







APPRENTICESHIP CURRICULUM (OPTIONAL TRADE)

Rubber

CAD/CAM Designer_Plastic Product

Course Code: CO082200015

⊠NAPS □Non-NAPS

NSQF Level: 5



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Course Details

1.	Course Name	CAD/CA	M Designer_Plastic Produ	uct			
2.	Course Code	CO08220	CO082200015				
3.	Apprenticeship Training Duration:	Months: 12 months					
	(2 to 4 weeks of BT is embedded in this duration as per the requirement						
	of the establishment)						
	Remarks						
4.	Credit	TBD					
5.	NSQF Level (Mandatory for NAPS)	5	NSQC.	Approval Date: 31st	March 2022		
6.	Related NSQF aligned qualification details						
		S. No.	QP/ Qualification/ NOS	QP/ NOS Code &	NQR Code		
			Name (As applicable)	Version			
		1.	CAD/CAM	RSC/Q8005_V1	2022/RUB/RSDC/05765		
			Designer_Plastic				
			Product				
7.	Brief Job Role Description		•	ble for designing pla	estic products including toys		
			D/CAM software				
8.	NCO-2015 Code & Occupation (Access the NCO 2015 volumes from:	NCO-201	.5/NIL				
	https://labour.gov.in/organizationsofmole/directorate-general-employment-training- dget)						
9.	Minimum Eligibility Criteria	10t	h Class + I.T.I ((after 10th	class) in the relevan	nt field) with 2 Years of		
.	(Educational and/ or Technical Qualification)			erience experience	Teneral with 2 rears of		
	Leaded to the first the fi		ехре	OR			
			12th Class with A	Years of experience	experience		
			12th Class With 4	OR	CAPCITCHEC		
				OIN			

		Certificate-NSQF (Level 4 - Designer - Plastic Product) with 2 Years of experience						
		relevant						
10.	Entry Age for Apprenticeship	18 years						
11.	Any Licensing Requirements (wherever applicable)	NA						
12.	Is the Job Role amenable to Persons with Disability	☐ Yes	o					
		If yes, check the	applicable type	e of Disability				
		☐ Locomotor Disability	☐ Leprosy Cured Person	☐ Cerebral Palsy	☐ Dwarfism	□ Muscular Dystrophy		
		☐ Acid Attack Victims	☐ Blindness	☐ Low Vision	□ Deaf	☐ Hard of Hearing		
		☐ Speech and Language Disability	☐ Intellectual Disability	☐ Specific Learning Disabilities	☐ Autism Spectrum Disorder	☐ Mental Illness		
		☐ Multiple Sclerosis	☐ Parkinson's Disease	□ Haemophilia	□ Thalassemia	☐ Sickle Cell Disease		
		☐ Multiple Disabilities						
		Remarks:						
13.	Submitting Body Details	Name: Rubber,	Chemical & Petr	ochemical Skill De	evelopment Cour	ıcil		
		E-mail ID: ceo@			•			
		Contact Numbe	r: 011-41009347	7- 48				

14.	Certifying Body	Rubber, Chemical & Petrochemical Skill development Council
15.	Employment Avenues/Opportunities	Self-Employment:
		Trainees can also start their own businesses and also provide jobs to other
		people.
		Maintenance Technician – Plastic Machinery
		Jobs Opportunities in private companies:
		The trainees can get a job in the plastic product manufacturing industry.
16.	Career Progression	Vertical progression
		CAD/ CAM Designer- Plastic Product (Level 5)
		Assistant Manager- Plastic Product Design (Level 6)
		Design Manager (Level 7)
17.	Trainer's Qualification & Experience:	Diploma (Any stream in Engineering) with 5 years of industry experience
18.	Curriculum Creation Date	20/07/2022
19.	Curriculum Valid up to Date	31/03/2025

