GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

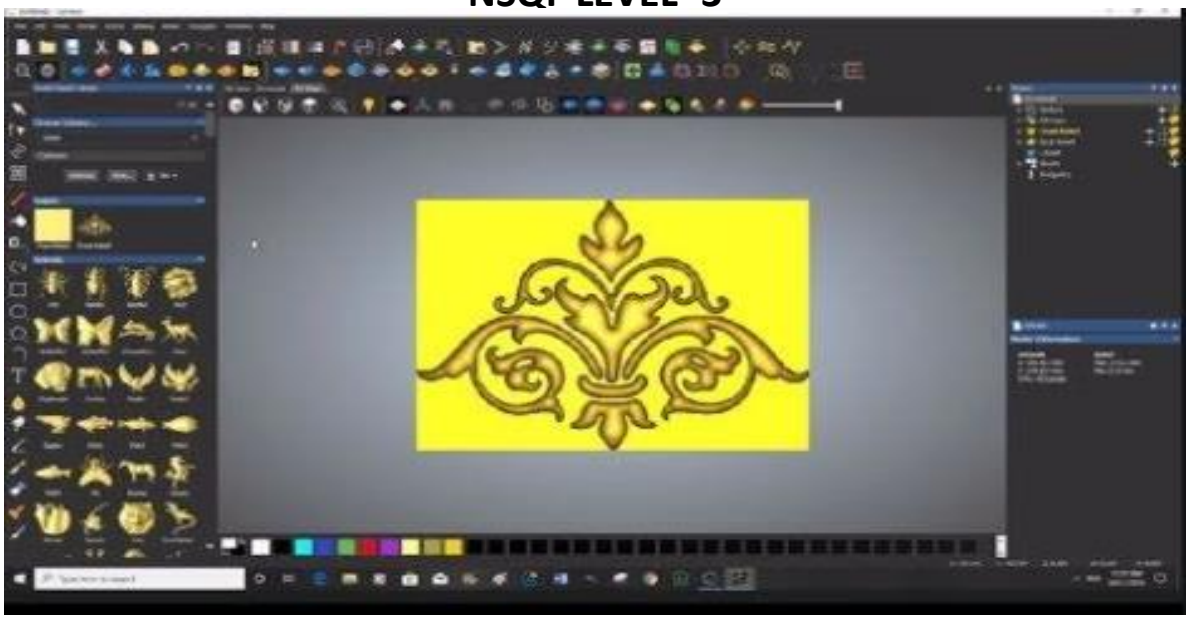
COMPETENCY BASED CURRICULUM

ARTISAN USING ADVANCED TOOL

(Duration: One Year)
(Revised in July 2022)

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 3



SECTOR –CAPITAL GOODS & MANUFACTURING

Directorate General of Training

ARTISAN USING ADVANCED TOOL

(Non-Engineering Trade)

(Revised inJuly 2022)

Version: 2.0

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL - 3

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

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CONTENTS

1. COURSE INFORMATION

During the one-year duration of Artisan Using Advanced Tool, a candidate is trained on Professional Skill, Professional Knowledge, Engineering Drawing, Workshop Calculation &Science and Employability Skill related to job role. In addition to this, a candidate, is entrusted to undertake project work, extracurricular activities to build up confidence.

The course will start with the safety aspect in general and specific to the trade, identification of tools & equipment, raw materials used. The trainee will perform Measuring &marking by using various Measuring & Marking tools.

Artisan Using Advanced Tool – Artisan Software toolis leading design tools, flexible manufacturing features and trusted by organizations and creative professionals around the world. It gives the power to create truly artistic, precision products for a wide variety of applications.

Students will get knowledge of artwork, most common vector and bitmap file formats.

Artisan Software directly supports over 300 CNC machine tools that range from desktop routers, rotary machines and laser engraving units, all the way through to large industrial hardware dedicated to production manufacturing. Artisan Software can also output solid cad model file – widely regarded as the industry standard format and accepted by most CNC machine tools. If you'd like to use a 3D printer, Artisan Software also allows you to export your design in the STL format.

Artisan Using Advanced Tool course is designed to give a solid introduction to the key tools and features you'll find in every product within the Artisan software package. The course will help students to understand the importance of Artwork in industry and practical hands on experience on Artisan software includes all its basics fundamental commands, operations and applications includes Basic 2D Machining and tool database and cutting Parameters selection,

Texture flow functions, to develop Rings, Bannisters, Turned Furniture designs, Pillars, Statues, Roller Dies etc., Machine Relief Tool paths, Roughing and Finishing functions, 3D Simulation and NC code Generation, tool Rotary Machining & Modelling Setup and to develop physical components by using 3D printer machine, CNC/VMC machine& laser cutting machine. Also helps student to understand and maintaining the documentation record.

2. TRAINING SYSTEM

2.1 GENERAL

The Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers a range of vocational training courses catering to the need of different sectors of economy/ Labour market. The vocational training programmes are delivered under the aegis of Directorate General of Training (DGT). Craftsman Training Scheme (CTS) with variants and Apprenticeship Training Scheme (ATS) are two pioneer schemes of DGT for strengthening vocational training.

CTScoursesaredeliverednationwidethroughnetworkofITIs.Thecourse'Artisan Using Advance Tool' is of one-year duration. It mainly consists of Domain area and Core area. The Domain area (Trade Theory and Trade Practical) imparts professional skills and knowledge, while Core area (Employability Skills) imparts requisite core skill, knowledge and life skills. After passing out of the training program, the trainee is awarded National Trade Certificate (NTC) by DGT which is recognized worldwide.

Candidates broadly need to demonstrate that they are able to:

- Read and interpret technical parameters/documents, plan and organize work processes, identify necessary materials and tools;
- Perform tasks with due consideration to safety rules, accident prevention regulations and environmental protection stipulations;
- Apply professional skill, knowledge & employability skills while performing jobs.
- Document the technical parameters related to the task undertaken.

2.2 PROGRESSION PATHWAYS

- Can join industry as Artisan and will progress further as Senior Artisan, Supervisor and can rise up to the level of Manager.
- Can become Entrepreneur in the related field.
- Can join Apprenticeship Programmes in different types of industries leading to a National Apprenticeship Certificate (NAC).
- Can join Crafts Instructor Training Scheme (CITS) in the trade for becoming an instructor in ITIs.

2.3 COURSE STRUCTURE

Table below depicts the distribution of training hours across various course elements during a period of one year: -

S No.	Course Element	Notional Training Hours
1	Professional Skill (Trade Practical)	840
2	Professional Knowledge (Trade Theory)	240
5	Employability Skills	120
	Total	**1200**

In addition, every year 150 hours of mandatory on the job training (OJT) in the industry, if nearby industry is not available then group project will be mandatory.

