MODEL CURRICULUM

CAM MACHINE OPERATOR

SECTOR: GEMS & JEWELLERY
SUB-SECTOR: CAST AND DIAMONDS-SET JEWELLERY
OCCUPATION: MASTER MAKING
REF ID: G&J/Q2401, VERSION 1.0
NSQF LEVEL: 4

Skill India
कौशल भारत - कुशल भारत

GJSCI
Gem & Jewellery Skill Council of India

N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

GEM & JEWELLERY SECTOR SKILL COUNCIL OF INDIA

for the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: '**CAM Machine Operator**' QP No. '**G&J/Q2401 NSQF Level 4**'

Date of Issuance: **October 15th, 2016**

Valid up to: **October 14th, 2018**

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

Premkumar Kothari

Mr. Premkumar Kothari
Chairman
(Gem & Jewellery Skill Council of India)

CAM Machine Operator

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a "CAM Machine Operator", in the "Gems & Jewellery" Sector and aims at building the following key competencies amongst the learner

Program Name	**CAM Machine Operator**		
Qualification Pack Name & Reference ID	G&J/Q2401, Version 1.0		
Version No.	1.0	**Version Update Date**	Not Applicable
Pre-requisites to Training	Minimum 12th standard or diploma		
Training Outcomes	**After completing this programme, participants will be able to:** • **Produce resin-based jewellery prototype using milling:** producing resin based prototype using CAM machine for a range of jewellery designs. The prototype is used for manufacturing jewellery or components in large quantity • **Use rapid prototyping technology:** producing resin based prototype using rapid prototyping machine for a range of jewellery designs, for further use in mass production of jewellery products in the jewellery manufacturing process. • **Respect and maintain IPR:** Respecting Intellectual Property Rights of company's products and designs to avoid infringement. • **Coordinate with others:** Encouraging artisan to work as a team and multitask and communicate with colleagues. • **Maintain occupational health and safety:** Familiarising artisan towards potential hazards to make work environment safe for everyone.		

This course encompasses 5 out of 5 National Occupational Standards (NOS) of "CAM Machine Operator" Qualification Pack issued by "Gem & Jewellery Skill Council of India".

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	**Produce resin-based jewellery prototype using milling** **Theory Duration** (hh:mm) 10:00 **Practical Duration** (hh:mm) 110:00 **Corresponding NOS Code** G&J/N2401	• To accurately set up and calibrate the CAM machine • To select appropriate cutting tools • To select resin type, size and thickness as per jewellery design • To accurately measure design dimensions (prong thickness, gap between diamonds) and prepare detailed note for the precision required at the manufacturing stage • To inspect and report 3D design errors before CAM operation • To produce number of resin based prototype/model as per target given and timely deliver it for mass production • To produce quality approved models as per the design and instructions given by merchandiser or designer • To minimise productions disruptions because of model imperfections	**Mandatory** – CAM machine, Resin (Amethyst), Acetone, UV / IR Machine (For heating resin), Vacuum Machine (For part cleaning), IPRO (Chemical), Computer, Software (Magics,3D lighter, Built station), Jewel CAD, Platform tray, 1 Ton AC for 100 sq. ft. area
2	**Use rapid prototyping technology (RPT)** **Theory Duration** (hh:mm) 10:00 **Practical Duration** (hh:mm) 110:00 **Corresponding NOS Code** G&J/N2402	• To receive the design concepts and prepare for RPT machine operations • To use RPT machine for generating resin prototype • To remove model from RPT machine • To produce number of resin based prototype/model as per target given and timely deliver it for mass production • To produce quality approved models as per the design and instructions given by merchandiser or designer • To minimise productions disruptions because of model imperfections • To ensure that multiple pieces on the prototype platform do not touch one another	**Mandatory** – CAM machine, Resin (Amethyst), Acetone, UV / IR Machine (For heating resin), Vacuum Machine (For part cleaning), IPRO (Chemical), Computer, Software (Magics,3D lighter, Built station), Jewel CAD, Platform tray, 1 Ton AC for 100 sq. ft. area
3	**Respect and maintain IPR** **Theory Duration** (hh:mm) 01:00	• To have good understanding of what is Intellectual Property Rights • To know the basics of IPR and patent laws	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Practical Duration (hh:mm) 02:00 **Corresponding NOS Code** G&J/N9901	• To know prevention and protection of manufacturing techniques practised in the company • To have sound knowledge of company policies related to IPR • To understand what to do in case of violation of IPR rules • To understand what all IPR is inclusive of • To know direct relation of IPR violation and its effect on company's competitiveness in market	
4	**Coordinate with others** **Theory Duration** (hh:mm) 02:00 **Practical Duration** (hh:mm) 02:00 **Corresponding NOS Code** G&J/N9902	• To know reporting structure • To know coordinating with supervisor and when to deal with a colleague individually • To understand importance of team work • To know sharing of workload	
5	**Maintain occupational health and safety** **Theory Duration** (hh:mm) 01:00 **Practical Duration** (hh:mm) 02:00 **Corresponding NOS Code** G&J/N9905	• To maintain personal hygiene • To maintain cleanliness of bench and tools • To understand first aid and emergency procedures • To report electrical	Mask, Hand gloves
	Total Duration **Theory Duration** 24:00 **Practical Duration** 226:00	**Unique Equipment Required:** CAM machine, Resin (Amethyst), Acetone, Mask, Hand gloves, UV / IR Machine (For heating resin), Vacuum Machine (For part cleaning), IPRO (Chemical), Computer, Software (Magics,3D lighter, Built station), Jewel CAD, Platform tray, 1 Ton AC for 100 sq. ft. area	

Grand Total Course Duration: **250 Hours, 0 Minutes**

*(This syllabus/ curriculum has been approved by **Gem and Jewellery Skill Council of India**)*

Trainer Prerequisites for Job role: "CAM Machine Operator" mapped to Qualification Pack: "G&J/Q2401, Version 1.0."