Module Details

S.No	Module/NOS Name, Code, Version	Name, Code, Outcomes Ma		Assessment Marks		ge
			Th.	Pr.	Th.	Pr.
1	Introduction	 Discuss the objectives and benefits of the Skill India Mission Describe the scope of the Plastic Industry and its sub-sectors Describe various types and characteristics of plastic for making different products Discuss job role and opportunities for CAD/CAM Designer- Plastic Product in Plastic Recycling sector List the basic terminology used in Plastic Manufacturing sector 	0	0	0	0
2	Prepare drawing using CAD/CAM software RSC/N8007 Version: 1.0	 Discuss relevant industry and standards and codes of practice for preparing drawings Explain properties and application of various plastics materials and plastic processing as well as manufacturing and processing of plastic products Discuss the process of reverse engineering and prototyping and feasibility of tool design from constraints view point and manufacturability of product List various types and application of peripherals used in drawing and design terminologies used in building designs for plastic products Explain effective ways of confirming purpose, scope, and information and presentation requirements for drawing/product Describe the methods of interpreting technical data to identify work requirements and reviewing available information relevant to project and work requirements, and identifying and addressing further information needs Describe various approaches to drawing along with types, fundamentals, capabilities, processes, key features and suitability of CAD software for producing specific drawings State the significance of arranging CAD software, tools and equipment as well as setting up the working environment for CAD/CAM designing for work in accordance with standard procedures Describe the procedure of creating and using layers of CAD software and preparing 	40	60	70%	70%

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.		
		advanced drawings in plane orthogonal or equivalent						
		Discuss effective ways to set up prototype for drawings						
		Explain the methods of manipulating and altering images and dimension styles in accordance with						
		the scope of the required design to test ideas on the screen using the CAD software						
		Discuss the importance of following standard naming conventions for CAD files and ensuring						
		proper standard on computer including saving mechanism						
		Describe the process of importing and exporting files into/out of working space and produce hard						
		copies						
		State the significance of organizing presentation of work as per standards						
		• Explain the methods of reviewing and validating CAD files generated out of reverse engineering as						
		well as calculating and validating strength and design analysis of plastic product						
		Describe the methods of closing application and performing CAD housekeeping						
		 Apply proper techniques to identify computing equipment and software used in the drawing and examine requirements for presentation of drawings 						
		Employ appropriate methods to record any measurements of components, sub- assemblies,						
		products, models, equipment, layouts or facilities needed for the preparation of the required drawings						
		Apply appropriate approach to calculate the required dimensions and other drafting details based						
		on measurements						
		Apply proper inspection techniques to check connection of computer peripherals with outlet ports						
		and proper condition of all leads by following manufacturer's instructions						
		Show how to access software applications by following manufacturer's instructions and navigate						
		filing and library system for software application						
		Apply appropriate methods to analyze software templates and identify standard symbols and						
		codes applied in drawing work						
		Show how to use CAD software program and functions to produce drawing and its						

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks							
			Th.	Pr.	Th.	Pr.				
		 elements as per standard protocols Demonstrate how to apply editing and transfer tools and methods to modify drawing elements and add dimensions, text and symbols to drawing elements Apply proper practices to generate different views and perspective for drawing Employ appropriate methods to record application and testing requirements of plastic product in consideration of end use application Show how to save and file drawing elements according to standard procedures and print drawing elements Apply proper methods to print drawing elements and evaluate presentation Employ appropriate methods to check drawings for accuracy and compliance with job specifications Prepare a sample portable document format files to view complete drawings without using CAD software Roleplay a situation to submit the drawings to the authorized person for approval, Apply standard procedures to modify the drawings and file completed drawings 								
S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Marks		1 100 000 1110 110		Passing Percentag	ge Pr.
4	Maintain effectively communicate at the workplace RSC/N5611 Version: 1.0	Discuss various types of workplace communication including communication equipment, document writing and facilitation of team meeting	40	60	70%	70%				

		 Explain standard codes of ethics, policy and procedures relating to effective communication Discuss various effective interpersonal and group communication processes and methods suited to audience and workplace requirement and meaning of various body language forms Elaborate on barriers to effective communication at the workplace and techniques to resolve communication challenges State the significance of facilitating respectful communication amongst others, considering the needs of those from diverse backgrounds and ensuring that all communication is consistent with legislative and other applicable requirements Outline the importance of communicating clearly and accurately with individuals and teams using active listening skills and 				
S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks Th. Pr.		Passing Percentag Th.	ge Pr.
		 questioning techniques to clarify issues or problem areas for resolution Discuss effective ways of building effective and impersonal relationship with subordinates, colleagues and seniors Explain the methods of briefing task to subordinates and team members effectively Describe the methods and techniques to participate in workplace discussion and present and convey workplace information or instructions State the significance of ensuring appropriate usage of agendas and minutes, in accordance with workplace procedures, to convey team decisions to appropriate personnel Explain the standard formats for meeting agendas and minutes documentation Describe the methods of identifying barriers to communication at workplace and resolve the same Role play on how to communicate information using different techniques such as face-to-face, telephonic and written means 				