On the Job Training (OJT)/ Group Project	150

Trainees of One-year or two-year trade can also opt for optional courses of up to 240 hours in each year for 10^{th}/12^{th} class certificate along with ITI certification, or, add on short term courses.

2.4 ASSESSMENT & CERTIFICATION

The trainee will be tested for his skill, knowledge and attitude during the period of course through formative assessment and at the end of the training programme through summative assessment as notified by the DGTfrom time to time.

a) The **Continuous Assessment** (Internal)during the period of training will be done by **Formative Assessment Method** by testing for assessment criteria listed against learning outcomes. The training institute has to maintain an individual trainee portfolio as detailed in assessment guideline. The marks of internal assessment will be as per the formative assessment template provided on www.bharatskills.gov.in.

b) The final assessment will be in the form of summative assessment. The All India Trade Test for awarding NTC will be conducted by Controller of examinations, DGT as per the guidelines. The pattern and marking structure is being notified by DGT from time to time. **The learning outcome and assessment criteria will be the basis for setting question papers for final assessment. The examiner during final examination will also check** the individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS REGULATION

For the purposes of determining the overall result, weightage of 100% is applied for six months and one-year duration courses and 50% weightage is applied to each examination for two years courses. The minimum pass percent for Trade Practical and Formative assessment is 60% & for all other subjects is 33%.

2.4.2 ASSESSMENT GUIDELINE

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be takeninto account while undertaking the assessment. Due consideration should be given while assessing for teamwork, avoidance/reductionofscrap/wastage and disposal of scrap/waste as per procedure, behavioral attitude, sensitivity to the environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency.

Assessment will be evidence based comprising some of the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment
- Project work
- Computer based multiple choice question examination
- Practical Examination

Evidences and records of internal (Formative) assessments are to be preserved until forthcoming examination for audit and verification by examining body. The following marking pattern to be adopted for formative assessment:

Performance Level	Evidence

(a) Marks in the range of 60%-75% to be allotted during assessment	
For performance in this grade, the candidate should produce work which demonstrates attainment of an acceptable standard of craftsmanship with occasional guidance, and due regard for safety procedures and practices	• Demonstration of good skills and accuracy in the field of work/ assignments. • A fairly good level of neatness and consistency to accomplish job activities. • Occasional support in completing the task/ job.
(b)Marks in the range of 75%-90% to be allotted during assessment	
For this grade, a candidate should produce work which demonstrates attainment of a reasonable standard of craftsmanship, with little guidance, and regard for safety procedures and practices	• Good skill levels and accuracy in the field of work/ assignments. • A good level of neatness and consistency to accomplish job activities. • Little support in completing the task/job.
©Marks in the range of more than 90% to be allotted during assessment	
For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.	• High skill levels and accuracy in the field of work/ assignments. • A high level of neatness and consistency to accomplish job activities. • Minimal or no support in completing the task/ job.

3. JOB ROLE

After completing this course, technician can craft beautifully detailed 3D pieces using flexible starting points. Intricate 3D designs to create from scratch, built from pre-drawn vector artwork or assembled from imported triangle or surface models.

Designs a variety of product from routing wood, creating molds or press tools, laser cutting, engraving hard-wearing metals for production lines, or simply nesting designs to achieve the minimum amount of material waste.

There are many opportunities in different industries for job roles like Artistic CADCAM Technician, Artistic CADCAM Specialist, CNC Router, Sculptor, Modeler, Commercial Artist, Visual Artist in different industries like Automotive, Architecture, Die Mold, Footwear, Toys, Packaging, Lighting, Sign making, Woodworking, Jewelry, Cabinetry, Furniture, Interiors, Patternmaking, Government Mints, Biscuit and Chocolate Making, Theme Park, Film Studio, Textile Industry, Paper Industry, Cutlery, Sanitary,etc.

Sculptor;Carves figures, statues, monuments and other imaginative designs in abstract forms by 6odeling6 stone or carving wood or 6odeling clay or any other material either direct from original or from models prepared by him or Modeller. Selects material such as stone, wood, clay, ivory, marble, wax, etc. according to requirements. Sketches design and makes scale model in wax or plaster. Transfers measurements to block. Carves, or shapes block using different tools achieving unity and harmony. Is designated as Sthapathi if engaged in designing, carving and drilling holes in stones to make Idols for use in temples from mental perception as described in 'Shastras' (holy scriptures of Hindus) by the use of hammer and chisels only. May sharpen tools by hand or on machine. May inscribe decorative lettering and monumental sculptures on models. May make clay or wax models and caste same in plaster of Paris or bronze.

Modeller (Except Stone); makes clay or plaster of Paris models of pottery, porcelain and models of anatomical studies according to drawing and specifications, for mass production. Prepares clay, wax or plaster of Paris foundation. Carves material, using shaping tools, lathe or potter's wheel to resemble model to exact size and other specifications. May prepare model of important persons by observing person's facial expression and features, and carving and shaping material to required size and form. May create own designs.

Stone Modeller; Stone Statue Maker carves out features, statues, models, idols and other artistic designs on stone slabs, blocks or pillars for construction of temples, monuments,

fountains, buildings etc. using hand tools. Studies nature of carvings to be done from drawings, photographs, written descriptions etc. or receives instructions from Sthapathi or other appropriate authority. Forms mental picture of carving to be done and selects required type of stone such as marble, soapstone, granite, green stone, etc. Chips off unwanted portions of stone with hammer and chisel and marks outline of figures with chalk, pencil or ochre solution by free hand sketching using drawing and measuring instruments. Places stone in working position, applies oil over its surface if working on granite and carefully carves out figures, statues, idols, models etc. as designed using hammer and chisels of different sizes. Marks portion with paint otherwise to indicate stages of work and facilitate carving and gives smooth and finishing touches to carved figures using fine chisels. Cuts slits and drills holes as designed using saw blades and hand drills or with hammer and chisels depending on specifications and nature of work done particularly for carvings of idols and images meant for temples. Brushes off dust and waste material from object and sprinkles water on it, as necessary, while carving. May carve numbers and letters and create designs. May make clay model of statue or image to be carved to ensure accuracy and facilitate working.

Commercial Artist; prepares designs for advertising articles or draws illustrations for books, magazines, posters, charts, hoardings etc. in suitable columns. Studies specifications and discusses details and cost with client. Determines subject matter in consultation with client and draws designs and sketches with or without colour to desired effect. Executes approved design in required medium such as paints, oils, water-colour etc.

