NSQF QUALIFICATION FILE
Version 6: Draft of 08 March 2016

NSDA Reference

CONTACT DETAILS OF THE AWARDING BODY FOR THE QUALIFICATION

Name and Address of Awarding Body:
Ministry of Micro, Small and Medium Enterprises
Government of India
Udyog Bhawan, Rafi Marg,
New Delhi - 110011

Name and Contact Details of Individual dealing with submission:
L.Raja Sekhar
Dy. General Manager
Central Tool Room and Training Centre, Bhubaneswar
Contact No. +91 9437491950
Email- rajasekharl@yahoo.com

List of documents submitted in support of the Qualification File:
1. Detailed Curriculum**(Ref: Annexure-I)**
2. Decision of the management review meeting. **(Ref: Annexure- II)**
3. Industry Manpower Requirements **(Ref: Annexure-III)**

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SUMMARY

Qualification Title: ADVANCE DIPLOMA IN CNC PROGRAMMING TECHNIQUES AND PRACTICES.
Qualification Code: MSME/ADCNC/06
Nature and Purpose of the Qualification: **Nature:** This is anAdvance Diploma programmein which students tend to get excellent career opportunities. **Purpose:** To upgrade professional skills of the people to deal with technological change.   - Learners who attain this qualification are competent in CNC programming and manufacturing in automobile and manufacturing sector.   - Qualifying learners attain skills to generate program by using CAM software and load the same program to CNC machines for manufacturing the component.Qualified learners are capable of creating drawings to develop models in software and also able to check the quality aspects of the finished products.
Body/bodies which will award the Qualification: Ministry of MSME (Certificate awarded by Central Tool Room and Training Centre, Bhubaneswar
Body which will accredit providers to offer courses leading to the qualification: Ministry of MSME, Government of India
Body/bodies which will carry out assessment of learners: Examination Cell of Central Tool Room and Training Centre, Bhubaneswar
Occupation(s) to which the Qualification gives access: CNC Programmer.
Licensing Requirements: N/A
Level of the Qualification in the NSQF: Level-6
Anticipated volume of training /learning required to complete the Qualification: 900 hours
Entry requirements and/or recommendations: Preferably Diploma in Mechanical/ Production/Tool Design/Mould Making/Automobile
Progression from the qualification: After completion of course and after 2 years of field experience the trainee can work as Asst. Supervisor and after that 3 years of experience, the person can work as a Supervisor in CNC department.

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Planned arrangements for the Recognition of Prior Learning (RPL)
Yes
Department of education, employment and workplace relation of Australian government approved the program NC/CNC machining centre. (https://training.gov.au)

Date of planed review of the qualification: 01/2018

Formal Structure of the Qualification:

Title of component and Identification code	Mandatory/ optional	Estimated size (learning hours)	Level
Production Technology: Code: PT Introduction to Workshop Technology	Mandatory	120 Hrs	6
Auto-CAD: Code: ACAD Drafting and modeling using Auto-CAD	Mandatory	120 Hrs	6
CNC Programming Code: CNCPGM	Mandatory	120 Hrs	6
Master-CAM: Code: MCAM Modelling and programming using Master-CAM	Mandatory	120 Hrs	6
Uni-Graphics: Code: UG Modelling and programming using Uni-Graphics	Mandatory	120 Hrs	5
Engineering Drawing: Code: ED Study of Engineering Drawing	Mandatory	36 Hrs	6
Metrology: Code: MET Application of metrology in manufacturing	Optional	36 Hrs	5
Material Technology: Code: MT Use of materials with respect to their application and properties.	Mandatory	36 Hrs	5
Communication Skill: Code: COMM Communication at Workplace	Mandatory	36 Hrs	6
Project Work : Code: PW	Mandatory	120 Hrs	6
Admission and Examination	Mandatory	36 Hrs	---------

Total	960 Hours

SECTION 1

ASSESSMENT

Body/Bodies which will carry out Assessment: Examination Cell of Central Tool Room and Training Centre, Bhubaneswar
Will theAssessment body be responsible for RPL assessment? Yes. Learners who have met the requirements of any Unit Standard that forms part of this qualification may apply for recognition of prior learning to the relevant Education body. The applicant must be assessed against the specific outcomes and with the assessment criteria for the relevant Unit Standards.

Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, reliable and fair and show that these are in line with the requirements of the NSQF.
 	
1. ASSESSMENT GUIDELINE:
• Criteria for assessment based on each learning outcome, will be assigned marks proportionately to its importance.
• The assessment for the theory & practical part is based on knowledge bank of questions created by trainers and approved by Examination cell (CTTC, Bhubaneswar)
• For each Individual batch, Examination cell will create unique question papers for theory part as well as practical for each examination.
• To pass the Qualification, every trainee should score a minimum of 70% cumulatively (Theory and Practical)
• Assessment comprises the following components:
    ➢ Job carried out in labs/workshop
    ➢ Record book/ daily diary
    ➢ Answer sheet of assessment
    ➢ Viva –voce
    ➢ Progress chart
    ➢ Attendance and punctuality
 	
2. ASSESSORS:
    CTTC, Bhubaneswar faculty looking after the course "Advance diploma in CNC Programming Techniques and Practices", also assesses the students as per guidelines set by Examination cell of CTTC, Bhubaneswar. Faculties have been trained from time to time to upgrade their skills on various aspects such as conduct of assessments, teaching methodology etc. These training are usually conducted at Xavier Institute of Management (XIMB), Bhubaneswar, Xavier Labor Relations Institute (XLRI), Jamshedpur and other renownedInstitutions/Establishments of the country.

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3. ELIGIBILITY TO APPEAR IN THE EXAM:
Minimum 80% attendance is compulsory for the students to appear for the assessments.

4. MARKING SCHEME:

Sr. No.	Method of Assessments	Weightage (Max. marks)	Evaluator
1	Written Test	20	Trainer + Course coordinator + Examiner nominated by Examination Cell of CTTC, Bhubaneswar
2	Practical Test	40	
3	Viva-voce	10	
4	Class/Workshop/Lab performance	10	
5	Project	20	
	TOTAL	**100**	

5. PASSING MARKS:
        Passing criteria is based on marks obtained in attendance record, term works, assignments, practical performance, viva or oral exam, module test, practical exam and final exam.

Minimum Marks to pass practical exam – 60%
Minimum Marks to pass final exam – 70%
Minimum Marks to pass viva / oral exam – 60%
Minimum Marks to pass Project report and presentation exam – 80%

6. RESULTS AND CERTIFICATION:
The assessment results are backed by evidences collected by assessors. Successful trainees are awarded the certificates by CTTC, Bhubaneswar.

ASSESSMENT EVIDENCE
Assessment evidence comprises the following components document in the form of records:
1)   Job carried out in labs/workshop
2)   Record book/ daily diary
3)   Answer sheet of assessment
4)   Viva –voce
5)   Progress chart
6)   Attendance and punctuality

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Title of Component: <u>Production Technology:</u> Code: PT Introduction to Workshop Technology		
Sr. No.	**Outcomes to be assessed**	**Assessment criteria for the outcome**
1	Demonstrate workshop safety rules and personal protective equipments (PPE) used.	• Describe safety rules • Describe precautions to be taken for safety at work • Suggest/explain the safety precautions required in the given set of work • Use PPE while working in the workshop.
	Demonstrate the cutting tool materials used.	• Describe the characteristics of the cutting tool materials • Describe different types of materials used for cutting tools • Identify tool materials and their properties • Select tool material for the specific cutting tool application.
	Demonstrate the parts of lathe machine and their function.	• List different types of lathe machine w.r.t. its specifications • Identify all the parts and mechanism used in lathe. • Operate/use the parts and mechanism
	Demonstrate standard operating procedure (SOP) for lathe.	• Describe SOP for the manufacturing of components/products • Use SOP for the manufacturing of parts.
	Demonstrate to operate the milling machine.	• Identify the parts and its function of milling machine and follow the SOP for manufacturing. • Describe SOP for the manufacturing of components/products • Use SOP for the manufacturing of parts.
	Demonstrate operation on grinding machine.	• Identify the parts and its function of grinding machine and follow the SOP for operation. • Describe SOP for the manufacturing of components/products • Use SOP for the manufacturing of parts.
	Demonstrate the de-burring process after every machining process.	• Describe the significance of de-burring process • De-burr and check whether the sharp edges are removed out from the work-piece after

		machining.