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
		 Roleplay a situation to assess and respond appropriately to body language of audience Apply proper practices to select communication strategies that are appropriate to the social and personal needs of the receiver and apply communication techniques and skills to effectively communicate with individuals and team Role play on how to brief subordinates and team members and provide performance feedback and additional support to others Dramatize how to seek feedback and assistance from others to improve own communication techniques and work procedures Dramatize on how to co-ordinate with team to integrate work as per requirements 				
5	Manage Housekeeping at workplace RSC/N5605 Version: 1.0	 Outline the cleaning standards, procedures and health, safety and environment guidelines, legislation and regulations Discuss the importance of completing the activities as per the schedule and implications of not following the defined procedures/work instructions Explain the levels of hygiene required by a workplace and importance of maintaining the same during work State the significance of ensuring proper working condition of cleaning equipment along with the availability of material and equipment required for cleaning in the stock at all time Discuss appropriate personal protective equipment for work area, cleaning equipment, tools, materials and chemicals used in cleaning and their storage norms Outline the importance of ensuring the team wears appropriate personal protective equipment for cleaning work, relevant safety board's/signs on the shop floor are properly placed for the safety of self and others and adequate ventilation is available at workplace for carrying out cleaning work 	40	60	70%	70%

		Describe appropriate techniques to inspect and decide the type of cleaning required in the work area and methods and materials used for cleaning various surfaces						
S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks					
			Th.	Pr.	Th.	Pr.		
		 Explain the standard procedure for using cleaning equipment, machinery and agents during cleaning work and importance of following them Describe the correct sequence for cleaning the work area and method to check the treated surface and equipment on completion of cleaning Discuss effective waste management techniques including the importance of following proper mechanism while collecting and disposing off waste Discuss various statutory documents relevant to safety and hygiene and methods to record data on waste disposal at workplace Dramatize a situation to support the team in identifying suitable alternatives for cleaning the areas in case the appropriate equipment and materials are not available and inform the concerned person Prepare a sample schedule plan for cleaning the area Role play on how to inform the affected people about the cleaning activity 						
S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks Th. Pr.		Marks		Passing Percenta	ge Pr.
		Show how to find the most appropriate place to carry out test cleans		Pr.				
		 Apply appropriate methods to monitor that team is following correct cleaning method for the work area, types of soiling and surface and manage the accidental damage caused during the cleaning work Dramatize on how to report to the appropriate person in case of any difficulties during cleaning or if any additional cleaning is required, which is outside the scope of one's responsibility or skill 						

		 Employ proper inspection techniques to check that there is no oily substance left on the floor to avoid slippage and the area is clean, dry and meet the requirements after completion of work and no scrap material is lying around Roleplay a situation to observe that team is following workplace procedures to deal with any accidental damage caused during the cleaning process and return back the equipment, materials and personal protective equipment to store as per standard procedures Show how to update and maintain schedules and records for housekeeping duty Apply proper techniques to check the necessary supplies or consumables are filled for use Outline the standard procedures for health, safety and security, as well as individual's role and 				
6	Manage Health and Safety Practices RSC/N5609 Version: 1.0	responsibilities in this context Discuss standard emergency, evacuation as well as workplace procedures for handling emergency situations and workplace injuries/illnesses and the importance of following the same List various types of fire extinguisher and safety signs along with their meaning Describe potential hazards, risks and threats based on the nature of work, procedure to identify them and report the same Explain the methods of implementing safe working practices for dealing with hazards to ensure safety of self and others and maintaining safe and secure work area State the significance of conducting regular checks on the machines to identify cpotential hazards and following all safety guidelines while using the tools and equipment Explain various materials used for cleaning and sanitizing work area and their storage norms and the correct and safe way to use them required for work State the significance of ensuring that equipment and material are used safely and correctly by the team, heavy and hazardous material is handled with care using appropriate tools and equipment without causing any accident Discuss the personal hygiene and fitness requirements along with the importance of ensuring that team is following hygiene and sanitation regulations and practices while working and the workplace, equipment, restrooms etc. are organized, clean, hazard free and regularly sanitized Outline the importance of good housekeeping in the workplace and appropriate use of protective clothing/ equipment while working Discuss various formats of documents used to record data on waste disposal, safety and hygiene at workplace	30	70	70%	70%