Visual Artists, Other;Sculptors, Painters and Related Artists, other include all other sculptures, painters and related artists engaged in specialized fields of painting, sculpture, 7odeling etc. not elsewhere classified.

Reference NCO-2015:

a) 2651.0100 – Sculptor
b) 2651.0200 – Modeller (Except Stone)
c) 2651.0300 – Stone Modeller
d) 2166.0100 – Commercial Artist
e) 2651.9900 – Visual Artists, Other

Reference NOS:

i) MIN/N1702,MIN/N1703, MIN/N1704,MIN/N1705, HCS/N9913,HCS/N9902
ii) HCS/N0802
iii) HCS/N4406,HCS/N0101
iv) HCS/N5601,HCS/N0102

v) HCS/N5202
vi) HCS/N9416
vii) HCS/N9417
viii) HCS/N9418
ix) HCS/N9419
x) HCS/N9420
xi) MIN/N0469
xii) HCS/N4506,HCS/N4504
xiii) CSC/N9401

4. GENERAL INFORMATION

Name of the Trade	**ARTISAN USING ADVANCED TOOL**
Trade Code	DGT/2023
NCO – 2015	2651.0100, 2651.0200, 2651.0300, 2166.0100, 2651.9900
NOS Covered	MIN/N1702,MIN/N1703, MIN/N1704,MIN/N1705, HCS/N9913,HCS/N9902 HCS/N0802 HCS/N4406,HCS/N0101 HCS/N5601,HCS/N0102 HCS/N5202 HCS/N9416 HCS/N9417 HCS/N9418 HCS/N9419 HCS/N9420 MIN/N0469 HCS/N4506,HCS/N4504 CSC/N9401

NSQF Level	Level-3
Duration of Craftsmen Training	One Year (1200 Hrs. + 150 hours OJT/Group Project)
Entry Qualification	Passed 10th class examination
Minimum Age	14 years as on first day of academic session.
Eligibility for PwD	LD, CP, LC, DW, AA, LV, DEAF, AUTISM, MD
Unit Strength (No. of Student)	10 (There is no separate provision of supernumerary seats)
Space Norms	120 Sq. m
Power Norms	3 KW (extended battery backup mandatory)
Instructors Qualification for:	
(i) Artisan Using Advanced Tool Trade	B. Voc/Degree in Mechanical/Industrial Engineering from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevantfield. OR 03 years Diploma in Mechanical/Industrial Engineering from AICTE/ recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant field. OR NTC/NAC passed in the trade of "Artisan Using Advanced Tool" with three years' experience in the relevant field. **Essential Qualification:** Relevant National Craft Instructor Certificate (NCIC) in any of the variants under DGT. ***Note:-Out of two Instructors required for the unit of 2 (1+1), one must have Degree/Diploma and other must have NTC/NAC qualifications.However,both of them must possess NCIC in any of its variants.***
(ii) Employability Skill	MBA/ BBA / Any Graduate/ Diploma in any discipline with Two years' experience with short term ToT Course in Employability Skills. (Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above)

	OR Existing Social Studies Instructors in ITIs withshort term ToT Course in Employability Skills.
(iii) Minimum Age for Instructor	21 Years
List of Tools and Equipment	As per Annexure – I

5. LEARNING OUTCOME

Learning outcomes are a reflection of total competencies of a trainee and assessment will be carried out as per the assessment criteria.

5.1 LEARNING OUTCOMES (TRADE SPECIFIC)

1. Recognize and comply safe working practices. (NOS: MIN/N1702,MIN/N1703, MIN/N1704,MIN/N1705, HCS/N9913,HCS/N9902)

2. Make different basic drawing and mathematical geometrical calculations. (NOS: HCS/N0802)
3. Plan & perform basic drawing and engineering calculations. (NOS: HCS/N0802)
4. Identify basic materials and product manufacturing process. (NOS: HCS/N4406,HCS/N0101)
5. Perform inspection with different measurement tools & techniques to ensure the quality of product. (NOS: HCS/N5601,HCS/N0102)
6. Plan and execute the user interface and basic set up of artisan design software. (NOS: HCS/N5202)
7. Perform basic setting, layout setup & Interface Customization in artisan software. (NOS: HCS/N5202)
8. Apply standard geometrics and artisan design software (such as circle, rectangular, arcs and text). (NOS: HCS/N5202)
9. Perform artisan software operation to Edit Mode, Scale the Geometries, break the vectors and re-join. (NOS: HCS/N5202)
10. Apply basic 2D machining, Tool Database, Cutting Parameters selection and application. (NOS: HCS/N5202)
11. Observe and create simple and advanced 3D Design which can generate some complex reliefs in artisan operation. (NOS: HCS/N5202)
12. Measure texture flow function use Texture Flow function by creating scales for a relief incorporate with manufacturing standards. (NOS: HCS/N9416)
13. Design cylindrical surface of the model and add the required artistic details. (To develop Rings, Bannisters, Turned Furniture designs, Pillars, Statues, Roller Dies etc.). (NOS: HCS/N5202)
14. Perform on 3D Machining, Tool Database and Machining Parameters (Cutting). (NOS: HCS/N9417)
15. Work on Machine Relief Toolpaths, Roughing and Finishing functions. (NOS: HCS/N9418)
16. Check 3D simulation and NC code Generation using artisan software. (NOS: HCS/N9419)
17. Use of Rotary Machining & Modeling Setup tools. (NOS: HCS/N9420)
18. Assess the additive manufacturing set up CNC/ VMC set up, laser cutting machine & general tools for develop the physical model. (NOS: MIN/N0469)
19. Carryout processing and painting to finish the component. (NOS: HCS/N4506,HCS/N4504)
20. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: CSC/N9401)

6. ASSESSMENT CRITERIA

LEARNING OUTCOME	ASSESSMENT CRITERIA
1. Recognize and comply safe working practices. (NOS: MIN/N1702,MIN/N1703, MIN/N1704,MIN/N1705, HCS/N9913,HCS/N9902)	Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements.
	Recognize and report all unsafe situations according to site policy.
	Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.
	Identify, handle and store / dispose of dangerous/unsalvageable goods and substances according to site policy and procedures following safety regulations and requirements.
	Identify and observe site policies and procedures in regard to illness or accident.
	Identify safety alarms accurately.
	Report supervisor/ Competent of authority in the event of accident or sickness of any staff and record accident details correctly according to site accident/injury procedures.
	Identify and observe site evacuation procedures according to site policy.
	Identify Personal Productive Equipment (PPE) and use the same asper related working environment.
	Identify basic first aid and use them under different circumstances.
2. Make different basic drawing and mathematical geometrical calculations. (NOS: HCS/N0802)	Identify the customer needs.
	By using different strategies improve perceived quality level
3. Plan & perform basic drawing and engineering calculations. (NOS: HCS/N0802)	Identify the drawing projection method.
	Apply Geometric dimensions & Tolerances as per assembly prospect.
	Preparation of Bill of Material.
	Perform basic engineering calculation.
4. Identify basic materials and product manufacturing process. (NOS:	Select material as per applicability.
	Select appropriate manufacturing processes.

