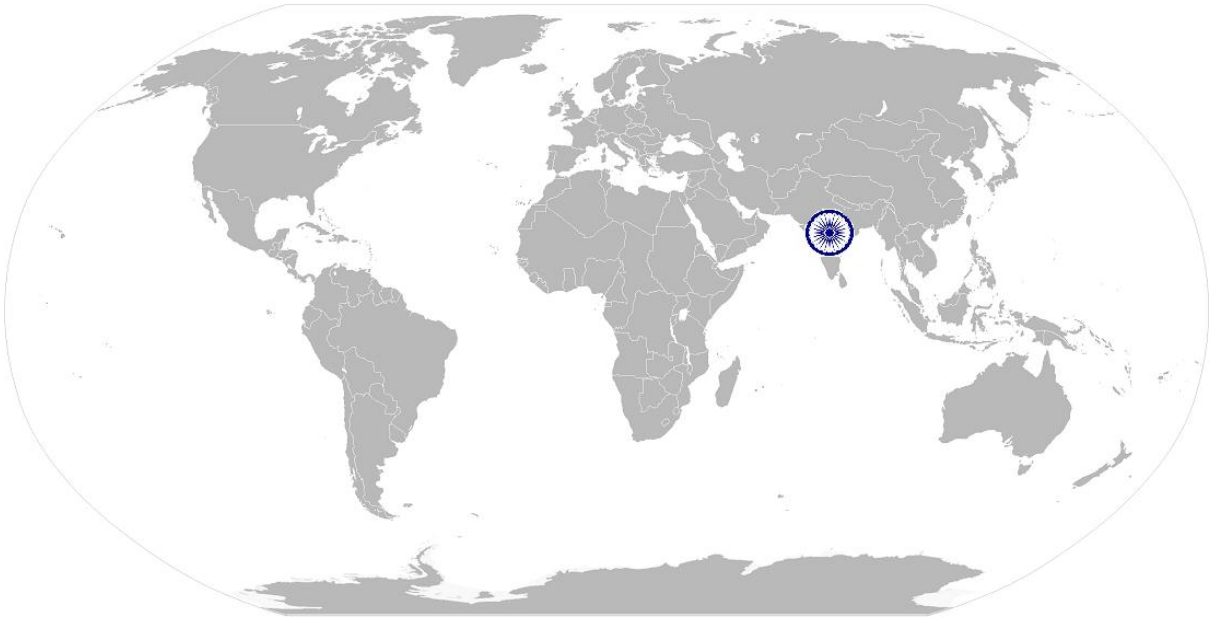
NOS Version Control

NOS Code	**RSC/N4301 (CPC/ N7111)**		
Job Role	**Machine Operator & Programmer – Plastic CNC Milling**		
Credits(NSQF)	**9.6**	**Version number**	**1.0**
Sector	**Rubber**	**Drafted on**	**18/05/2016**
Sub Sector	**Plastics Processing**	**Last reviewed on**	**26/12/2016**
Occupation	**CNC Milling**	**Next review date**	**31/12/2021**



RSC/N4302 (CPC/ N7112) Perform machining operations on metal or plastic work pieces using Computer Numerically Controlled Milling machines

National Occupational Standards



Overview

This unit covers the operation of Computer Numerically Controlled milling machine, in order to perform machining operations on metal or plastic components, as per specifications provided. It includes machine setting and basic programming.

RSC/N4302 (CPC/ N7112) Perform machining operations on metal or plastic work pieces using Computer Numerically Controlled Milling machines

National Occupational Standards

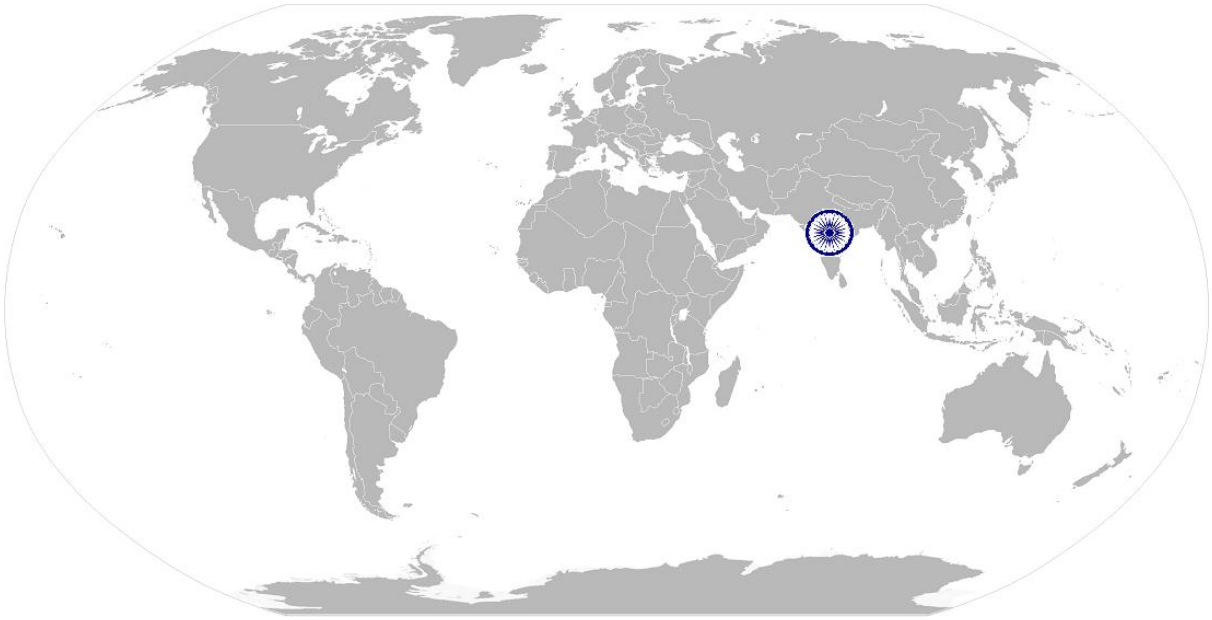
Unit Code	RSC/N4302 (CPC/N7112)
Unit Title (Task)	**Perform machining operations on metal or plastic work pieces using Computer Numerically Controlled Milling machines**
Description	This unit covers the operation of Computer Numerically Controlled (CNC) milling machine in order to perform machining operations on metal and plastic components, as per specifications provided. This involves removal of material by machining from the work-piece.
Scope	This unit/task covers the following: • Understanding the working principle of CNC milling machine • Working safely • Carry out machining operations using CNC milling machine • Measuring and checking the work piece as per specifications
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Working safely	The individual on the job should be able to: PC1. Comply with safety, environmental & other relevant regulations and guidelines PC2. Wear personal protective equipment (PPE) like safety glasses, apron, no loose cloths/hair, safety shoes while performing milling operations PC3. Ensure work area is clean and safe PC4. Ensure that machine safety guards are in place and are in correctly working condition PC5. Ensure that all tools, equipments are in a safe and usable conditions
Prerequisite for operating CNC milling machine	PC6. Ensure availability - job specification i.e. Approved drawing, sketches, instructions from supervisor, job instruction sheet/ job card. PC7. Read the Job requirements from the job specifications & attention shall be given to the geometric tolerances 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 PC9. Plan to perform machining operations & sequence of operations as per required job specifications on CNC milling machine PC10. Obtain all the appropriate tools and measuring instruments/ gauges required for the job PC11. Check the CNC milling machine for its functioning and ensure that it is ready for operation PC12. Prepare CNC milling M/c for operations by mounting and setting the required work holding & tool holder devices and cutting tools PC13. Clarify any doubt, if any and see necessary instruction /training on the operation of the CNC milling machine whenever required PC14. Hold the work piece securely and correctly, without distortion PC15. Adjust the CNC milling machine settings as per job requirement to

	maintain desired accuracy PC16. Perform daily maintenance of machine according to defined checklist, at the beginning of day's shifts.
Performing Operations on CNC milling machine	PC17. Extract information from engineering drawings, dimensioning and tolerances PC18. Extract information from reference charts, tables, graphs and Engineering standards PC19. Load and unload component(s) using pre-determined fixtures or work holding devices as per work instructions PC20. Make basic program and check correctness of program through dry run and single block check PC21. Adjust and set the speed and feed of the CNC milling machine to achieve the job specifications PC22. Operate the machine tool controls safely and correctly, in line with operational procedures. PC23. Stop the CNC milling machine, both in normal and emergency situations correctly by following the right procedure and should be able to restart the machine after the emergency PC24. Do first part cutting trial by setting tool offsets to get oversize part PC25. Measure the critical parameters of the machined component on machine (without removing from the machine), after the trial run PC26. Correct the offsets based on the measurements by accessing program edit facility in order to enter tooling data PC27. Measure the component after unloading to check for accuracy in the critical parameters as per job specifications PC28. Produce machined components that combine different machining operations and have a range of features PC29. Follow the specified machining sequence and procedure as per job Specifications PC30. Interpret in-built machine alarms and respond to the same as per operating manual or specified instructions PC31. Observe for inconsistency in dimensions due to tool wear and correct the offsets accordingly PC32. Ensure that machine settings are adjusted as and when required, either by self or the setter, to maintain the required accuracy PC33. Identify when tools need replacement and replace worn tool with new tool PC34. Produce components as per required standards PC35. Report problems and seek appropriate assistance in a timely manner PC36. Complete documentation during & post operations as per organizational procedures & applicable quality Mgt system PC37. Return the machine and all tools and equipment to the correct location on completion of activities