Title of Component: Auto-CAD:
Code: ACAD
Drafting and modeling using Auto-CAD

Sr. No.	Outcomes to be assessed	Assessment criteria for the outcome
2	Demonstrate co-ordinate system, used in CAD/CAM & AutoCAD	• Describe co-ordinate system used in CAD/CAM • Describe the CAD/CAM software • Use auto-cad to draw geometry by co-ordinate system.
	Demonstrate interface of AutoCAD, mouse function, functional keys, shortcut keys, paper size	• Describe the functions used in using AutoCAD software • Write the purpose of each function/mouse function, functional keys • Set the standard paper size in the AutoCAD.
	Demonstrate scratch window, limits, line, construction line, ray, trim, extend, erase.	• Prepare the drawings in auto-cad by using limits, line, construction line, ray, trim, extend, erase.
	Demonstrate circle, rectangle, copy, move, offset, rotate.	• Use commands to prepare the drawings- circle, rectangle, copy, move, offset, rotate.
	Demonstrate array, mirror, scale, stretch, polyline, polygon, and arc.	• Describe the purpose of array, mirror, scale, stretch, polyline, polygon, and arc. • Use commands array, mirror, scale, stretch, polyline, polygon, and arc. • Identify the proper commands and draw the given drawings in auto-cad.
	Demonstrate spline, ellipse, revision cloud, region, xplode, join, break, break at a point.	• Describe the purpose of commands spline, ellipse, revision cloud, region, xplode, join, break, break at a point • Use the commands properly while drafting in Auto-CAD
	Demonstrate point, point style, divide, measure, fillet, chamfer, blend curve	• Describe point, point style, divide, measure, fillet, chamfer, blend curve • Use commands point, point style, divide, measure, fillet, chamfer, blend curve • Identify the proper commands and draw the

		given drawings in auto-cad.
	Demonstrate hatch, gradient, details of sectional view.	- Describe the commands hatch, gradient, details of sectional view. - Use/operate the commands hatch, gradient, details of sectional view. - Identify the commands for proper sectioning methods as per the material.
	Demonstrate text, mtext, text style, arc aligned text, mirror text	- Describe the commands text, mtext, text style, arc aligned text, mirror text - Use the commands text, mtext, text style, arc aligned text, mirror text - Use the commands for putting the text on the drawing.
	Demonstrate block, wblock, insert block, edit block	Draw the title block using those commands using auto-cad.
	Identify dimension toolbar, dimension style & GD&T symbols	Provide dimension on the geometry by using auto-cad software.
	Demonstrate solid modeling, 3d environment & toolbars, extrude, revolve, boolean operation, sweep, loft, presspull, 3d move, 3d rotate, 3d array, 3d align, solid editing toolbar, primitives.	- Descibe solid modeling, 3d environment & toolbars, extrude, revolve, boolean operation, sweep, loft, presspull, 3d move, 3d rotate, 3d array, 3d align, solid editing toolbar, primitives. - Prepare the solid model by using the commands in auto-cad and do the editing whenever it is necessary to modify.
	Do plotting	- Explain the types of plotters - Plot the drawing with the help of auto-cad software.