HCS/N4406,HCS/N0101)	
5. Perform inspection with different measurement tools & techniques to ensure the quality of product. (NOS: HCS/N5601,HCS/N0102)	Select appropriate measuring instruments such as micrometers, Vernier calipers, etc. (as per tool list).
	Measure dimension of the components observing standard inspection process & record data to analyze with given drawing/measurement.
	Calibrate the measuring instruments.
6. Plan and execute the user interface and basic set up of artisan design software. (NOS: HCS/N5202)	Perform basic set up of Graphic User Interface to Artisan Software.
	Customize the layout of artisan software.
	Customize the toolbars of artisan artisan module.
7. Perform basic setting, layout setup & Interface Customization in artisan software. (NOS: HCS/N5202)	Customize the Docking Toolbars, Panels and Themes for artisan software.
	Customize the shortcut keys for artisan software to improve productivity.
	Interface Customization in artisan Software.
8. Apply standard geometrics and artisan design software (such as circle, rectangular, arcs and text). (NOS: HCS/N5202)	Create artisan work using standard geometries.
	Create Various curves, vector layers & shapes creation.
	Use of Node Mode to convert the spans to Arcs and convert them to free flow shapes.
9. Perform artisan software operation to Edit Mode, Scale the Geometries, break the vectors and re-join. (NOS: HCS/N5202)	Create and Edit mode the geometrics by using artisan software.
	Scale up the geometrics by using artisan software.
	Create and Break the vectors and re-join.
	Crate art work by using Vector Layers.
10. Apply basic 2D machining and Tool Database and Cutting Parameters selection and application.	Setting up the software for Basic 2D Machining
	2D Machining parameter selection and updating in tool library.
	Create 2D Profiling, 2D Roughing, Drilling, V Bit Carving and Bevel Carving.

(NOS: HCS/N5202)	
11. Observe and create simple and advanced 3D Design which can generate some complex reliefs in artisan operation. (NOS: HCS/N5202)	Create & Edit the Shape with the help of artisan standard toolbar.
	Add &Subtract the 3D geometries in artisan software.
	Use of smooth relief and sculpting tool.
12. Measure texture flow function use Texture Flow function by creating scales for a relief incorporate with manufacturing standards. (NOS: HCS/N9416)	Create and edit on 2 Rail Sweep, leaf shape, star shape & Multiple section by using artisan software.
	Applying the texturingand incorporate texture relief.
	Applying the texture flow spacingandtexture flow vary scale.
13. Design cylindrical surface of the model and add the required artistic details. (To develop Rings, Bannisters, Turned Furniture designs, Pillars, Statues, Roller Dies etc.) (NOS: HCS/N5202)	Create the cylindrical surface of the model by considering manufacturing constraints.
	Create and edit the ring side vector.
14. Perform on 3D Machining, Tool Database and Machining Parameters (Cutting). (NOS: HCS/N9417)	Applying and updating the3D Material for 3D Machining.
	Create and upload the Cutting tool Parameter database.
15. Work on Machine Relief Toolpaths, Roughing and Finishing functions. (NOS: HCS/N9418)	Selection of tooling for various operation.
	Generate the machine relief toolpaths for roughing to finishing operation.
	Simulate & optimize the machining toolpath.

16. Check 3D simulation and NC code Generation using artisan software. (NOS: HCS/N9419)	Generate thetoolpath simulation and NC (Numerical Control) output for Machining.
	Perform 3D Simulation of generated NC (Numerical Control) code.
17. Use of Rotary Machining & Modelling Setup tools. (NOS: HCS/N9420)	Performing setup for Rotary Machining.
	Use of sub commands Ring Design and Pillar Design.
18. Assess the additive manufacturing set up CNC/ VMC set up, laser cutting machine &general tools for develop the physical model. (NOS: MIN/N0469)	Export 3D model to various CAD file formats.
	Develop the physical product by using Additive manufacturing technique.
	Develop the physical product by using CNC/VMC Machine.
	Develop the physical product by using laser cutting Machine.
19. Carryout processing and painting to finish the component. (NOS: HCS/N4506,HCS/N4504)	Finish the component using post processing tools.
	By using paint booth apply the painting to make product andwork of art is aesthetically good.
20. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: CSC/N9401)	Solve different mathematical problems
	Explain concept of basic science related to the field of study

7. TRADE SYLLABUS

SYLLABUS FOR ARTISAN USING ADVANCED TOOL			
ONE YEAR – 1200 Hrs			
Duration	**Reference Learning outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
Professional Skill 25Hrs.; Professional Knowledge 5Hrs.	Recognize and comply safe working practices. (NOS: MIN/N1702,MIN/ N1703, MIN/N1704,MIN/ N1705, HCS/N9913,HCS/N 9902)	1. Safety attitude development of the trainee by educating them to use Personal Protective Equipment (PPE) such as use of gloves and goggles. (03 hrs.) 2. First Aid Method and basic training. (03hrs.) 3. Safe disposal of waste materials like cotton waste, metal chips/burrs etc. (02hrs.) 4. Hazard identification and avoidance. (03 hrs.) 5. Safety signs for Danger, Warning, caution & personal	All necessary guidance to beprovided to the new comers tobecome familiar with the working ofIndustrial Training Institute systemincluding stores procedures. Soft Skills, its importance and Jobarea after completion of training. Importance of safety and generalprecautions observed in the in theindustry/shop floor. Introduction of First aid. Operationof electrical mains and electricalsafety. Introduction of