	PC38. Leave the work area in a safe and tidy condition on completion of job activities as per 5S practices
Seeking Guidance for unresolved Problems	PC39. Report the problem to the supervisor, if it cannot be resolved. PC40. Seek guidance from the supervisor/ specialist of the problem is outside his/her area of competence
Knowledge and Understanding (K)	
A. Organization	The individual on the job needs to know and understand: KA1. General policies, procedures rules and regulations followed in the company KA2. Employment terms & conditions, entitlements, job role and responsibilities KA3. Do's and Don'ts to be followed in the company KA4. Reporting structure, inter-dependent functions, lines and procedures in the work area KA5. Relevant people and their responsibilities within the work area KA6. Work related procedures and documentation and their importance KA7. Quality management related documentation, if any and their importance
B. Technical Knowledge	The individual on the job needs to know and understand: KB1. Working principle and construction of the CNC milling machine KB2. Start, stop, emergency buttons & machine controls of CNC milling machine KB3. Safety mechanisms on the machine, safety guards and procedure to check their functionality KB4. Hazards associated with the CNC milling operations and safety to be observed KB5. The use of the metric system of measurements KB6. Absolute and incremental systems of tool positioning and offsetting KB7. Machine zero, work piece zero, work offsets, tool offsets KB8. Tool radius compensation- its necessity and effects of not using it KB9. Types and sources of appropriate job specifications KB10. Basic programming, canned cycles, G & M codes in CNC milling KB11. Tools & equipment used for machining operations on CNC M/Cs KB12. Various CNC milling operations that can be performed, and the methods and equipment used KB13. Correct techniques and procedures to carry out specific machining operations on a CNC milling KB14. Understanding error messages on machine and taking appropriate corrective action KB15. Importance of securing the work-piece/raw material correctly using appropriate devices and mechanisms and setting the work-holding device in relationship to the machine axis and reference points

	KB16. Common problems that can occur in CNC milling operations and their implications & correct procedures to address problems commonly encountered during CNC milling operations KB17. The quality of machined components against the specified quality standards KB18. Use of HSS, Tungsten carbide, Ceramic and Diamond indexible tips, and factors which determine their selection and use KB19. Use of various work holding devices KB20. Importance of conducting cutting trial, methods of trial – dry run, single block checks, cutting with offset adjustment to get oversize part KB21. Parameters to be checked before operating in auto mode – dimensions, surface finishes KB22. Importance of periodic maintenance checks for the machine and what are the common maintenance checks KB23. Selection of cutting tools, tool materials, chip breaker geometry, selecting cutting parameters from tool catalogues, selecting coolant KB24. Extent of their own authority and to whom they should report if they have problems that they cannot resolve
Skills (s) [optional]	
A. Core Skills/ Generic Skills	**Communication**
	The individual on the job needs to know and understand how to: SA1. Read and interpret correctly the job specifications from growing/ job card, manuals, safety instructions etc. In English and/ or local language SA2. Able to fill up the required formats/ documents in English and / or local language SA3. Interact and communicate with supervisor or other company personnel as per requirement
	Numerical and computational skills
	The individual on the job needs to know and understand how to: SA4. Shall be able to use simple numerical computation such as addition, subtraction, multiplication, division, fractions and decimal, percentages and proportions, simple ratios and average SA5. Check and clarify task-related information
B. Professional Skills	**Plan and Organize**
	The individual on the job needs to know and understand how to: SB1. Plan, prioritize and sequence work operations as per job requirements SB2. Shall be able to detect out of tolerance limit of component or any malfunctioning of the machine and take corrective action
	Decision making
	The individual on the job needs to know and understand how to: SB3. Decide when to contact supervisor in case of any unresolved problems

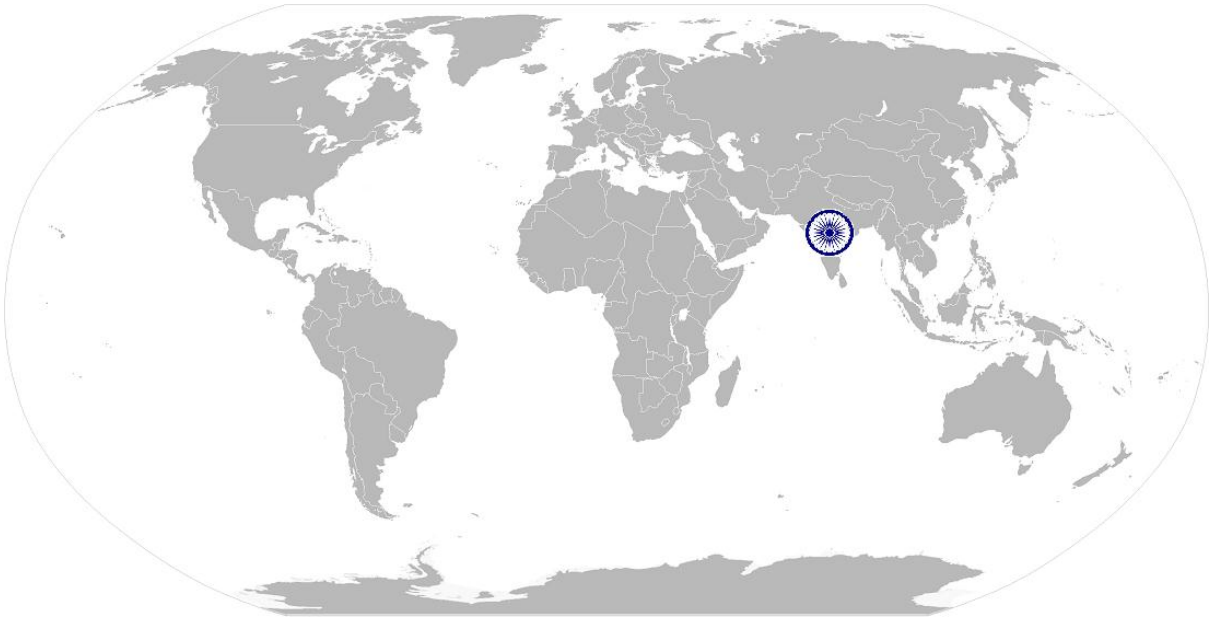
	Analytical and critical thinking
	The individual on the job needs to know and understand how to: SB4. Analyse and interpret geometric dimensions and tolerance and apply balanced judgments to different instructions



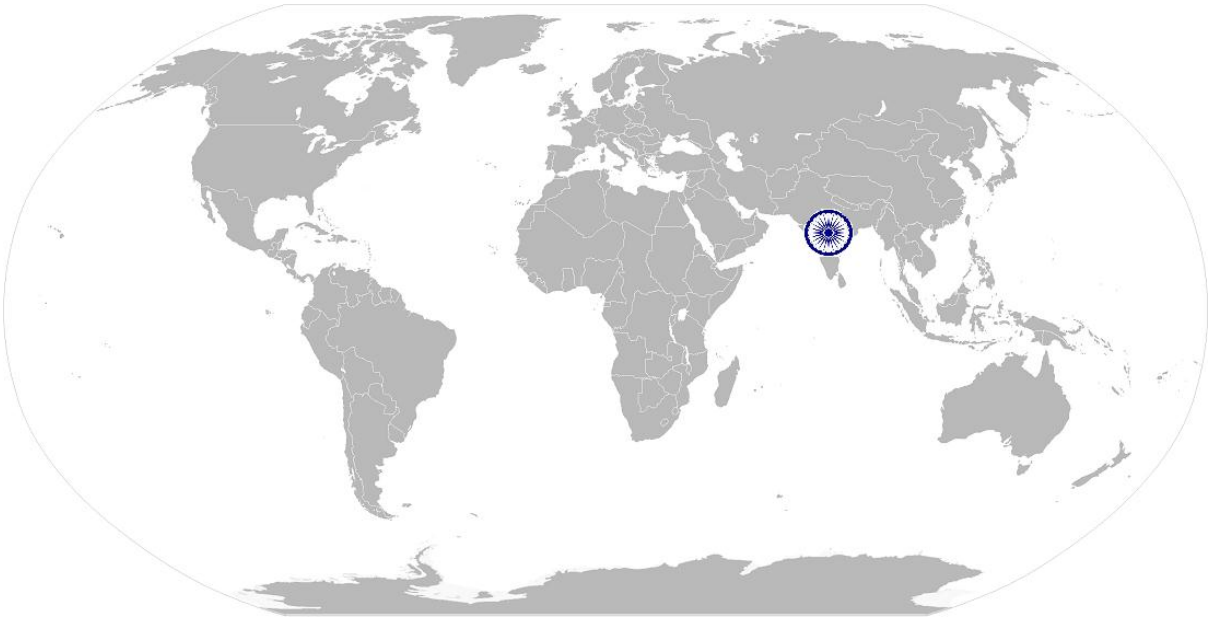
RSC/N4302 (CPC/ N7112) Perform machining operations on metal or plastic work pieces using Computer Numerically Controlled Milling machines

NOS Version Control

NOS Code	**RSC/N4302 (CPC/ N7112)**		
Job Role	**Machine Operator & Programmer – Plastic CNC Milling**		
Credits(NSQF)	**9.0**	**Version number**	**1.0**
Sector	**Rubber**	**Drafted on**	**18/05/2016**
Sub Sector	**Plastics Processing**	**Last reviewed on**	**26/12/2016**
Occupation	**CNC Milling**	**Next review date**	**31/12/2021**



National Occupational Standards



Overview

This unit covers how to prepare, load and prove the machine tool programs for computer numerically controlled (CNC) Milling machines using manual data input /appropriate software, as per approved procedures.