Title of Component: CNC Programming

Code: CNCPGM

Sr. No.	Outcomes to be assessed	Assessment criteria for the outcome
3	Demonstrate CNC machine, advantage & disadvantage, G & M-codes for milling, part programming fundamentals,	- Compare the conventional machines with CNC machines - Describe the codes and its function - Use codes and Write programmes

	functional keys & steps to write a programme.	• Do practice on CNC by using G-codes and M-codes.
	Demonstrate contouring, used of compensation, how to prepare a programme. Chamfer, circular movement, label setting	• Write a programme. Chamfer, circular movement, label setting • Do contouring operation taking tool compensation by setting the label.
	Demonstrate pocketing (rectangular & circular), polar movement, peck drilling, mirror cycle, datum shift.	• Describe pocketing , polar movement, peck drilling, mirror cycle, datum shift in CNC programming • Do the pocketing practice of rectangular and circular type. • Use polar movement, peck drilling, mirror cycle, datum shift, and peck drilling cycle on the machine.
	Demonstrate G & M-codes for turning, homing process, rough turning cycle, facing, chamfer, circular movement	• Do practice on m-codes and g-codes for turning. • Run the cycle for rough turning, facing, chamfering.
	Demonstrate grooving, peck drilling, threading (internal & external)	• Write codes for grooving and peck drilling and threading • Demonstrate grooving and peck drilling and threading (internal & external)
	Demonstrate boring, CD, sub programme.	• Do practice by running the machine using sub-programme for boring, centre drilling.

Title of Component: Master-CAM

Code: MCAM

Modeling and programming using Master-CAM

Sr. No.	Outcomes to be assessed	Assessment criteria for the outcome
4	Demonstrate introduction to CAM technology & benefits, interface of Master Cam, used of toolbars, functional keys & mouse functions	• Describe CAM technology • Explain the benefits of CAM • Identify the toolbar and use functional key.

	Demonstrate line , rectangle , rectangle shape, circle & arc, fillet ,fillet chain, chamfer , chamfer chain , polygon , ellipse	• Describe line , rectangle , rectangle shape, circle & arc, fillet ,fillet chain, chamfer , chamfer chain , polygon , ellipse • Use the icon for the required command to draw the assigned geometry.
	Demonstrate translate , mirror ,rotate, trim , spline, scale , move to origin , offset ,offset contour ,rectangular array.	• Describe translate, mirror, rotate, trim, spline, scale, move to origin, offset, offset contour, rectangular array. • Do the 2-D modeling by using the icons for different command.
	Demonstrate letter, point, spiral, and helix, break two pieces, trim many joint entity, close arc, break many pieces, simplify.	• Describe the purpose, function and procedure for letter, point, spiral, and helix, break two pieces, trim many joint entity, close arc, break many pieces, simplify. • Do modeling using these icons of Master-CAM
	Demonstrate break at intersection, break circle, break drafting into line, convert to nurbs , modify spline, x hatch , dimension tools , dimension option , note.	• Describe break at intersection, break circle, break drafting into line, convert to nurbs, modify spline, x hatch , dimension tools , dimension option , note. • Do modeling using these icons of Master-CAM
	Demonstrate introduction to surface modeling, 3D Environment, used of 3D tool bar, draft, extrude, fillet, trim.	• Explain surface modeling, 3D Environment, • Describe the use of 3D tool bar, draft, extrude, fillet, trim. • Demonstrate introduction to surface modeling, 3D Environment, used of 3D tool bar, draft, extrude, fillet, trim. • Create 3-D models using these icons.
	Demonstrate ruled / lofted, revolved, offset, swept.	• Describe the function of icons such as ruled / lofted, revolved, offset, swept • Generate 3-Dprofile using those icons.

	Demonstrate net surface, fence, extend, flat boundary, fill holes, remove boundary. Demonstrate split, untrim , 2 surface blend , 3 surface blend , 3fillet blend , project, types of tool path , step to generate a tool path , use of machining tool bars.	• Describe net surface, fence, extend, flat boundary, fill holes, remove boundary. Demonstrate split, untrim , 2 surface blend , 3 surface blend , 3fillet blend , project. • Explain types of tool path, step to generate a tool path. • Describe use of machining tool bars. • • Generate tool path using machining toolbar and other commands.
	Demonstrate 2D countering & pocketing, 2D drilling & facing	• Do the machining using the options like 2-D countering,pocketing,2-D drilling, etc.
	Identify surface rough (pocket , parallel , radial) surface finish (parallel , radial), flow line , contour , shallow , project , pencil.	• Describe the function of the commands, surface rough (pocket , parallel , radial) surface finish (parallel , radial), flow line , contour , shallow , project , pencil. • Demonstrate the use of those commands and its use.
	Demonstrate to generate programs & lathe tool path.	• Do practice of generating the tool path and programmes for lathe operation.