Sr. No.	Area	Details
1	**Job Description**	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack "G&J/Q2401", Version 1.0.
2	**Personal Attributes**	Aptitude for conducting training, and pre/post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field.
3	**Minimum Educational Qualifications**	Graduate, preferably
4a	**Domain Certification**	Certified for Job Role: CAM Machine Operator mapped to QP: **"**G&J/Q2401, Version 1.0**"**. Minimum accepted score as per SSC guidelines is 80% on the SSC prescribed online theory assessment test based on an industry validated question bank.
4b	**Platform Certification**	Recommended that the Trainer is certified for the Job Role: "Trainer", mapped to the Qualification Pack: "SSC/1402". Minimum accepted score for the trainer is 80% as per SSC guidelines.
5	**Experience**	Minimum 3 years of experience in operating CAM Machine

Annexure: Assessment Criteria

Assessment Criteria	
Job Role	CAM Machine Operator
Qualification Pack	G&J/Q2401, Version 1.0
Sector Skill Council	Gem & Jewellery Skill Council of India

Sr. No.	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 lay down 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 theory question papers for candidates at every examination/training centre. (as per assessment criteria below)
4	Individual assessment agencies will create practical tests for skill evaluation for candidates at every examination/training centre. (as per assessment criteria below)
5	To pass the Qualification Pack, every candidate should score a minimum 70% of aggregate marks to successfully clear the assessment
6	In case of successfully passing only certain number of NOSs, the candidate is eligible to take subsequent assessment on the balance NOSs to pass the Qualification Pack.

		Marks Allocation			
Assessment outcomes	**Assessment Criteria for outcomes**	**Total Marks (80+20)**	**Out Of**	**Theory**	**Skills Practical**
1.G&J/N2401 Produce resin-based jewellery prototype using milling	PC1. Accurately set up and calibrated CAM machine	**37**	4	1	3
	PC2. Select appropriate cutting tools		3	0	3
	PC3. Select resin type, size and thickness according to jewellery design		8	3	5
	PC4. Accurately measure design dimensions (prong thickness, gap between diamonds)		5	0	5
	PC5. Prepare detailed note for the precision required at the manufacturing stage		3	0	3
	PC6. Inspect and report 3D design errors before CAM operation		3	0	3
	PC7. Timely deliver resin based prototype/model for mass production of jewellery pieces		2	0	2
	PC8. Produce number of prototype/model as per target given		2	0	2
	PC9. Produce quality approved models as per the design and instructions given by merchandiser or designer		4	1	3
	PC10. Minimise productions disruptions because of model imperfections		3	0	3
		Total	**37**	**5**	**32**
2. G&J/N2402 Use rapid prototyping technology (RPT)	PC1. Accurately set up and calibrated CAM machine	**38**	2	1	1
	PC2. Select appropriate cutting tools		2	0	2
	PC3. Select resin type, size and thickness according to jewellery design		6	1	5
	PC4. Accurately measure design dimensions (prong thickness, gap between diamonds)		6	1	5
	PC5. Prepare detailed note for the precision required at the manufacturing stage		2	0	2
	PC6. Inspect and report 3D design errors before CAM operation		2	0	2
	PC7. Upload file correctly		2	0	2
	PC8. Calibrate accurately for minimum vibration		3	1	2
	PC9. Clean the prototype properly		3	1	2
	PC10. Timely deliver resin based prototype/model for mass production of jewellery pieces		2	0	2

	PC11. Produce number of prototype/model as per target given		2	0	2
	PC12. Produce quality approved models as per the design and instructions given by merchandiser or designer		2	0	2
	PC13. Minimise productions disruptions because of model imperfections		2	0	2
	PC14. Ensure that multiple pieces on the prototype platform do not touch one another		2	0	2
		Total	**38**	**5**	**33**
3. G&J/N9901 Respect and maintain IPR	PC1. Be able to spot plagiarism and report	**9**	3	2	1
	PC2. Be aware of patents and IPR		4	1	3
	PC3. Not be involved in IPR violations		2	1	1
		Total	**9**	**4**	**5**
4. G&J/N9902 Coordinate with others	PC1. Understand the work output requirements	**8**	2	1	1
	PC2. Comply with company policy and rule		1	0	1
	PC3. Deliver quality work on time as required by reporting any anticipated reasons for delays		1	0	1
	PC4. Put team over individual goals		1	1	0
	PC5. Be able to resolve conflicts		1	0	1
	PC6. Learn how to multi-task relevant activities		2	1	1
		Total	**8**	**3**	**5**
5. G&J/N9905 Maintain occupational health and safety	PC1. Spot and report potential hazards on time	**8**	2	1	1
	PC2. Follow company policy and rules regarding use of hazardous materials		2	0	2
	PC3. Attend and actively participate in the health and safety campaigns organised by the company		2	1	1
	PC4. Use or wear safety gear as per the rules of the company		2	1	1
	Sub Total		**8**	**3**	**5**
	Grand Total		**100**	**20**	**80**
	Percentage Weightage:			**20%**	**80%**
	Minimum Pass % to qualify (aggregate):			**70%**	