		safety message. (03 hrs.) 6. Preventive measures for electrical accidents & steps to be taken in such accidents. (02hrs.) 7. Use of Fire extinguishers. (03 hrs.) 8. Practice and understand precautions to be followed while working in fittingjobs. (03hrs.) 9. Safe use of tools and equipment used in the trade by using tweezers for all purposes and handle scrappers. (03hrs.)	PPEs. Response to emergencies e.g.;power failure, fire, and systemfailure. Importance of housekeeping &good shop floor practices. Introduction to 5S concept & itsapplication. Occupational Safety &Health:Health, Safety and Environmentguidelines, legislations &regulations as applicable.Material handling equipment.
Professional Skill 120 Hrs.; Professional Knowledge 20 Hrs.	Make different basic drawing and mathematical geometrical calculations. (NOS: HCS/N0802)	10. Develop a concept of an innovating product to reduce human effort. (05 Hrs) 11. Define the complete product lifecycle. (04 Hrs) 12. Use product development phases to develop a new innovative product. (04 Hrs) 13. Developing a new product concept consider the function, aesthetics, production costs, and usability of products with the help of industrial designstudy. (07 hrs.)	Introduction to innovation and its necessity. Understanding of product design and development process.Concept of product life cycle management. Introduction to Industrial design & its process.
		14. Improve the perceived quality of product with the help of cite research & Ergonomics (08 hrs.) 15. List out and Practical demonstrations of ergonomic principles (04 hrs.) 16. Evaluate human factors and	Concept of perceived quality Importance of Perceived quality,variety of strategies used to improve perceived quality levelConcept of Product based quality.Concept of industrial design rights.Concept of Human factors andTypes of ergonomics

		ergonomics ranged from simple questionnaires to complex. (08 hrs.)	& its importance
		17. Foundation buildup using SCOPE tool. (05 hrs.) 18. Generate multiple ideas through brainstorming. (04 hrs.) 19. Develop a product using SCAMPER tool (Substitute, Combine, Adapt, Modify, Magnify, Minify, Eliminate, Reverse &Rearrange) (08 hrs.)	Introduction to design challenge.Phases of design thinking.Use of SCOPE toolExplore the problem statement.Concept of Ideation & rules of idea generation.Process & theoretical structure of SCAMPER tool.
		20. Develop a concept model from of Analogous Inspiration.(08 Hrs) 21. Develop a concept model by Deconstruct & Reconstruct of materialtool. (04 Hrs) 22. Refinement and Evaluation of Ideas. (08 Hrs.)	Refinement and optimum selection of ideas.Analogous and inspiration of model.Construct and deconstruct concept.
		23. Develop a concept model by sharing & integrating the all ideas. (08 Hrs.) 24. Draws the touch-point of your idea and describe the activities with the help of story boarding tool. (08 Hrs.) 25. Develop common understanding of review all the user feedback and Finalize the big idea. (04 Hrs)	Concept of co-creation with user.Series of activities of the solution idea.Refinement and Finalizing through customer or user experience journey.Finalize your big idea concept.
		26. List out the virtual testing platform as per application. (08 Hrs) 27. Create/Prepare Innovative product concept design with	Concept of digital mock upIntroduction of product testingImportance of virtual testing & its methodology.

		Digital mock up (DMU). (12 Hrs)	
Professional Skill 25Hrs.; Professional Knowledge05 Hrs.	Plan & perform basic drawing and engineering calculations. (NOS: HCS/N0802)	28. Identify the drawing projection method. (5Hrs.) 29. Use of Geometric dimensions & Tolerances as per assembly prospect. (5Hrs.) 30. Preparation of Bill of Material. (8Hrs.) 31. Perform basic engineering calculation. (07Hrs.)	First angle and third angle projection.Units of dimensioning, System of dimensioning, Method of dimensioning &common features.Concept of Geometric dimensions & TolerancesIntroduction to Bill of Material in drawing.
Professional Skill 25Hrs.; Professional Knowledge 5Hrs.	Identify basic materials and product manufacturing process. (NOS: HCS/N4406,HCS/N 0101)	32. Prepare list of appropriate materials by interpreting detail drawings and determine quantities of such materials. (12Hrs.) 33. Explain Different manufacturing processes (10Hrs.) 34. List out the benefit of Additive manufacturing technology. (3Hrs.)	Introduction to Material Science,Different types of materials, its properties and applications.Introduction to manufacturing process.Introduction to additive Manufacturing.Benefits of Additive manufacturing.Different types of Additive Manufacturing.
Professional Skill 25Hrs.; Professional Knowledge 05Hrs.	Perform inspection with different measurement tools & techniques to ensure the quality of product. (NOS: HCS/N5601,HCS/N 0102)	35. Perform linear measurements using Vernier Caliper, Vernier height gauge, and Micrometer. (07hrs.) 36. Draw the system with indication of geometrical tolerances (04hrs.) 37. Perform Angular Measurement. (10hrs.) 38. Inspection data recorded to analyze with given drawing/measurement. (04 hrs.).	Introduction to measurement & quality control. Principle of Vernier scale and least count. Handling of measuring instrument & Calibration importance. Inspecting GD & T on product techniques.

Professional Skill 25Hrs.; Professional Knowledge 05Hrs.	Plan and execute the user interface and basic set up of artisan design software. (NOS: HCS/N5202)	39. Customize the layout of artisan software.(5 Hrs) 40. Customize the toolbars of artisan software module. (10hrs.) 41. Creation and selection of work directory. (05 Hrs) 42. Selection of units and screen resolution for new model (05 Hrs)	Introduction to GUI (Graphical user Interface).Industrial application of artisan software. Orientation of selection bar and the importance of unit selection for creation of new model.
Professional Skill 25Hrs.; Professional Knowledge 05Hrs.	Perform basic setting, layout setup & Interface Customization in artisan software. (NOS: HCS/N5202)	43. Customize the Docking Toolbars, Panels and Themes for artisan software. (08 hrs.) 44. Use of shortcut keys &Mouse buttons application, Picking and selecting & Additional functions like Import export, save, new model, cut, pest etc. (7hrs.) 45. Selection of working plane. (04 hrs.) 46. Importing and aligning the existing model. (06 hrs.)	Various settings to personalize the softwareconfigurations to suit the user's requirements. Create 2D artistic designs The list of available toolbars and panels can be accessed from the Window pull downmenu and choosing Toolbars and Docking Windows.
Professional Skill 40 Hrs.; Professional Knowledge 09 Hrs.	Apply standard geometrics and artisan design software (such as circle, rectangular, arcs and text) (NOS: HCS/N5202)	47. Create Standard Geometries by using line, Circle, Arcs and Text, etc. (08 hrs.) 48. Create standard geometries Square, Rectangle, Parallelogram, Rhombus, Trapezium, etc. (04 hrs.) 49. Create smooth curves by using node editing median smooth curve option. (04 hrs.) 50. Create smooth curves by using node editing virtual midpoint option. (04 hrs.) 51. Create vector layers by using Recess, window, outside,	IntroductionCreate Standard Geometries, Orientation of basic sketchers tool like line, Circle, Rectangle, Arcs and Text. Concept of Various curves. vector layers NS Shapes creation Importance & need of free flow shapes. Manufacturing consideration and feasibility verification of design.