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks				Passing Percentage	
	VEISION	 Role play on how to report any accidents, incidents or problems to the concerned person and respond promptly and appropriately to an accident or medical emergency and take immediate necessary action to reduce further danger Employ appropriate methods to use emergency equipment in accordance with manufacturers' specifications and workplace requirements Show the procedure of providing first aid to the victims wherever required eg.in case of bleeding, burns, choking, electric shock etc. Roleplay how to organise safety drills and training sessions for team members and encourage them and ensure that they attend the safety drills Apply proper inspection techniques to check for any leakages, water logging, pests, fire, pollution, 	Th.	Pr.	Th.	Pr.		
	Implement ethical	etc. at the workplace and take preventive actions and other required steps • Dramatize on how to report advanced hygiene and sanitation issues to appropriate authority • Show how to use and dispose of Personal Protective Equipment (PPE) as required during a pandemic						
7	and sustainable practices at workplace RSC/N5604 Version: 1.0	 Discuss organisational policies for usage of alternate energy source, such as solar energy, for the site. Discuss the importance of efficient utilisation of material and water. Explain basics of electricity and prevalent energy efficient devices. Explain the processes to optimize usage of material and energy/electricity. Enlist common practices for conserving electricity at workplace. Discuss the significance of greening. Classify different categories of waste for the purpose of segregation. 	40	60	70%	70%		

		 Differentiate between recyclable and non-recyclable waste. Discuss various methods of waste collection and disposal. Discuss the importance of completing tasks on time. Discuss the ways to adjust the communication styles to reflect sensitivity towards gender and persons with disability (PwD). Explain the importance of respecting personal space of colleagues and customers. Discuss gender-based concepts, issues and legislation as well organization standards, guidelines, rights and duties of PwD. Discuss the importance of PwD and gender sensitization to ensure that team shows sensitivity towards them. State the importance of following organizational standards and guidelines related to PwD. Recall the rights and duties at workplace with respect to PwD. Employ practices for efficient utilization of material, water and energy/electricity. Demonstrate proper waste collection and disposal mechanism depending upon types of waste. Employ different means and methods of communication depending upon the requirement to interact with the team members. 				
8	Prepare drawing using CAD/CAM software RSC/N8008 Version: 1.0	 Role play a situation on how to offer help to people with disability (PwD) if required at work. Discuss the fundamentals of CAD software and hazard and control measures associated with using CAD system, including housekeeping Discuss the toy modelling techniques and national and international standards for toy manufacturing Describe the purpose of developing 3-D toy model, procedure for creating and manipulating entities in 3-D space and physical properties of shapes created in 3-D space that can be extracted from the drawing file Discuss properties and application of various plastics materials and plastic processing and methods of manufacturing and processing plastic products Explain the methods to determine drawing and documentation requirements by reviewing toy design brief and parameters Describe the methods of identifying and preparing equipment and CAD software for 	40	60	70%	70%

completing the work and procedure to retrieve and manipulate required information and navigate CAD technology