Title of Component: Uni-Graphics	
Code: UG	
Modelling and programming using Uni-Graphics	

Sr. No.	Outcomes to be assessed	Assessment criteria for the outcome
5	Demonstrate introduction to UG, interface of UG, functional keys & toolbars.	• Describe UG features • Explain the functional keys and tools bars in UG • Identify the functional keys and tool bar for further use of Uni-graphics software.
	Demonstrate sketch environment & tools.	• Write the purpose of sketch environment & tools. • • Use the toolbar of sketch environment for 2-D drafting.

	Demonstrate constraints	• Understand the importance of constraints and make the sketch full proof.
	Demonstrate extrude, Revolve, edge blend, chamfer Face blend, datum axis.	• Describe the function of extrude, Revolve, edge blend, chamfer Face blend, datum axis. • Create the solid model using the icons like extrude, revolve, edge blend, chamfer.
	Demonstrate datum plane, datum points. Demonstrate mirror feature, mirror face, trim body, split body, hole tools, rib, thread.	• Describe datum plane, datum points. Demonstrate mirror feature, mirror face, trim body, split body, hole tools, rib, thread. • Use the datum concept for using the icons like mirror features to generate solid model.
	Demonstrate pattern feature, pattern face, pattern geometry.	• Describe the function/purpose of pattern feature, pattern face, pattern geometry. • Use the icons for creating the geometry.
	Demonstrate ruled, shell, through curve Demonstrate draft, scale body, sweep along guide, swept, variable sweep, tube.	• Describe the purpose of the functions/commands ruled, shell, through curve Demonstrate draft, scale body, sweep along guide, swept, variable sweep, tube. • Identify where to use those options for solid modeling.
	Demonstrate use of assembly, types of assembly, assembly toolbars used of assembly constraints, bottom up assembly, Top down assembly	• Do the assembly of given detail out parts using Uni-Graphics software.
	Demonstrate use of kinematics & motion path animation.	• Describe the purpose and nature of kinematics and motion path animation • Use the kinematic and motion path to check the functionality of an assembly.
	Demonstrate manufacturing environment and toolbars, Facing, pocketing, and contouring.	• Check the simulation using facing, pocketing and contouring cycle.
	Dimension type and dimensioning placing & GD & T symbols	• Do dimensioning of previously finished sketches.

	Demonstrate paper setting, placement of base view, sectional view	• Do paper setting properly by placing the base view and sectional views as required.

Title of Component: Engineering Drawing

Code: ED

Study of Engineering Drawing

Sr. No.	Outcomes to be assessed	Assessment criteria for the outcome
6	Identify types of line, line group, arrow head, type of paper size, title block, out boundary.	• Explain types of line, line group, arrow head, type of paper size, title block, out boundary. • Practice of drawing by conventional method with the help of drawing tools like, drawing board, mini drafter, pencil etc.
	Demonstrate scale, dimension, dimensioning rules & its use.	• Use scale and put dimension with the help of drawing tools on different mechanical objects.
	Demonstrate angle of projection method, orthographic views, Sectioning, its type and application.	• Do practice with the help of drawing tools of different parts.
	Use surface roughness symbol.	• Do practice by providing different surface roughness symbols on the drawing as per requirement.
	Use limits, fits and tolerances on the drawing.	• Describe the concepts limits, fits and tolerances on the drawing • Do conventional practice by showing tolerance of different fittings in an assembly drawing.
	Prepare assembly drawing.	• Do practice by studying the individual parts of an assembly drawing.
	Identify and draw types of line, line group, arrow head, type of paper size, title block,	• Identify types of line, line group, arrow head, type of paper size, title block, out boundary. • Draw by conventional method with the help of

	out boundary.	drawing tools like, drawing board, mini drafter, pencil etc.