RSC/N4303 (CPC/N 7121) Programming of Computer Numerically Controlled (CNC) Milling Machines

National Occupational Standards

Unit Code	**RSC/N4303 (CPC/N 7121)**
Unit Title (Task)	**Programming of Computer Numerically Controlled (CNC) Milling Machines**
Description	This unit covers making programs for Computer Numerically Controlled (CNC) Milling machines/ machining centers. Programming can be done manually or using appropriate CAM software. The program is transferred to the machine's controller by entering it at the console, transmitting it through a wired link, or copying it through a data storage device. The candidate will be expected to perform safe operations with a minimum of supervision, taking personal responsibility for one's own actions and for the quality and accuracy of the work produced.
Scope	This unit/ task covers the following: • Working safely • Preparing for programming CNC milling machine for production • Carrying out programming for CNC milling machine • Test and prove the program on the CNC milling Machine
Performance criteria (PC) w.r.t. the Scope	
Element	**Performance criteria**
Working safely	The user/individual on the job should be able to: PC1. Comply with health and safety, environmental and other relevant regulations and guidelines at work PC2. Adhere to procedures and guidelines for personal protective equipment (PPE)and other relevant safety regulations while programming CNC milling machines PC3. Work following laid down procedures and instructions PC4. Ensure that machine guards are in place and are correctly adjusted PC5. Read and understand safety instructions, warning signs on the machine PC6. Ensure work area is clean and safe from hazards PC7. Ensure that all tools, equipment, power tool cables, extension leads are in a safe and usable condition
Preparing for programming CNC Milling machine for production	The user/individual on the job should be able to: PC8. Ensure availability of job specification i.e. approved drawings, sketches, instructions from the supervisor, job instruction sheet/ job card. PC9. Read and establish job requirements from the job specification document accurately PC10. Follow job instructions, assembly drawings and laid down procedures at all times PC11. Report and rectify incorrect and inconsistent information in job

	specification documents as per organization procedures PC12. Use and extract information from reference charts, tables, graphs and standards PC13. Prepare the work area as per procedure or operational specification PC14. Conduct a preliminary check of the readiness of the program so that the CNC machine operates correctly PC15. Determine what operational objectives and targets need to be achieved and how best the machine needs to be programmed to achieve this **CNC programming operations**: preparing, loading, storing in appropriate format, proving the part program, trial runs PC16. Extract and use information from engineering drawings and related specifications in relation to work undertaken PC17. Identify tool requirements from tooling layout and assess their suitability PC18. Identify suitable workholding or fixturing device as per the job requirement PC19. Ensure the correct and latest part-program is uploaded onto the CNC system
Carrying out programming for CNC Milling machine	The user/individual on the job should be able to: PC20. Make the CNC program with commands for tool motions, spindle motions, miscellaneous functions and tool change, in syntax corresponding to the machine and control system on which the component will be machined. PC21. Make CNC program by writing it on paper or in a computer's text editor, or using CAM software or controllers on machine **Ways**: written, directly entered into the machine controller, using computer software- CAM software PC22. Ensure that the part program is efficient and results in minimal cycle time, with optimal cutting parameters and no unnecessary tool motions PC23. Use subprograms and canned cycles, to reduce program size and input time and avoid memory overflow on the machine 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 PC25. Follow the correct procedures for calling up the program and dealing with any error messages or faults PC26. Handle the typical problems that can occur with the programming, loading and editing activities effectively using approved procedures PC27. Save the proven program in the appropriate storage medium – paper, computer hard disk, etc. - and location PC28. Complete relevant documentation as per organizational procedure PC29. Leave the work area in a safe and tidy condition on completion of

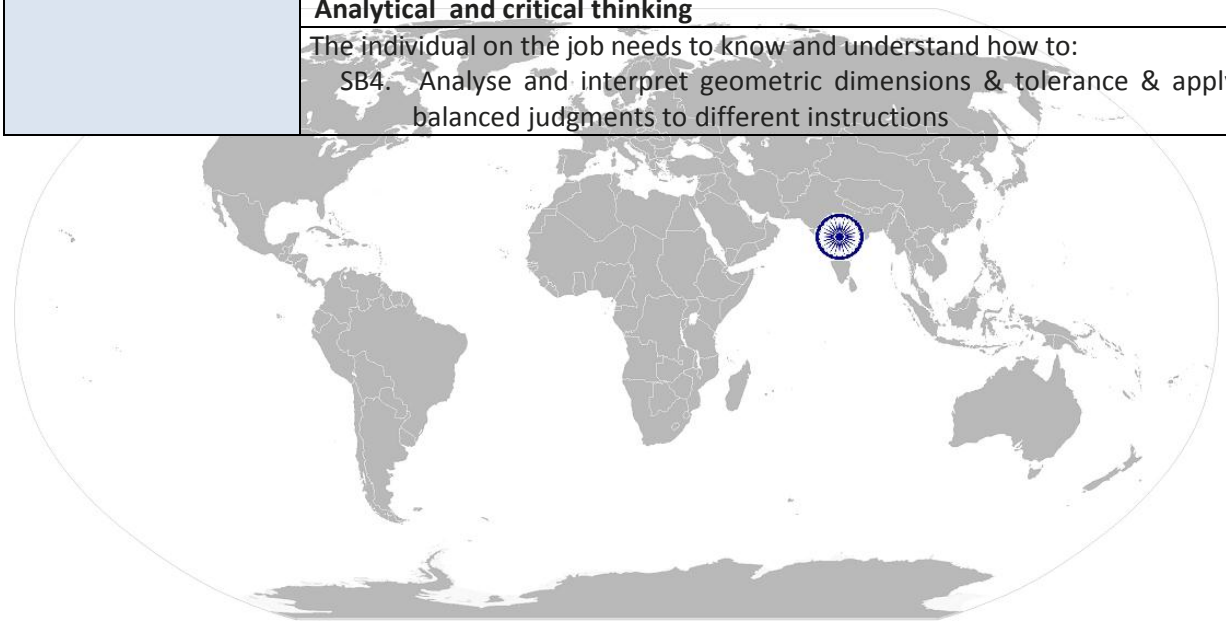
	the activities
Test and prove the program on the CNC Milling Machine	The user/individual on the job should be able to: PC30. Obtain appropriate equipment or tools needed as per job requirements PC31. Ensure that all measuring equipment is calibrated and approved for usage PC32. Ensure that the tools and fixtures are in usable condition(eg. Free from breakage, damage, calibration, etc.) PC33. Pre-set the tooling appropriately using setting jigs/fixtures PC34. Seek any necessary instruction/training on the operation of the machine where required PC35. Mount tools in the correct positions in the tool turret or magazine PC36. Check that the tools have been 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. 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. PC39. Ensure that tool data has been entered in offset number corresponding to the tool offset numbers in the part program PC40. Deal with error messages and faults on the program or equipment PC41. Cut a trial part using single block run, dry run and feed and speed override controls PC42. Edit the program and adjust tool and wear offsets to correct any dimensional errors on the part PC43. Ensure that the trial part conforms to drawing specifications in terms of dimensions, surface finishes and geometrical parameters like concentricity, parallelism, runout, etc. PC44 Correct the tool wear offsets whenever required, based on the results of the period inspection PC45. Change worn out tools and indexable inserts whenever required PC46. change of a worn out tool or insert after every, cut a trial part and correct any dimensional inaccuracies by adjusting the tool offsets or wear offsets PC47. Return worn out cutting tools, workholding device / fixtures / instruments / drawings to store PC48. Ensure that there is no damage to the tool/fixture while doing the prove-out PC49. Shut down the equipment to a safe condition on conclusion of the activities PC50. Deal promptly and effectively with problems within span of responsibility and control and report those that cannot be solved

RSC/N4303 (CPC/N 7121) Programming of Computer Numerically Controlled (CNC) Milling Machines