		default layer option. (04 hrs.) 52. Perform shapes creation operation. (08 hrs.) 53. Node Mode to convert the spans to Arcs (04 hrs.) 54. convert Spans/Arcs to free flow shapes. (04 hrs.)	
Professional Skill 50Hrs.; Professional Knowledge 12 Hrs.	Perform artisan software operation to Edit Mode, Scale the Geometries, break the vectors and re-join. (NOS: HCS/N5202)	55. Restore the tool bar for basic geometry. (04 Hrs) 56. Select appropriate tool bar and create 2D design (use size, corner or center of geometry options) (03 Hrs) 57. Rotate the 2D design into specific angle. (03 Hrs) 58. Use of vector tool to align the model to left, right, top, bottom and center. (07 Hrs) 59. Create the vector text with the help of style tool. (03 Hrs) 60. Editing the existing text like changing the size & style of vector text. (04 Hrs) 61. Use of vector text spacing tool to edit the existing art work model. (04 Hrs) 62. Create the duplicate mirror design by using mirror tool (Horizontal/vertical) (04 Hrs) 63. Constraint the complete model using constraint tool. (03 Hrs) 64. Create and Edit mode the geometrics by using artisan software. (03 Hrs) 65. Scale the geometrics by using artisan software. (03 Hrs) 66. Create &break the vectors and re-join. (03 Hrs)	Orientation of Tool setting. Use and selection method of various tools. Importance of plane selection for art work in software. Vector tool and its importance. Orientation of style tool and its importance for increasing the productivity. Concept of mirror modeling. Application of spacing tool and its importance for increasing the productivity. Concept of constraint tool to correct the geometry. Selection and use of On a Curve tool to edit specific geometry. Use Scale option. Edit the Geometries, break the vectors and re-join.Use of Vector Layers to manage the artwork.Vector Preview – Print for approval.

		67. Crate art work by using Vector Layers (03 Hrs) 68. Exercises on Vector Preview – Print for approval. (03 Hrs)	
Professional Skill 40 Hrs.; Professional Knowledge 09 Hrs.	Apply basic 2D machining and Tool Database and Cutting Parameters selection and application. (NOS: HCS/N5202)	69. Setting up the software for Basic 2D Machining (04Hrs) 70. Create 2D art shape for machining (04Hrs) 71. Create area clearance toolpath on 2D geometry. (08 Hrs) 72. Selection of vector and cutting depth for 2D machining. (04Hrs) 73. 2D Machining parameter selection from library.(04Hrs.) 74. Selection of tool from libraryfor 2D machining. (04 hrs.) 75. Create 2D Roughing path for curve & square path using 2D machining tools. (04 hrs.) 76. Create Drilling operation set up and generate 2D tool path. (08 Hrs)	Introduction to Machining – Material Setup Introduction to cutting tools. Types of cutting tools and their application. Selection criteria for cutting tools. Uploading Tool Database for library. Selection of appropriate tool as per application and material properties. Cutting Parameters Use of various 2D Toolpath Strategies.Use 2D Profiling, 2D Roughing, Drilling, V Bit Carving and Bevel Carving.
Professional Skill 40 Hrs.; Professional Knowledge 09 Hrs.	Observe and create simple and advanced 3D Design which can generate some complex reliefs in artisan operation. (NOS: HCS/N5202)	77. List out the Basic 3D Modelling functionalities (04 hrs.) 78. Create & edit the Shape Spherical, Conical, Flat (08 hrs.) 79. Importing of 3D model and placement on working plane (04 Hrs) 80. Use 3D boundary frame from existing library and adjust according to the model (04 Hrs) 81. Add &Subtract the 3D geometries in artisan software. (04 hrs.)	Introduction to 3D Modelling functionalities. Use of Shape Editor – Spherical, Conical Flat. Importance of importing and exporting of art work. Updating of frame library and its importance. Use of Add, Subtract. Concept of design merging. Importance of design relief points and its machining importance. Concept of Sculpting & its industrial case study.

		82. Create merger by Using Tool Merge High and Merge Low (04 hrs.) 83. Create Smooth Relief & generate the profile.(04 hrs.) 84. Perform Sculpting operation and create Tool profile. (08 hrs.)	
Professional Skill 80 Hrs.; Professional Knowledge 14 Hrs.	Measure texture flow function use Texture Flow function by creating scales for a relief incorporate with manufacturing standards. (NOS: HCS/N9416)	85. Import the model and use select whole tool for texturing. (04 Hrs.) 86. Import the model and select the selected vector tool for texturing. (04 Hrs.) 87. Use of standard texture Sphere, Ellipse, Cone, Pyramid, etc.(08 hrs.) 88. Create 2 Rail Sweep &leaf shape. (08 hrs.) 89. Create star shape. (08 hrs.) 90. Change the height of art work using boundary relief option (08 Hrs)	Tool orientation of texture & their selection criteria. Types of texture and its application. Create freeform three-dimensional shapes using vector artwork and Vector Based Relief Creation and Relief Editingtools. Concept of geometric patterns and organic textures directly from artwork.
		91. Create smooth boundaries of art work using boundary relief option (04 Hrs) 92. Setting up the machine area by using machine relief option. (04 Hrs) 93. Selection of vectors to create machine tool relief. (08 Hrs) 94. Perform the texture Relief operation. (08 Hrs) 95. Exercise on Texture Flow tool (08 hrs) 96. Exercise on Texture scale up and Flow Spacing (08 Hrs)	Concept and importance of art work boundaries. Library overview of boundaries. Use of texture flow tool and relief constrain. Concept of Scale up in design.

Professional Skill 45 Hrs.; Professional Knowledge 10 Hrs.	Design cylindrical surface of the model and add the required artistic details. (To develop Rings, Bannisters, Turned Furniture designs, Pillars, Statues, Roller Dies etc.) (NOS: HCS/N5202)	97. Create the cylindrical surface of the model by considering manufacturing constraints. (20Hrs) 98. Create & edit the ring side vector. (09 Hrs.). 99. Create & edit the Bannister. (08 Hrs.). 100. Create & edit the roller dies. (08 Hrs.).	Concept of cylindrical surface. Concept of ring side vector & Bannister
Professional Skill 25 Hrs.; Professional Knowledge 5Hrs.	Perform on 3D Machining, Tool Database and Machining Parameters (Cutting). (NOS: HCS/N9417)	101. Import the tool library for roughing to finishing operation. (05 Hrs) 102. Create and update the Tool Database. (05hrs.) 103. Create and update the Cutting Parameters. (05hrs.) 104. Selection of Tools and editing the parameters as per 3D art work operation. (10hrs.)	Introduction to 3D Machining – 3D Material SetupTool Database and Cutting Parameters.Selection of Tools.
Professional Skill 25Hrs.; Professional Knowledge 05Hrs.	Work on Machine Relief Toolpaths, Roughing and Finishing functions. (NOS: HCS/N9418)	105. Perform Roughing operation set up in artisan software. (05Hrs.) 106. Create End mill and Finishing set up of Ball Nose (05hrs.) 107. Generate Machine Relief Toolpaths artisan software. (05hrs.) 108. Setting up the material thickness and model position of in material. (05 hrs.) 109. Export toolpath summary information of finalize toolpath.(05hrs.)	Concept of Machine Relief Toolpaths. Material thickness and its importance. Importance of model position.
Professional Skill 80 Hrs.;	Check 3D simulation and NC	110. Import the model and set to the co-ordinate. (04 Hrs)	Difference between 3D simulation and 2D simulation and