Title of Component: Metrology

Code: MET

Application of metrology in manufacturing

Sr. No.	Outcomes to be assessed	Assessment criteria for the outcome
7	Explain standardization of measuring instrument (linear, angular, precision & non precision).	• Describe significance of measurement and types of measurements. • Explain how to do standardization of the measuring instruments.
	Explain Gauges (standard gauge: feeler gauge, radius gauge, screw pitch gauge).	• Explain types of gauges • Compare the gauges • Use the gauges for checking the machined parts.
	Explain Telescopic gauge, slip gauge, standard wire gauge.	• Explain Telescopic gauge, slip gauge, standard wire gauge. • Check the hole diameter and wire diameter using telescopic gauge and wire gauge respectively..
	Demonstrate Limit gauge: plug gauge, thread plug gauge, snap gauge.	• Describe Limit gauge: plug gauge, thread plug gauge, snap gauge with sketch. • Do inspection of a hole and internal thread using plug gauge and thread plug gauge.
	Demonstrate Ring gauge, thread ring gauge.	• Describe Ring gauge, thread ring gauge with sketch. • Check the size of a shaft and threaded shaft using ring gauge and thread ring gauge.
	Demonstrate Comparators as well as hand on practice on CMM,	• Inspect the given job using CMM.
	Demonstrate Height master, profile projector.	• Use height master and profile projector for the measurement.

Title of Component: Material Technology

Code: MT

Use of materials with respect to their application and properties.		
Sr. No.	**Outcomes to be assessed**	**Assessment criteria for the outcome**
8	Descript about the Material,Materials comprise, properties.	• Explain Properties such as Mechanical, Thermal, • Electrical, magnetic, Chemical, Optical, Physical • and Technological Properties render a material
	Mechanical properties of material.	• Describe 1. Strength, 2.Elasticity, 3.Plasticity, 4.Stiffness, 5.Resilience, 6.Toughness, 7.Ductility, 8.Malleability, 9.Hardness. 10.Brittleness, 11.Creep and 12,Fatigue • Explain the properties with example in real applications • Describe the properties of the given sample material.
	Metals and non-metals which are used to give a shape to product	• Describe Metals like ferrous & non ferrous. • **Ferrous materials**: Contain Iron as base. Ferrous Metals & their alloys extensively used in Metallurgical and mechanical Industries for shaping the products. • **Non ferrous materials:** Aluminum , Copper, Lead, Zinc, Tin , Nickel, Magnesium • Write the factors consider in selection of material. • Compare ferrous material with non-ferrous material. • Identify the type of material (ferrous or non-ferrous)
	Use of Ferrous materials iron & steel. Steel making process.	• Describe the use of : • IRON: Pig Iron , wrought iron , cast iron • STEEL: low carbon, high carbon, medium carbon, Alloy Steel. • Describe the steel making process.
	Heat treatment process. Various Heat treatment processes.	• Describe the purpose of heat treatment • Explain the different heat treatment process • Explain the concepts, Annealing, Stress relieving, Refining, Normalizing, Tempering and Hardening.

Title of Component: Communication Skill Code: COMM Communication at Workplace		
Sr. No.	**Outcomes to be assessed**	**Assessment criteria for the outcome**
9	Interpersonal Skill	• Interpersonal behavior while working in team
	Personality traits and body language.	• Behavior, values while working on task • Gesture/Postures/eye contact/ facial expression/ behavioral traits
	Public Speaking and presentation skill	• Speech, oration, elocution, • presentation through ppt mode, video mode, board presentation
	Written communication	• Resume writing, Letter writing, Report writing, writing the story/incident.
	Grooming style	• Performance on task • Progression and reflection of personality development • Working in different situations. • Dealing with stress and conflict
	Interview Skills	• Communication, Confidence, decision making, presence of mind, creativity, presentation style, analysis of situation. And aptitude.
	Life Skills	• Self-concepts • Intrinsic motivation • Positive attitude • Presence of mind • Consciousness and concern • Concern for self-life and society • Commitment • Dedication • Owning

Means of assessment 1 and 2

Skill performance is assessed by conducting

i)	Assignment for each component
ii)	Written test for each component
iii)	Final exam after completion of all component.
iv)	Practical exam for each professional component.
v)	Final practical exam after completion of all professional component.
vi)	Viva / Oral Exam
vii)	Project report and presentation.