Knowledge and Understanding (K)	
A. Organization	The individual on the job needs to know and understand: KA1. General policies, procedures rules and regulations followed in the company KA2. Employment terms & conditions, entitlements, job role and responsibilities KA3. Do's and Don'ts to be followed in the company KA4. reporting structure, inter-dependent functions, lines and procedures in the work area KA5. Relevant people and their responsibilities within the work area KA6. Work related procedures and documentation & their importance KA7. Quality management related documentation, if any & their importance
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. Specific safe working practices, cnc programming procedures and environmental regulations that must be observed KB2. Hazards associated with carrying out the machining operations on a cnc machine and how can they be minimized KB3. Personal protective equipment to be used during the machining activities on a CNC machine and where can it be obtained KB4. Safety mechanism on the machine and how to check if they are functioning properly KB5. Types and sources of appropriate job specifications KB6. Common terminology used in CNC programming features of produced CNC program KB7. Selection of strategies based on material and fixturing, holding and clamping force KB8. The factors which will determine selection and use of tungsten carbide and tips **Factors**: hardness of the component material; machinability characteristics of the material; tolerances to be achieved; surface finish to be achieved; geometrical accuracies like ovality, straightness and flatness to be achieved; rigidity of work holding KB9. Importance of tool selection based on material, finish required and tolerances achieved KB10. Importance of cutter engagement and exit KB11. The factors affecting tool life and importance and effect of the depth of cut, RPM and feed KB12. Interpretation of first and third angle component drawings KB13. Engineering drawings or data and related specifications KB14. The function keys and user interface of the machine control system KB15. Determination and entry of work and tool offsets, tool wear data KB16. Main features and working parts of the CNC machine, and the

	accessories that can be used KB17. Importance of following specified machining sequences and procedures KB18. Importance and procedures to ensure that tools and equipment are in a safe and usable condition KB19. Various CNC operations that can be performed, and the methods and equipment used KB20. Methods of setting the work-holding devices, and the tools and equipment that can be used KB21. Various tool holding devices that are used, and the methods of correctly mounting and securing the cutting tools to the tool holders KB22. To set the machine controller in the program and editing mode, and enter or download the prepared program KB23. The function of error messages, and appropriate subsequent action KB24. importance of proving the program, how to do it and selecting the correct proving tools Tools: single block mode, jog, dry run, graphical tool path simulation, search facilities, program save/store facilities, edit facilities, spindle speed and feed rate override controls, program input facilities – insert, delete, modify, tool data input facilities – tool offset, LOe radius KB25. The need for storing program tapes and disks safely and correctly, away from contaminants and electromagnetic sources KB26. quality control procedures that are used, inspection checks to be carried out, and the equipment that will need to be used KB27. Importance to report problems in a timely manner KB28. Importance of writing programs that are easily editable or correctable by the next person KB29. Methods of checking quality of the shaped components against the required quality standards
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	**Communication**
	The individual on the job needs to know and understand how to: SA1. read and interpret correctly the job specifications from growing/ job card, manuals, safety instructions etc. in English and/ or local language SA2. able to fill up the required formats/ documents in English and / or local language SA3. interact and communicate with supervisor or other company personnel as per requirement
	Numerical and computational skills
	The individual on the job needs to know and understand how to: SA4. Use simple numerical computation such as addition, subtraction,

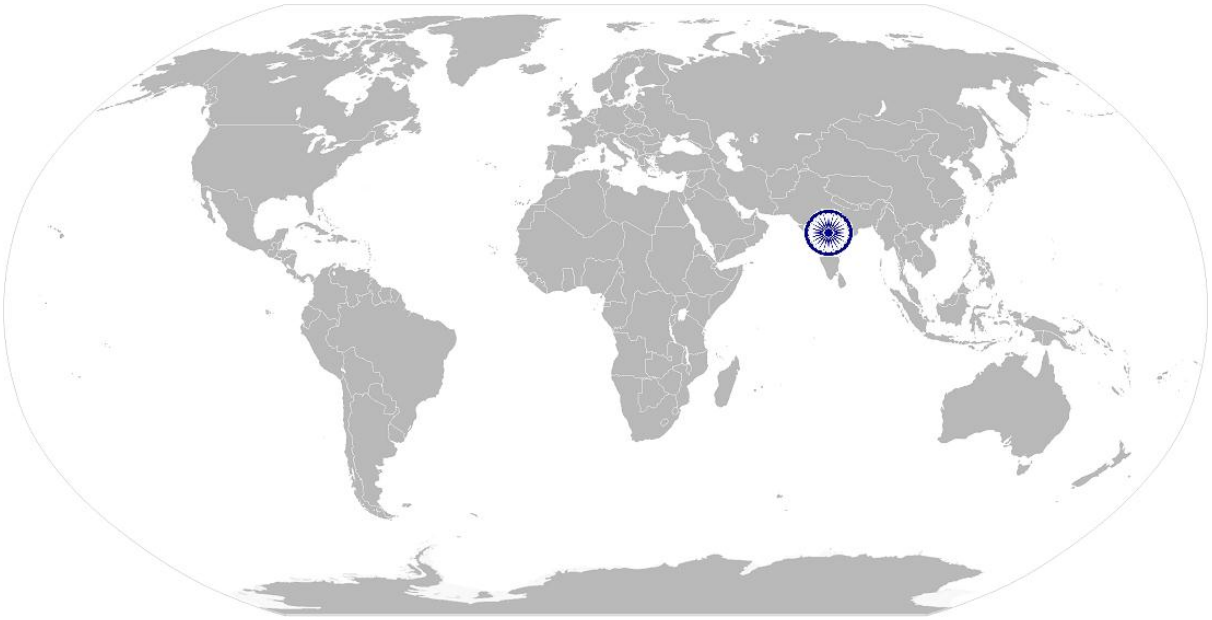
	multiplication, division, fractions and decimal, percentages and proportions, simple ratios and average SA5. Check and clarify task-related information
B. Professional Skills	**Plan and Organize**
	The individual on the job needs to know and understand how to: SB1. Plan, prioritize and sequence work operations as per job requirements SB2. Detect out of tolerance limit of component or any malfunctioning of the machine and take corrective action
	Decision Making
	The individual on the job needs to know and understand how to: SB3. Decide when to contact supervisor in case of any unresolved problems
	Analytical and critical thinking
	The individual on the job needs to know and understand how to: SB4. Analyse and interpret geometric dimensions & tolerance & apply balanced judgments to different instructions



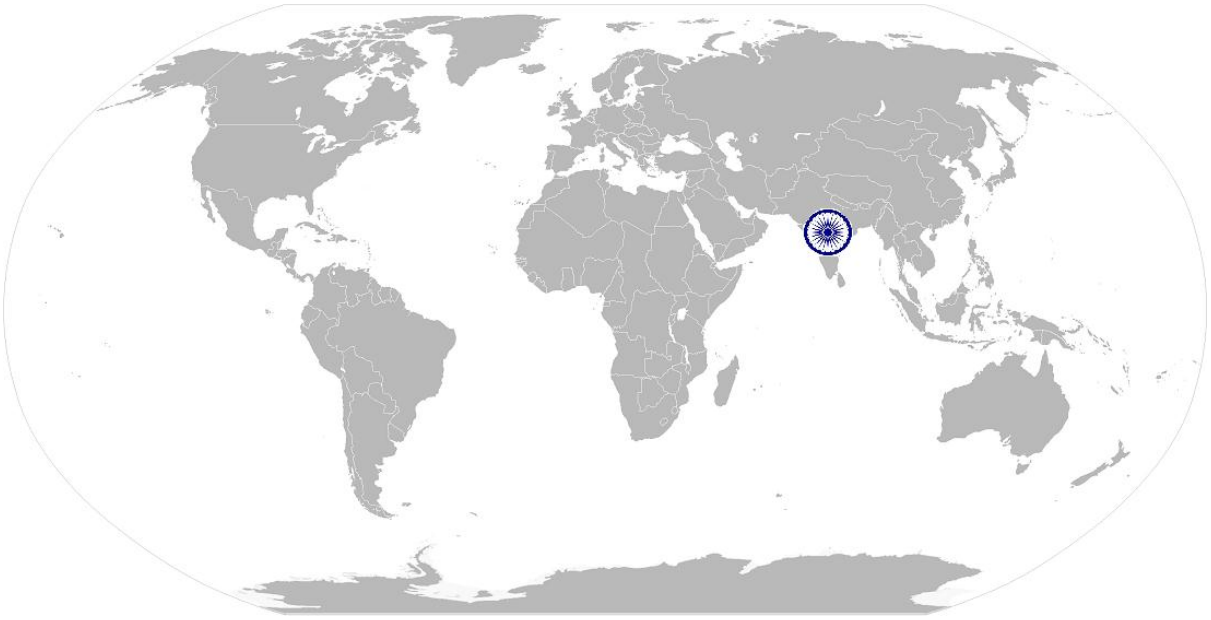
RSC/N4303 (CPC/N 7121) Programming of Computer Numerically Controlled (CNC) Milling Machines

NOS Version Control

NOS Code	**RSC/N4303 (CPC/N 7121)**		
Job Role	**Machine Operator & Programmer – Plastic CNC Milling**		
Credits(NSQF)	**17.4**	**Version number**	**1.0**
Sector	**Rubber**	**Drafted on**	**18/05/2016**
Sub Sector	**Plastics Processing**	**Last reviewed on**	**26/12/2016**
Occupation	**CNC Milling**	**Next review date**	**31/12/2021**



National Occupational Standards



Overview

This unit covers health, safety and security at the workplace. This includes procedures and general work practices that candidates need to follow to help maintain a healthy, safe and secure environment at work place.

RSC/N4101 (CPC/N0411) Maintain basic health and safety practices at the workplace, 5S.