Professional Knowledge 14 Hrs.	code Generation using artisan software. (NOS: HCS/N9419)	111. Select the model or 3D art work and set the tooling data for simulation. (08 Hrs) 112. Run the simulation tool and virtually verification of tool path. (08 hrs.) 113. Export the 3D generated tool path for future references. (80 Hrs) 114. Generate the NC code of art work design. (08 hrs.) 115. Export the NC code for machining purpose. (04 Hrs)	their industrial application. Toolpath Simulation and its importance. Modify the toolpath and its importance. Orientation of NC code & Generate the NC code and machining purpose.
		116. Modify the tool path by changing tooling and reference points. (08 hrs.) 117. Update the tool library and tooling database. (04 Hrs) 118. Virtual verification of machining by using simulation tool to confirm the tooling data and machining relief (10 hrs.) 119. Create complex product by using artisan software and generate the NC code by using advanced 3D machining toolbar. (18 Hrs.)	Customize the 3D machining toolbar. Orientation of machining operation and machining limitation. Importance machining cycle time & their optimization technique.
Professional Skill 40Hrs.; Professional Knowledge 09 Hrs.	Use of Rotary Machining & Modelling Setup tool. (NOS: HCS/N9420)	120. Performing Rotary Machining Setup (12Hrs.) 121. Use of sub commands Ring Design. (12 Hrs) 122. Develop Pillar Design and perform machining setup (16Hrs.)	Understanding toolbars Rotary Machine Setup, Ring Design, Pillar Design, Rotary machining setup, Ring Machining, Pillar Machining.
Professional Skill 80 Hrs.;	Assess the additive manufacturing set up CNC/ VMC set	123. Export 3D model to various CAD file formats. (08 hrs.) 124. Prepare 3D printing machine	Working principle of Additive manufacturing. Application of additive manufacturing with the

Professional Knowledge 14 Hrs.	up, laser cutting machine & general tools for develop the physical model. (NOS: MIN/N0469)	(Material loading, Nozzle selection and calibration of work plate). (08 hrs.) 125. Prepare and optimize the model design using Slicing software. (08 hrs.) 126. Create the physical product by using Additive manufacturing machine (16 hrs.)	help of case studies. Orientation of 3D Printer machine & its basic maintenance. Process of preparing 3D model and exporting it to desired format.
		127. Prepare the CNC & VMC machine (Loading of cutting tools, machine and tool offset referencing. (08 hrs.) 128. Create the physical product by using CNC/VMC Machine for Artisan. (08 hrs.) 129. Prepare laser cutting machine (Setting of cutting parameters and adjusting of work holding device) (04 hrs.) 130. Create the physical product by using Laser cutter equipment's. (08 Hrs.) 131. Perform Preventive maintenance and basic troubleshooting of 3D printing, CNC, VMC and laser cutting machine. (04 hrs.) 132. Maintaining drawing, document and performing print operation. (08 Hrs.)	Operating & Programming on CNC/VMC operations.Study of laser cutter equipment's, making vectors for laser cutter with artisan software Design & drawing documents.
Professional Skill 25 Hrs.; Professional Knowledge 05 Hrs.	Carryout processing and painting to finish the component. (NOS: HCS/N4506,HCS/N 4504)	133. Finish the component using post processing tools. (10Hrs.) 134. Setting up the paint booth.(05Hrs.) 135. By using paint booth apply the paint to make product/ work of art is aesthetically good and	Industrial standards for Post processing operations. Orientation of post processing tool &their application. Types of painting and industrial application.

		adds value.(10Hrs.)	
Professional Knowledge ED: 40 Hrs WSC: 35 Hrs	Read and apply engineering drawing for different application in the field of work. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: CSC/N9401)	**ENGINEERING DRAWING: (40 Hrs.)** Introduction to Engineering Drawing and Drawing Instruments – • Conventions • Sizes and layout of drawing sheets • Title Block, its position and content • Drawing Instrument Lines- Types and applications in drawing Free hand drawing of – • Geometrical figures and blocks with dimension • Transferring measurement from the given object to the free hand sketches. • Free hand drawing of hand tools and measuring tools. Drawing of Geometrical figures: • Angle, Triangle, Circle, Rectangle, Square, Parallelogram. • Lettering & Numbering – Single Stroke. Dimensioning • Types of arrowhead • Leader line with text • Position of dimensioning (Unidirectional, Aligned) Symbolic representation – • Different symbols used in the related trades. Concept and reading of Drawing in • Concept of axes plane and quadrant • Concept of Orthographic and Isometric projections • Method of first angle and third	**WORKSHOP CALCULATION & SCIENCE: (35 Hrs)** **Unit, Fractions** • Classification of unit system • Fundamental and Derived units F.P.S, C.G.S, M.K.S and SI units • Measurement units and conversion • Factors, HCF, LCM and problems • Fractions - Addition, substraction, multiplication & division • Decimal fractions - Addition, subtraction, multilipication& division • Solving problems by using calculator **Square root, Ratio and Proportions, Percentage** • Square and suare root • Simple problems using calculator • Applications of pythagoras theorem and related problems • Ratio and proportion • Ratio and proportion - Direct and indirect proportions • Percentage • Precentage - Changing percentage to decimal and fraction **Material Science** • Types metals, types of ferrous and non ferrous metals • Physical and mechanical properties of metals • Introduction of iron and cast

		angle projections (definition and difference) Reading of Job drawing related to trades.	iron • Difference between iron & steel, alloy steel and carbon steel • Properties and uses of rubber, insulating materials **Mass, Weight, Volume and Density** • Mass, volume, density, weight and specific gravity, **numericalsrealted to sections L,C, O.** • Related problems for mass, volume, density, weight and specific gravity **Speed and Velocity, Work, Power and Energy** • Speed and velocity - Rest, motion, speed, velocity, difference between speed and velocity, acceleration and retardation • Speed and velocity - Related problems on speed & velocity **Heat & Temperature and Pressure** • Concept of heat and temperature, effects of heat, difference between heat and temperature, boiling point & melting point of different metals and non-metals • Heat &Temperature - Transmission of heat - Conduction, convection and radiation • Co-efficient of linear expansion and related problems with assignments • Concept of pressure - Units of pressure, gauge pressure and gauges used for measuring pressure