Pass/Fail

Trainees scoring the percentage of marks mentioned below will be declared as "**competent**",otherwise" **not yet competent**".

i)	Minimum Marks to pass practical exam – 60%
ii)	Minimum Marks to pass final exam – 70%
iii)	Minimum Marks to pass viva / oral exam –60%
iv)	Minimum Marks to pass Project report and presentation exam – 80%

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SECTION 2

Evidence of Level

Title/Name of the qualification/Component:Advance Diploma in CNC Programming Techniques & Practices			
			Level-6
NSQF Domain	**Outcomes of the Qualification/Component**	**How the job role relates to the NSQF level descriptors**	**NSQF Level**
Process	• Develop different models and generate programme by using CAMsoftware and execute the same on the CNC turning and CNC milling machines,ensuring the quality aspect of components after manufacturing .	The job role after attaining this qualification "ADCNC" is to develop models and generate the program for manufacturing the varieties of desired jobs/components within tolerance provided as per the drawing in CNC Turning, and CNC Milling in a well familiarenvironment. The role also involves study and understand the drawing and selects optimum manufacturing technique by himself and modify/edit the programme as per requirement.	6
Professional Knowledge	• Study and analyze the job/ component drawing to develop model by using CAD/CAM software considering the material need to be machined and tool materials which requires knowledge of facts, principles processes and general concepts in working field.	The job holder in this job role must have knowledge and understanding the concepts based on facts and principles, processes with respect to different kinds of CAD/CAM software to develop model by studying information from Engineering drawings. The job holder also have the field of knowledge on the manufacturing techniques and specification of CNC machines for which the program need to be generated.	6
Professional Skill	• Selection of proper cutting speed, feed and depth of cut which depends on the type of material, process and cutting tool to generate the programme for	The Job holder must know the correct procedures to address problems commonly encountered during generating and transferring the program for the specified controllers and able to detect and solve the problem in a timely	6

	manufacturing the job. • Do modeling and generate program to manufacture the job/ component according to specified controller and language of the machine as per drawing. • Edit the program whenever required and execute the same for manufacturing. • Send the program to the machine through DNC for optimum utilization of resources. • Optimize the data transfer from computer to machine for smooth manufacturing process.Identify the material which will be used for manufacturing product. • Identify and select the proper machines, cutting tools and measuring instruments to carry out the job. • Read the drawing and conceive the idea to generate program and recognize the fault on the machine during operation.	manner; interpret in-built machine alarms/sounds and respond to the same as per operating manual/organizational guidelines and rules and ensure the quality of the manufactured product is maintained as per standard.	
Core Skill	• Calculate the machining parameters like cutting speed, feed and depth of cut. • Communicate to the supervisors/ co-workers if anything goes wrong during the process. • Aware about the social as well as environmental situations during working.	The job holder will have wide range of numerical and computational abilities for different machining process , communications, health, safety, first aid, He must also be able to read drawing and complete documentation as per organizational procedures which could be in local or English	6

		language Numerical abilities limited to: Numerical computations: addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages Algebraic expressions: Represent numerical quantities using symbols, apply laws of precedence in the use of precedence (BODMAS) identify various basic, compound and solid shapes use appropriate measuring techniques and units of measurement, etc.	
Responsibility	• Understand the drawing properly, create model and generate program for the particular profile on the work piece independently and solve the related problems of the co-workers.	The candidate is expected to perform as per given instructions, taking responsibility of proper execution of the program generated and its actions for the operation, quality and accuracy of the work. The candidate with this job role works independently and takes own responsibility fully and also takesfull responsibility of other colleagues through the work to meet the organizational output.	6