National Occupational Standards

Unit Code	**RSC/N4101 (CPC/N0411)**
Unit Title (Task)	**Maintain basic health and safety practices at the workplace, 5S**
Description	This OS unit is about knowledge and practices relating to health, safety and security that candidates need to use in the workplace. It covers responsibilities towards self, others, assets and the environment. It includes understanding of risks & hazards in the workplace, along with common techniques to minimize risk, deal with accidents, emergencies etc. It covers knowledge of fire safety, common first aid applications and safe practice. This OS is about ensuring all 5S activities both at the shop floor and the office area to facilitate increase in work productivity.
Scope	The role holder will be responsible for • Health and safety procedure. • Fire safety procedure. • Emergencies, rescue and first aid procedures. • Ensure sorting, stream lining, storage and documentation, cleaning, standardization and sustenance across the plant premises of the organization.
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Health and safety	The individual on the job should ensure to: PC1. Wear protective clothing/equipment for specific tasks and work conditions PC2. Carry out safe working practices while dealing with hazards to ensure the safety of Self and others. PC3. Ensure good housekeeping practices at all times
Fire safety	The individual on the job should be able to: PC4. Use the various appropriate fire extinguishers on different types of fires correctly 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.
Identify and report the risks identified	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. 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. PC8. Create awareness amongst others by sharing information on the identified

	risks.
Ensure sorting	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. PC10. Ensure segregation of waste in hazardous/ non Hazardous waste as per the sorting work instructions PC11. Follow the technique of waste disposal and waste storage in the proper bins as per SOP PC12. Segregate the items which are labeled as red tag items for the process area and keep them in the correct places 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 PC14. Ensure that areas of material storage are not overflowing PC15. Ensure 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 PC16. Return of extra material and tools to the designated sections and make sure that no additional material/ tool is lying near the work area PC17. Follow the floor markings/ area markings used for demarcating the various sections in the plant as per the prescribed instructions and standards
Ensure proper documentation and storage(organizing, streamlining)	PC18. Follow the proper labelling mechanism of instruments/ boxes/ containers and maintaining reference files/ documents with the codes and the lists PC19. Ensure to check the items in the respective areas have been identified as broken or damaged PC20. Follow 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. PC21. Make sure that all material and tools are stored in the designated places and in the manner indicated in the 5S instructions
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. Relevant standards, procedures and policies related to Health, Safety and Environment followed in the company KA2. The emergency handling procedures & hierarchy for escalation
B. Technical Knowledge	**The user/individual on the job needs to know and understand:** KB1. The basic knowledge of Safety procedures (fire fighting, first aid) within the

RSC/N4101 (CPC/N0411) Maintain basic health and safety practices at the workplace, 5S.

	organization KB2. The basic knowledge of various types of PPEs and their usage KB3. The basic knowledge of risks/hazards associated with each occupation in the organization KB4. The knowledge of personal hygiene and how an individual contribute towards creating a highly safe and clean working environment the individual on the job needs to know and understand. KB5. The meaning of "hazards" and "risks" KB6 The health and safety hazards commonly present in the work environment and related precautions KB7. The possible causes of risk, hazard or accident in the workplace and why risk and/or accidents are possible KB8. The Possible causes of risk and accident (due to oil leakage) KB9. Methods of accident prevention KB9. Safe working practices when working with tools and machines KB10. Safe working practices while working at various hazardous sites KB11. The location of general health and safety equipment in the workplace KB12. Various dangers associated with the use of electrical equipment KB13. Preventative and remedial actions to be taken in the case of exposure to toxic materials KB14. The Importance of using protective clothing/equipment while working KB15. Precautionary activities to prevent the fire accident KB16. Various causes of fire KB17. The techniques of using the different fire extinguishers KB18. Different methods of extinguishing fire KB19. Different materials used for extinguishing fire KB20. Rescue techniques applied during a fire hazard KB21. Various types of safety signs and what they mean KB22. Appropriate basic first aid treatment relevant to the condition e.g. shock, electrical shock, bleeding, breaks to bones, minor burns, resuscitation, poisoning, eye injuries KB23. The content of written accident report KB24. Potential injuries and ill health associated with incorrect manual handing KB25. Safe lifting and carrying practices KB26. Personal safety, health and dignity issues relating to the movement of a person by others KB27. Potential impact to a person who is moved incorrectly KB28. Basic knowledge of 5S procedures KB29. The various types 5s practices followed in various areas KB30. The 5S checklists provided in the department/ team KB31. The skills to identify useful & non useful items KB32. The knowledge of labels , signs & colours used as indicators KB33. The knowledge on how to sort and store various types of tools, equipment, material etc.

RSC/N4101 (CPC/N0411) Maintain basic health and safety practices at the workplace, 5S.

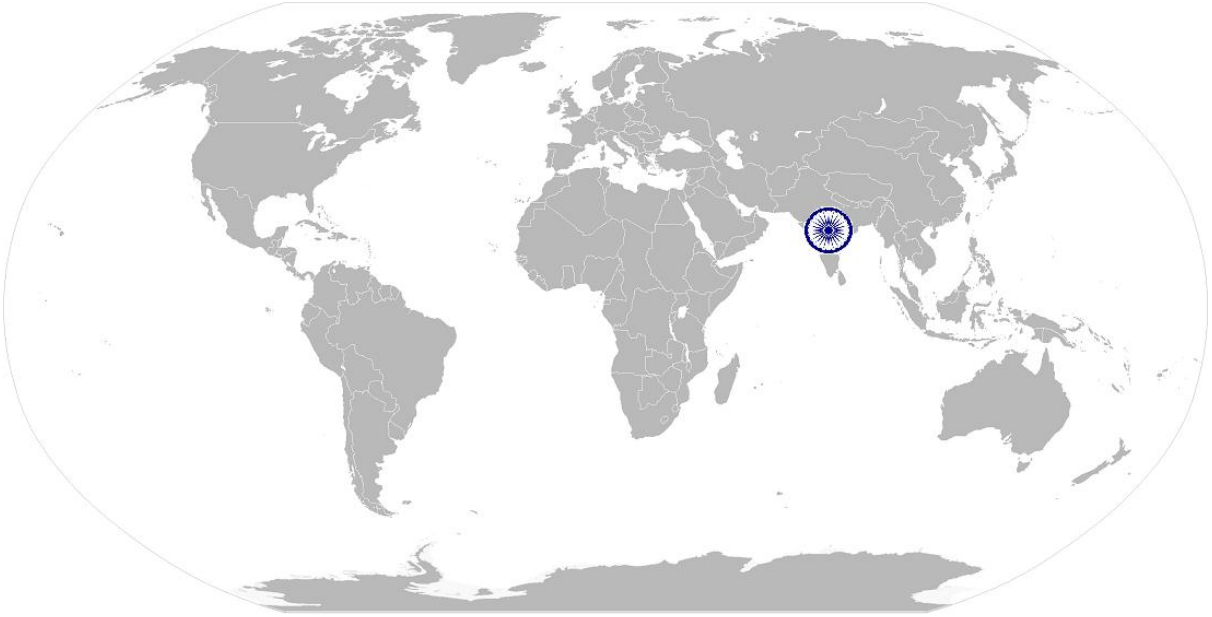
	KB34. Various types of waste products KB35. The impact of waste/ dirt/ dust/unwanted substances on the process/ environment/ machinery/ human body. KB36. The best ways of cleaning & waste disposal
Skills (S) [Optional]	
Element	**Skills**
A. Core Skills/ Generic Skills	**Writing Skills**
	The user/ individual on the job needs to know and understand how to: SA1. The basic level notes and observations.
	Reading Skills
	The user/ individual on the job needs to know and understand how to: SA2. safety instructions put up across the plant premises SA3. Safety precautions mentioned in equipment manuals and panels and understand the potential risks associated
	Oral Communication (Listening and Speaking skills)
	The user/ individual on the job needs to know and understand how to: SA4. Communicate information to team members effectively SA5. Inform employees in the plant and concerned functions about events, Incidents & potential risks observed related to Safety, Health and Environment. SA6. Question operator/ supervisor in order to understand the safety related issues SA7. Attentively listen with full attention and comprehend the information given by the speaker during safety drills and training programs
B. Professional Skills	**Plan and Organize**
	The user/ individual on the job needs to know and understand how to: SB1. Process the work order and jobs received from the internal customers. SB2. Design documents received from internal customers SB3. Understand & organize all process/ equipment manuals so that sorting out information is fast.
	Critical Thinking
	The user/ individual on the job needs to know and understand how to: SB4. Use common sense and make judgments during day to day basis SB5. Use intuition to detect any potential problems which could arise during operations
	Problem solving
	The user/ individual on the job needs to know and understand how to: SB6. Follow instructions and work on areas of improvement identified SB7. Complete the assigned tasks with minimum supervision SB8. Complete the job defined by the supervisor within the timelines and quality norms

RSC/N4101 (CPC/N0411) Maintain basic health and safety practices at the workplace, 5S.

NOS Version Control

NOS Code	**RSC/N4101 (CPC/N0411)**		
Job Role	**Machine Operator & Programmer – Plastic CNC Milling**		
Credits(NSQF)	**2.4**	**Version number**	**1.0**
Sector	**Rubber**	**Drafted on**	**18/05/2016**
Sub Sector	**Plastics Processing**	**Last reviewed on**	**26/12/2016**
Occupation	**CNC Milling**	**Next review date**	**31/12/2021**