- State the significance of ensuring the drawings comply with relevant tests and standards for toy products
- Explain the methods of reviewing and validating CAD files generated out of reverse engineering
- Describe the calculation methods to calculate and validate strength analysis of plastic product
- Explain process of reverse engineering and prototyping as well as feasibility of tool design from constraints view point and manufacturability of product
- Explain the methods of establishing coordinate system and orientation according to job specifications
- Describe the techniques of extracting physical properties to job requirement, including volume, mass and center of gravity
- Elaborate the principles of perspective for enhancement of the spatial illusion of toy in space
- Discuss various rendering types and preferences, render lighting techniques, and views and scenes for solid models
- Explain the methods of creating simulations of the toy design and performing stress analysis using CAD system to determine the parts in the assembly that are subjected to most amount of stress
- Outline the importance of ensuring that toy model reflects specifications accurately, contains all relevant information, and is presented as per work requirements
- Explain the methods of evaluating work and identifying areas for improvements
- Describe various formats in which drawing files can be saved and the procedure to save and file the drawings as per standard documentation system
- Role play on how to obtain and interpret job specification and blueprint
- Apply proper practices to determine the required design, detailed drawings, modelling and layouts from job specifications
- Employ proper techniques to examine sketches, drawings and other information and confirm calculations and measurements as well as select and prepare computing equipment and suitable software for plastic toy designs

all necessary annotation Employ appropriate techniques to alter the design to reduce any breakages in the prototype Apply proper methods to submit the drawing for approval and modify if required Duration (in Hours) / Total Marks/Passing Percentage 230 370 70%
Total Markey Fundamental Processing Fundament

Glossary

Term	Description
Sector	Sector is a conglomeration of different business operations
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
National Occupational	NOS are occupational standards which apply uniquely in the Indian context.
Standards (NOS)	

Acronyms

Acronym	Description
NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training

Annexure 1: Tools and Equipment

List of Tools and Equipment

The tools and equipment required are:

Sno	Tool / Equipment Name	Specification (per batch of 30 trainees)	
1	White board, marker, projector, CAD installed systems for candidates, first aid kit	15	

Classroom Aids

The aids required to conduct sessions in the classroom are:

- 1 Projector
- 2 Computer/laptops
- 3 Internet connectivity
- 4 Whiteboard

Annexure 2: Assessment Strategy

This section includes the processes involved in identifying, gathering and interpreting information to evaluate the learner on the required competencies of the program.

Assessment System Overview:

- Batches assigned to the assessment agencies for conducting the assessment on SDSM/SIP or email
- Assessment agencies send the assessment confirmation to VTP/TC looping SSC
- Assessment agency deploys the ToA certified Assessor for executing the assessment
- SSC monitors the assessment process & records
- If the batch size is more than 30, then there should be 2 Assessors.

Testing Environment: Assessor must:

- Confirm that the centre is available at the same address as mentioned on SDMS or SIP
- Check the duration of the training.
- Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
- Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
- Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
- Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
- Check the availability of the Lab Equipment for the particular Job Role.

Assessment Quality Assurance levels / Framework:

- Question papers created by the Subject Matter Experts (SME)
- Question papers created by the SME should be verified by the other subject Matter Experts along with the approval required from SSC
- Questions are mapped with NOS and PC

- Question papers are prepared considering that level 1 to 3 is for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor higher management Apprenticeship Curriculum: NAPS Jr. Machine Operator CNC Milling of Plastic Page 20 of 14
- &

- Assessor must be ToA certified
- Assessment agency must follow the assessment guidelines to conduct the assessment

Types of evidence or evidence-gathering protocol:

- Time-stamped & geotagged reporting of the assessor from assessment location
- Centre photographs with signboards and scheme specific branding
- Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
- Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos.

Method of verification or validation:

- Surprise visit to the assessment location
- Random audit of the batch
- Random audit of any candidate

Method for assessment documentation, archiving, and access

- Hard copies of the documents are stored
- Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage and are stored in the Hard Drive

On the Job:

- 1. Assessment for on the job training to be conducted by the industry partner on the practical competency output defined in the NOS/QP and the assessment criteria.
- 2. The candidate must score 70% in each module to complete the OJT.
- 3. Tools of Assessment that can be used are:
 - a. Videos of Trainees during OJT should be shared by employer to RCPSDC.
- 4. Assessment will ensure that the apprentice will be able to:
 - a. Work effectively and efficiently as per schedules and timelines while complying with the health and hygiene norms.
 - b. Implement safety practices.
 - c. Optimize the use of resources to ensure less wastage and maximum conservation.
 - d. Communicate effectively and develop interpersonal skills.