SECTION 3

Evidence of Need

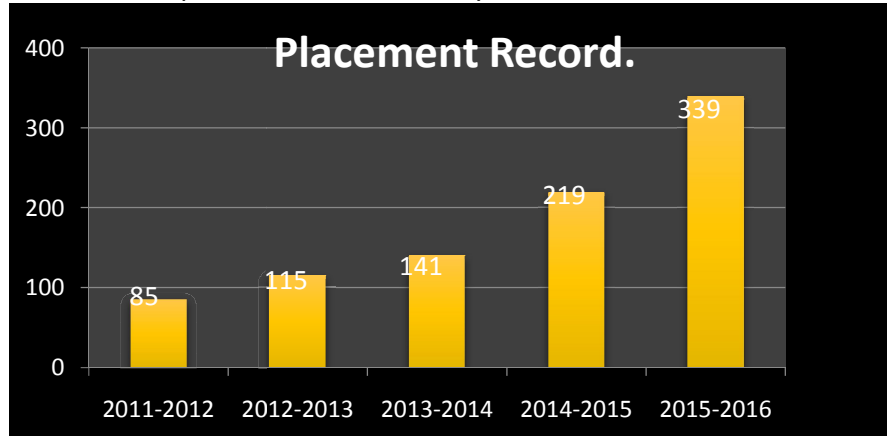| **What Evidence is there that the Qualification is needed?** |
|---|
|
• Decision of the management review meeting.**(Ref: Annexure- II)**
• Industry Requirements **(Ref: Annexure-III)** |

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What is the estimated uptake of this Qualification and what is the basis of this estimate?
- The estimated uptake of this qualification in the year of 2016-17 is700.
- The basis of this estimation is based on the requirements of manpower in the industries of this qualification of last five years.

Placement Record.

Year	Placement
2011-2012	85
2012-2013	115
2013-2014	141
2014-2015	219
2015-2016	339

Trainees Trained/Trainees opted for Placement/Trainees placed in last five year:
2165/934/900

What steps were taken to ensure that the Qualification(s) does/do not duplicate already existing or planned Qualifications in NSQF?
The qualification is originally designed by curriculum committee comprising the training head, industrial expert, academic professional experts.

The work group under the guidance of curriculum development committee already conducted desk search as well as refers the qualification packs for as a supporting document for the mapping of curriculum.

As per the search it is found that, the advanced diploma course is not available for the skill development of the candidates in CNC programming and techniques of 6 months duration under the Capital goods and Automotive sector skill council.

What arrangements are in the place to monitor and review the Qualification(s)?
What data will be used and at what point will the Qualification(s) be revised or updated?

The curriculum committee meeting for review will be in the month of Jan 2018 which comprising industrial expert, training head and representative of existing employers. Feedbacks of each trainee are used by core committee for revision and up gradation of the qualification.

The data used for revision or update will be impact analysis (student and industries) and new subject area opportunities, multiple entry and exits incorporated or RPL strategy implementations.

The curriculum review and updates, in consultation with industries and expert of respective domain, NOS approved by NSDA will also be referred from time to time.

NSQF QUALIFICATION FILE
Version 6: Draft of 08 March 2016

SECTION 4

EVIDENCE OF PROGRESSION

What steps have been taken in the design of this or other Qualifications to ensure that there is a clear path to other Qualifications in this Sector?

Qualifying trainee will obtain a CTTC Certificate for 'Advanced diploma in CNC programming techniques and Practices'. After 2 year of experience trainees may get the opportunities to work as supervisor as a career progression with this position and experience of 3 years gives career scope of assistant supervisor of respective department. Also he/she can become an entrepreneur in this sector after getting 3 year of experience. The below mention diagrams represent the vertical mobility for the job holder as a job progression in CNC Programming field.

Career Progression for a trainee appointed as CNC Programmer