National Occupational Standards



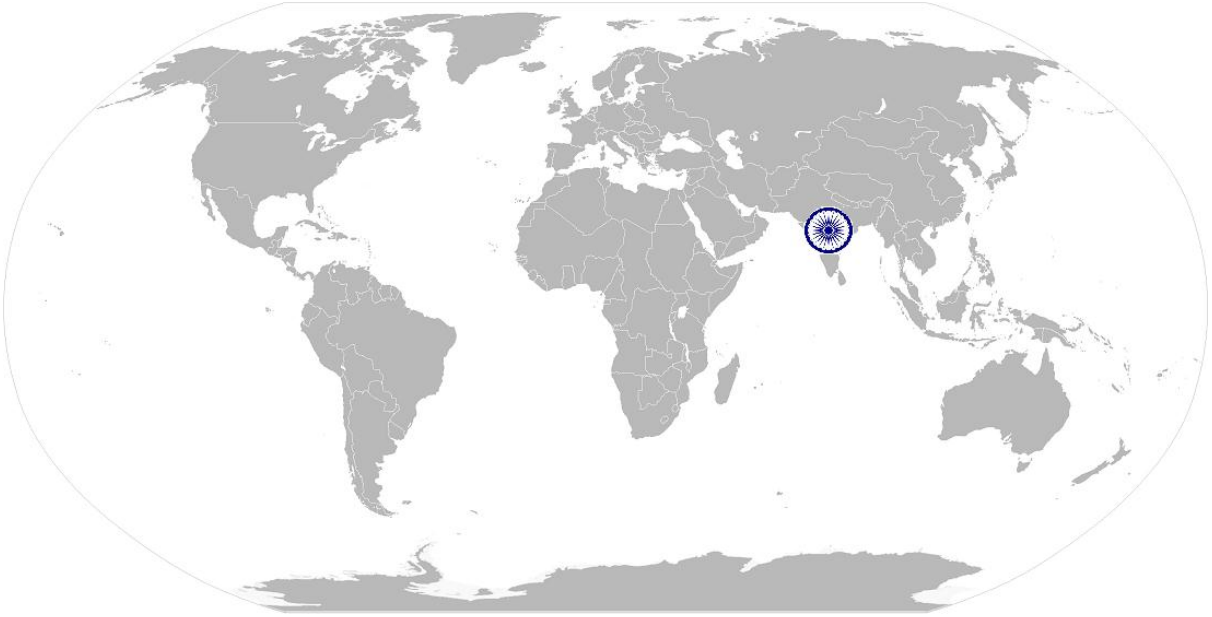
Overview

This unit covers general practices that improve effectiveness of working with others in an organizational set-up.

National Occupational Standards

Unit code	**RSC/N4203 (CPC/N7014)**
unit title (task)	**Effective working with others**
Description	This unit covers basic etiquette and competencies that an individual is required to possess & demonstrate in their behaviour & interactions with others at workplace. These cover areas such as communication, discipline, handling conflict and grievances.
Scope	This unit/task covers the following: • Effective working with others
Performance criteria (PC) w.r.t. The scope	
Element	**Performance criteria**
Effective working with others	The individual on the job should be able to: PC1. Follow appropriate communication etiquette while working PC2. Display active listening skills while interacting with others at work PC3. Demonstrate responsible & disciplined behaviours at the workplace PC4. Accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required PC5. Accurately pass on information to authorized persons who require it & 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 PC7. Consult with and assist others to maximize effectiveness and efficiency in carrying out tasks PC8. Escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict.
Knowledge and understanding (k)	
A. Organizational context (knowledge of the company / organization and its processes)	The individual on the job needs to know and understand: KA1. Policies and procedures followed in the company for working with others in an organizational set-up. KA2. Grievance/ conflict handling mechanism of the company KA3. Relevant people and their responsibilities within the work area
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. Importance of effective communication in the workplace KB2. Importance of teamwork in organizational and individual success KB3. Barriers to effective communication KB4. Importance of avoiding casual expletives and unpleasant terms while communicating professional circles KB5. Various categories of people that one is required to communicate and co-ordinate within the organization KB6. Importance of discipline for professional success KB7. Importance of ethics for professional success KB8. Disciplined behaviour for a working professional

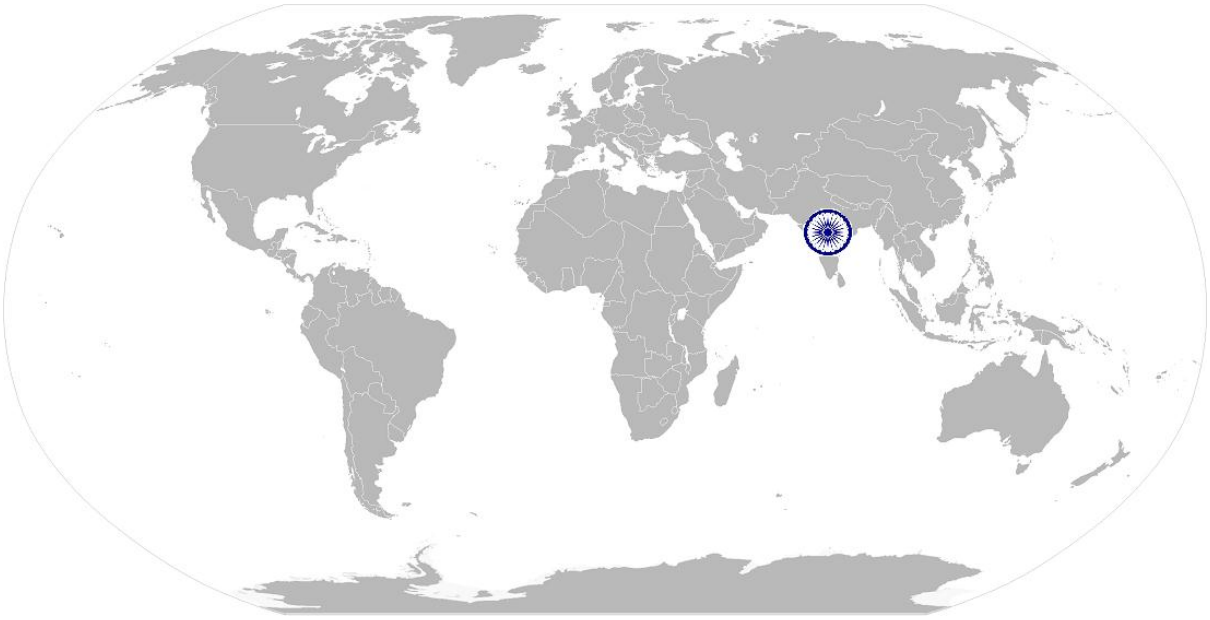
	KB9. Common reasons for interpersonal conflict KB10. Importance and ways of managing interpersonal conflict effectively KB11. Importance of developing effective working relationships for professional success KB12. Expression and address grievances appropriately and effectively



NOS Version Control

NOS Code	**RSC/N4203 (CPC/N7014)**		
Job Role	**Machine Operator & Programmer – CNC Milling**		
Credits(NSQF)	**2.4**	**Version number**	**1.0**
Sector	**Rubber**	**Drafted on**	**18/05/2016**
Sub Sector	**Manufacturing / Plastics Processing**	**Last reviewed on**	**26/12/2016**
Occupation	**CNC Milling**	**Next review date**	**31/12/2021**

National Occupational Standards



Overview

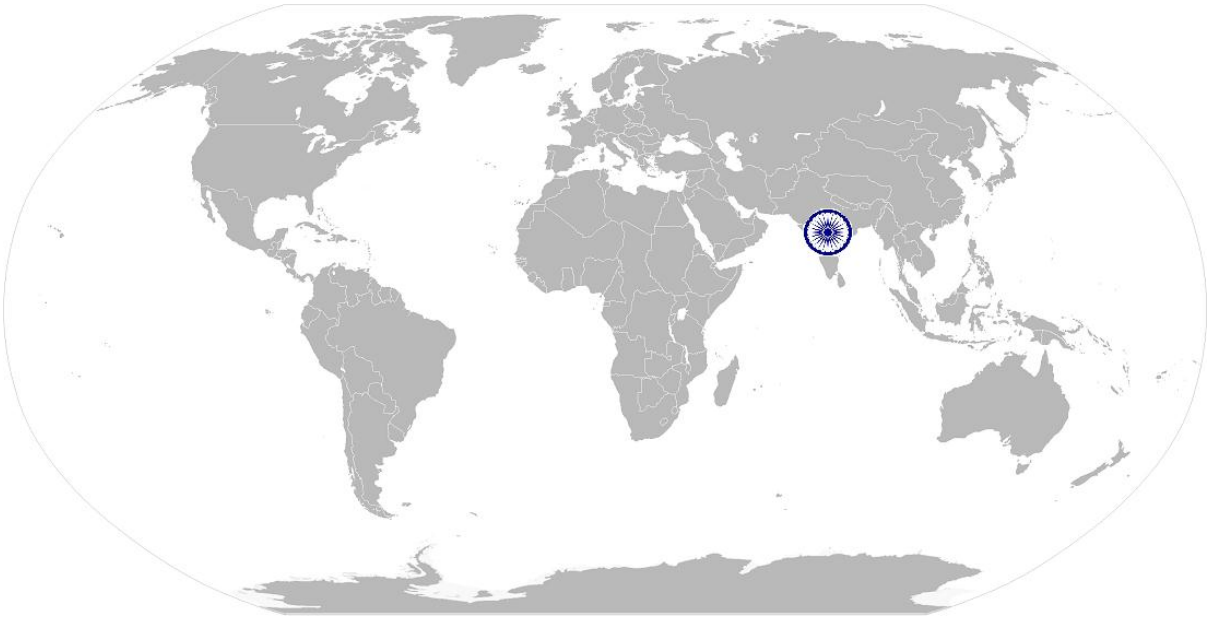
This unit is about Basics of computer and data entry in MS OFFICE/office Open source suite Software.

RSC/N4504 (CPC/N0219) **Basics of computer and data entry in MS OFFICE/office Open source suite Software**

National Occupational Standards

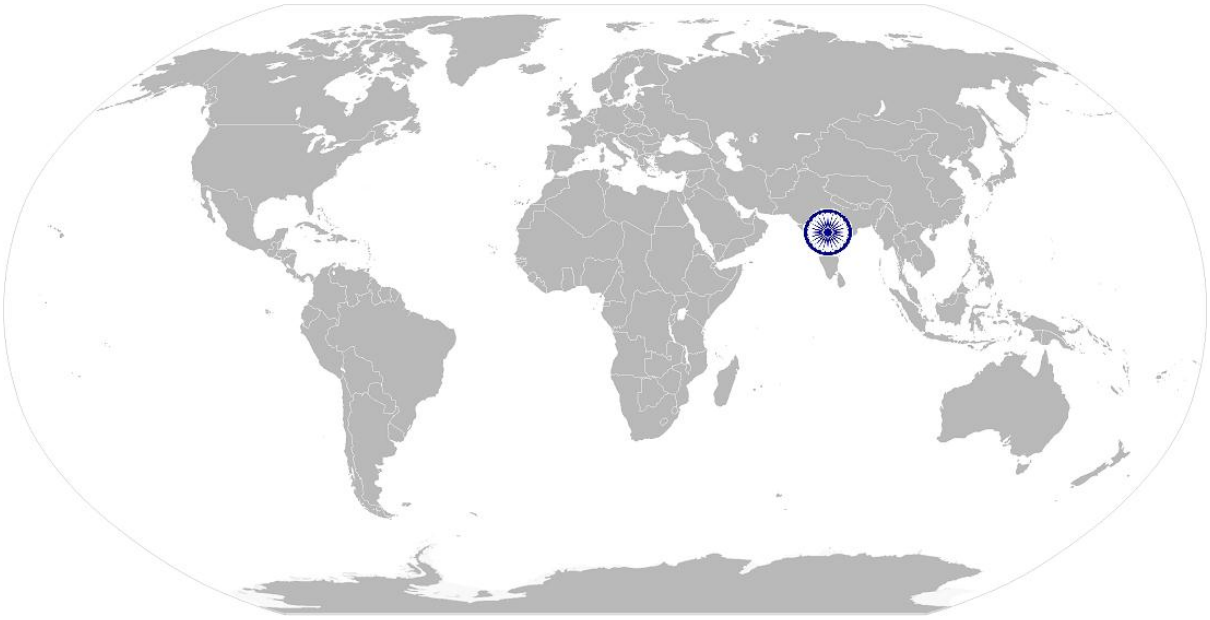
Unit Code	**RSC/N4504 (CPC/N0219)**
Unit Title (Task)	**Basics of computer and data entry in MS OFFICE/office Open source suite Software**
Description	This OS unit is about basics of computer and data entry like entering, updating & maintain Job work related data in the computer systems having MS Office software.
Scope	This unit / task covers the following • Enter, update and maintain data in MS Office system
Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Enter, update and maintain data	The individual on the job should be able to: 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. PC2. Verify data entered with source documents, checks for compliance and corrects all typographical errors and missing or repeated data. PC3. Maintain files of source documents or other information related to data entered. PC4. Update database information to reflect most current source information PC5. Assist in filing and storage of security and back up data files PC6. Respond to requests for information and access relevant files
Process Compliances	Comply with relevant legislation, standards, policies and procedures
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. The data management applications/tools used by the company KA2. Data entry protocol KA3. Data integrity and security policies of the company KA4. The approved methods for carrying document control and archiving
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. Basic understanding computers and its terminology KB2. MS office software
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	**Reading and Writing Skills**
	The user/ individual on the job needs to know and understand how to: SA1. Efficiently enter data into computer applications SA2. Prepare legible reports SA3. Read & understand manuals, SOPs, instructions, memos, reports, job cards etc.

	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA4. Communicate effectively with the team members and supervisors
B. Professional Skills	**Problem solving**
	The user/individual on the job needs to know and understand how to: SB1. Apply basic logic to identify data errors SB2. Pay attention to details
	Plan and Organize
	The user/individual on the job needs to know and understand how to: SB3. Plan assigned tasks within timeline and as per priority order specified
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB4. Identify process improvements

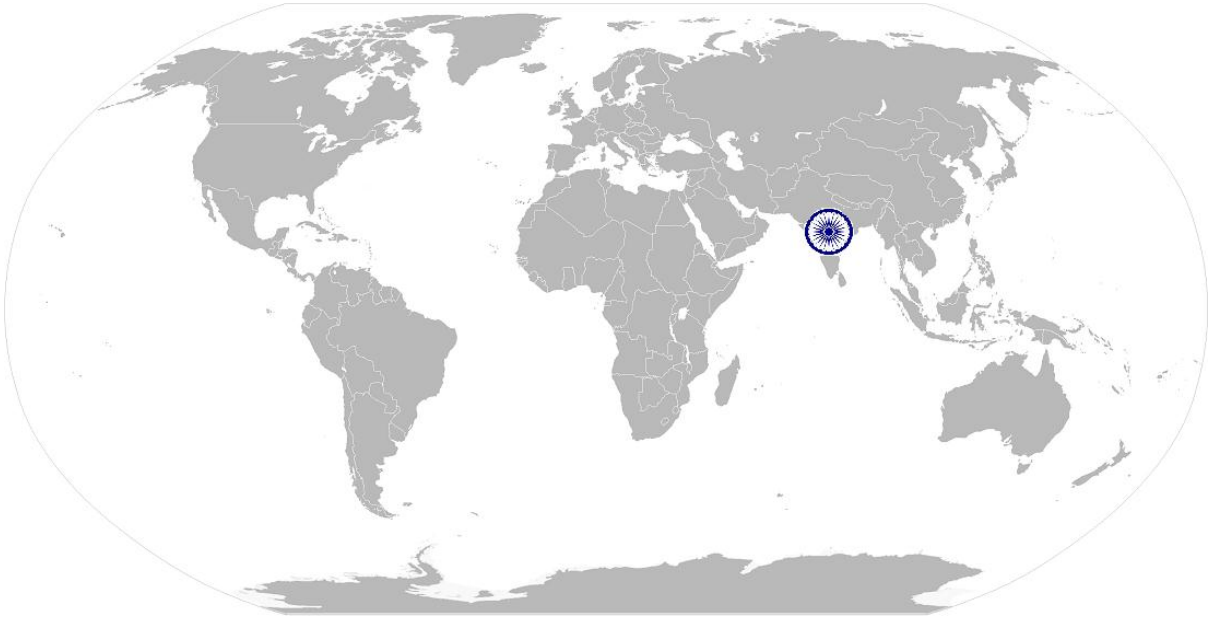


NOS Version Control

NOS Code	**RSC/N4504 (CPC/N0219)**		
Job Role	**Machine Operator & Programmer – Plastic CNC Milling**		
Credits(NSQF)	**2.4**	**Version number**	**1.0**
Sector	**Rubber**	**Drafted on**	**18/05/2016**
Sub Sector	**Plastics Processing**	**Last reviewed on**	**26/12/2016**
Occupation	**CNC Milling**	**Next review date**	**31/12/2021**



National Occupational Standards



Overview

This unit is about understanding and performing basic reading & writing and verbal communication skills required for day to day activities in the industry.

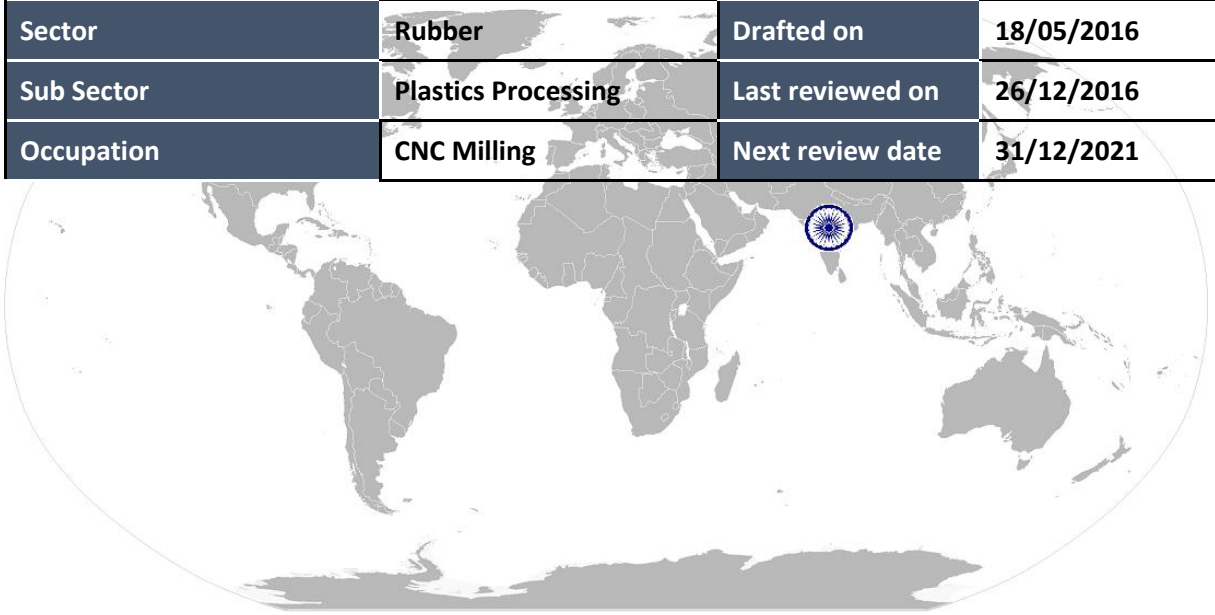
National Occupational Standards

Unit Code	**RSC/N4108 (CPC/N0418)**
Unit Title (Task)	**Basic Knowledge of Communication/soft skills**
Description	This OS is about ensuring a Person with this attribute has the ability to work in various situations equally well and move from one situation to another with ease and grace. The ability to be diplomatic and respectful even when there are disagreements is also a key soft skill. This skill requires the employee to maintain a professional tone and demeanor even when frustrated.
Scope	The individual needs to understand the following: • Basic Knowledge on functions of computer & its operations. • Effective communication & Inter-personal skills
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Basic Knowledge on functions of computer & its operations.	**The individual on the job should be able to:** PC1. Perform basic computer operartions. PC2. Learn about basic functions in a Computer
Effective communication & Inter-personal skills	PC3. Receive information and instructions from the supervisor/operator and fellow workers, getting clarification where required PC4. Pass on information to authorized persons accurately who require it and within agreed timescale and confirm its receipt PC5. Display helpful behavior by assisting others in performing tasks in a positive manner, where required and possible PC6. Consult and assist others to maximize the effectiveness and efficiency in carrying out tasks PC7. Display active listening skills while interacting with others at work PC8. Use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism PC9. Behave as a responsible person at the workplace PC10. Escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict
Knowledge and Understanding (K) w.r.t. the scope	
Element	**Knowledge and Understanding**
A. Organizational Context (Knowledge of	**The individual on the job needs to know and understand:** KA1. Standards, policies, and procedures followed in the company relevant to own employment and performance conditions KA2. Reporting structure, inter-dependent functions, lines and procedures in the

the company / organization and its processes)	work area KA3. Relevant people and their responsibilities within the work area
Elements and Principles of Communication	KA4. Basic Study of Elements of Soft communication skills: •Principle of Communication Process •Clarity •Conciseness •Objectivity •Consistency •Completeness •Relevancy •Audience Knowledge •Receiver •Barriers
How does a computer work?	KA5. Computer functions in the following manner: •The computer accepts input •The computer performs useful operations •The computer stores data •The computer produces output •Turning the Computer On and Logging On
B. Technical Knowledge	**The individual on the job needs to know and understand:** KB1. Various categories of people that one is required to communicate and co-ordinate with in the organization KB2. The importance of effective communication in the workplace KB3. Key elements of active listening KB4. The value and importance of active listening and assertive communication KB5. The importance of tone and pitch in effective communication KB6. The importance of ethics for professional success KB7. The importance of discipline for professional success. KB8. The Importance of developing effective working relationships for professional success. KB9. Expression and address the grievances appropriately and effectively KB10. The importance and ways of managing interpersonal conflict effectively

NOS Version Control

NOS Code	**RSC/N4108 (CPC/N0418)**		
Job Role	**Machine Operator & Programmer – Plastic CNC Milling**		
Credits(NSQF)	**2.4**	**Version number**	**1.0**
Sector	**Rubber**	**Drafted on**	**18/05/2016**
Sub Sector	**Plastics Processing**	**Last reviewed on**	**26/12/2016**
Occupation	**CNC Milling**	**Next review date**	**31/12/2021**



CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role: Machine Operator & Programmer – Plastic CNC Milling
Qualification Pack Code: RSC/Q4302 (CPC/Q7104)
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 center (as per assessment criteria below)
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this 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/N4301 (CPC/ N 7111) Perform machining operations on metal or plastic material using conventional milling machine	PC1. Comply with safety, environmental & other relevant regulations and guidelines	5	1	4
	PC2. Wear personal protective equipment (ppe) like safety glasses, apron, no loose cloths/ hair, safety shoes while performing milling operations regulations while performing cnc turning operations	5	1	4
	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, equipments 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	1.5	4
	PC8. Check the work piece material for the dimensions and ensure that it is free from foreign objects, dirt or other contamination	6	1	5

	and is within the required size			
	PC9. Plan to perform the machining operations and the sequence of operations as per required job specifications on milling machine	6	1	5
	PC10. Obtain all the appropriate tools and measuring instruments/ gauges required for the job	6	1	5
	PC11. Check the milling machine for its functioning and ensure that it is ready for operation	5	0.5	4.5
	PC12. Prepare the milling machine for the operations by mounting and setting the required work holding devices, tool holding devices and cutting tools	5.5	0.5	5
	PC13. Clarify any doubt, if any and see necessary instruction /training on the operation of the machine whenever required	5.5	0.5	5
	PC14. Hold the work piece securely and correctly, without distortion	4.5	0.5	4
	PC15. Adjust the machine settings as per job requirement to maintain desired accuracy	4.5	0.5	4
	PC16. Adjust and set the speed and feed of the lathe machine to achieve the job specifications	4.5	0.5	4
	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	5	1	4
	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.	5	1	4
	PC20. Perform various lathe operations using different tools to produce components with various features.	5	1	4
	PC21. Produce components as per required quality standards and free from burrs & sharp edges	5	1	4
	PC22. Shall achieve given production targets	4	1	3
	PC23. Shall be able to apply roughing and finishing	4	1	3

	cuts, considering the effect on tool life, surface finish and dimensional accuracy			
	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 specifications	4	1	3
	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
	Sub total	**144**	**27.5**	**116.5**
RSC/N4302 (CPC/ N 7112) Perform machining operations on metal or plastic work pieces using Computer Numerically Controlled Milling machines	PC1. Comply with safety, environmental & other relevant regulations and guidelines	3.5	0.5	3
	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	3.5	0.5	3
	PC3. Ensure work area is clean and safe	4	1	3
	PC4. Ensure that machine safety guards are in place and are in correctly working condition	3.5	0.5	3
	PC5. ensure that all tools, equipments 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 supervisor, job instruction sheet/ job card.	4	1	3
	PC7. Read & understand the job requirements from job specifications & attention shall be given to geometric tolerances	2.5	0.5	2

	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 milling operations and the sequence of operations as per required job specifications on cnc milling machine	3.5	0.5	3
	PC10.	Obtain all appropriate tools and measuring instruments/ gauges required for the job	3.5	0.5	3
	PC11.	Check the cnc milling machine for its functioning and ensure that it is ready for operation	3.5	0.5	3
	PC12.	Prepare the cnc milling 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 cnc milling machine whenever required	3.5	0.5	3
	PC14.	Hold the work piece securely and correctly, without distortion	3.5	0.5	3
	PC15.	Adjust the cnc milling 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.	3.5	0.5	3
	PC17.	Use & extract information from engineering drawings, dimensioning and tolerances	4.5	0.5	4
	PC18.	Use and extract information from reference charts, tables, graphs and engineering standards	4.5	0.5	4
	PC19.	Load and unload component(s) using pre-determined fixtures or work holding devices as per work instructions	4.5	0.5	4
	PC20.	Make basic program and check correctness of program through dry run and single block check	4.5	0.5	4
	PC21.	Adjust and set the speed and feed of the cnc milling machine to achieve the job specifications	3.5	0.5	3
	PC22.	Operate the machine tool controls safely and correctly, in line with operational	3.5	0.5	3

		procedures.			
	PC23.	Stop the cnc milling machine, both in normal and emergency situations correctly by following the right procedure and should be able to restart the machine after the emergency	3.5	0.5	3
	PC24.	Do first part cutting trial by setting tool offsets to get oversize part	3.5	0.5	3
	PC25.	Measure the critical parameters of the machined component on the machine (without removing from the machine), after the trial run	3.5	0.5	3
	PC26.	Correct the offsets based on the measurements by accessing program edit facility in order to enter tooling data	3.5	0.5	3
	PC27.	Measure the component after unloading to check for accuracy in critical parameters as per job specifications	3.5	0.5	3
	PC28.	Produce machined components that combine different machining operations & have a range of features	3.5	0.5	3
	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	4	1	3
	PC37.	Return the machine and all tools and equipment to the correct location on	3	1	2

	completion of activities			
	PC38. Leave the work area in a safe and tidy condition on completion of job activities as per 5s practices	3	1	2
	PC39. Report the problem to the supervisor, if it cannot be resolved	3	1	2
	PC40. Seek guidance from the supervisor/ specialist of the problem is outside his/her area of competence	2	1	1
	Sub total	**140.5**	**33**	**107.5**
RSC/N4303 (CPC/N 7121) Programming of Computer Numerically Controlled (CNC) Milling 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 Milling 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	4	1	3

	readiness of the program so that the CNC machine operates correctly			
	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 workholding 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 the component will be machined.	4	1	3
	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	4	1	3

	procedures			
	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(eg. 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 mounted in positions corresponding to tool numbers in the part program	4	1	3
	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 specifi-cations in terms of dimensions,	4	1	3

	surface finishes & geometrical parameters like concentricity, parallelism, runout, etc.			
	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, workholding 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
	Sub total	**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	2.5	0.5	2

	maintenance team on machine health to identify potential hazards due to wear and tear of machine.			
	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	1.5	0.5	1

	instructions and standards.			
	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
	Sub total	**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 behaviors 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 authorized persons who require it and within agreed timescale and confirm its receipt	1.5	0.5	1
	PC6. Display helpful behavior 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
	Sub total	**13.5**	**5.5**	**8**
RSC/N4504 (CPC/N0219) Basics of computer	PC1. Fill and process mandated forms for receiving, processing, or tracking data, enter data from source documents in to	4	2	2

and data entry in MS OFFICE/office Open source suite Software	computer application having ms office software			
	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
	Sub total	**22**	**14**	**8**
RSC/N4108 (CPC/N0418): Basic Knowledge of Communication/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 behavior 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 behaviors 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

	Sub total	**40**	**10**	**30**
	Total	**600**	**150**	**450**