			Basic Electricity • Introduction and uses of electricity, electric current AC,DC their comparison, voltage, resistance and their units **Mensuration** • Area and perimeter of square, rectangle and parallelogram • Area and perimeter of Triangles • Area and perimeter of circle, semi-circle, circular ring, sector of circle, hexagon and ellipse • Surface area and volume of solids - cube, cuboid, cylinder, sphere and hollow cylinder • Finding the lateral surface area, total surface area and capacity in litres of hexagonal, conical and cylindrical shaped vessels Trigonometry • Measurement of angles • Trigonometrical ratios • Trigonometrical tables
Project work / Industrial visit: - Project work involving preparing cad models of different art work in artisan software and to make it in 3D printer machine, CNC/VMC Machine, laser cutting machine, Paint booth & general tools.			

SYLLABUS FOR CORE SKILLS
Employability Skills (Common for all CTS trades) (120Hrs)

Learning outcomes, assessment criteria, syllabus and Tool List of Core Skills subjects which is common for a group of trades, provided separately inwww.bharatskills.gov.in

ANNEXURE-I

List of Tools & Equipment			
ARTISAN USING ADVANCED TOOL (For batch of 10 Candidates)			
S No.	**Name of the Tools and Equipment**	**Specification**	**Quantity**
A. TRAINEES TOOL KIT			
1.	Steel rule	30 cm & 60 cm graduated both in English & Metric units	20 Nos.
2.	Micrometer Outside	0-50 mm outside	10 Nos.
3.	Vernier Caliper	0- 15 cm	10 Nos.

4.	Micrometer Inside	up to 20 mm	10 Nos.
5.	Hand Gloves	–	10 Nos.
6.	Safety Shoes	–	10 Nos.
7.	Helmet	–	10 Nos.
B. GENERAL MACHINERY / SOFTWARE INSTALLATIONS			
8.	3D Printer Plastic(Common to other trades)	Industrial Grade 3D Printer	2 Nos.
9.	Latest version compatible for running ARTISAN CARVECO software, preloaded with latest configurations and Internet connection with standard operating system.	CARVECO premium	2 Nos.
		CVCOLIB- Carveco Relief Library - over 500 Relief models available for practice and learning exercises	2 Nos.
		Technology tools for Artisan and Handicraft	3 Nos.
10.	CNC Tool room Lathe	Max. Cutting dia. 406 mm Max. Cutting Length 762 mm Max. Part Swing dia. 508 mm X: 203 mm / Z: 762 mm 1,800-rpm Spindle, A2-5 7.5 kW vector drive 11.4 m/min Rapids Early Power-Failure Detection Module Work Light 15" Color LCD Monitor 1 GB Program Memory, Memory Lock Key switch Ethernet USB Port Haas Connect Mobile App Internal Transformer 380-480 V Media Display M-Code; M-130	1 No.
11.	Vertical Machining Center	Center X: 406 x Y: 305 x Z: 254 mm BT40 40 taper, belt drive 5.6 kW vector drive 7.6 m/min, Rapids	1 No.

		Early Power-Failure Detection Module Work Light 15" Color LCD, Monitor 1 GB Program Memory Lock Key switch Ethernet USB Port, Haas Connect Mobile App Internal Transformer 380-480 V Media Display MCode; M-130 Haas Window Blast	
12.	Laser Cutter	SIL 1212	1 No.
13.	Air Compressor	Deep : 3 HP	2 Nos.
14.	Painting Spray Booth,	DB 15 Dry type technology, ground mounted, side draft type, Suction Chamber, Hood & Damper for Velocity control, Illumination System, Electrical controls, Pressure feed Spray Gun, Pressure feed container with stirrer, Paint hose and air hose	1 No.
15.	UPS (Common to other trades)	3 KVA With Battery & Trolley	1 No.
16.	Industrial Workstation(Common to other trades)	32 GB RAM, NVIDIA Qtr. 4GB, Intel XeonW-2123 3.6 4C, 1TB HDD, USB Keyboard & USB Optical Mouse	20 Nos.
17.	Monitor(Common to other trades)	IPS Display, Narrow Bezel	20 Nos.
18.	Server with rack(Common to other trades)	Intel Xeon Silver 4114 2.2G, 10C/20T, 9.6GT/s, 14M Cache, Turbo, HT (85W) DDR4-2400, 600GB x 5nos. 10K RPM SAS, 12Gbps 512n 2.5in Hot plug	1 No.

		Hard Drive	
C : TOOLS, INSTRUMENTS AND GENERAL SHOP OUT FITS			
19.	"V" block	V-Block pair 7 cm with clamps	10 Nos.
	"V" block	V-Block 15 cm with clamps	10 Nos.
20.	Metal L	Metal - L - 15cm	10 Nos.
21.	Metal L	Metal - L - 30cm	10 Nos.
22.	Angle Plate	10 x 20 cm.	10 Nos.
23.	Spirit Level	15 cm metal	10 Nos.
24.	File warding	15 cm smooth	10 Nos.
25.	File knife edge	15 cm smooth	10 Nos.
26.	File cut saw	15 cm smooth	10 Nos.
27.	File feather edge	15 cm smooth	10 Nos.
28.	File triangular	15 cm smooth	10 Nos.
29.	File round	20 cm second cut	10 Nos.
30.	File square	15 cm second cut	10 Nos.
31.	File square	25 cm second cut	10 Nos.
32.	File triangular	20 cm second cut.	10 Nos.
33.	File flat	30 cm second cut.	10 Nos.
34.	File flat	20 cm bastard	10 Nos.
35.	File flat	30 cm bastard.	10 Nos.
36.	File Swiss type	Needle set of 12.	10 Nos.
37.	File half round	25 cm second cut.	10 Nos.
38.	File half round	25 cm bastard.	10 Nos.
39.	File round	30 cm bastard.	10 Nos.

40.	File hand	15 cm second cut.	10 Nos.
41.	Card file.	----	10 Nos.
42.	Oil Stone	15 cm x 5 cm x 2.5 cm	10 Nos.
43.	Pliers combination	15 cm	10 Nos.
44.	Blow Lamp	0.50 liters.	10 Nos.
45.	Spanner	D.E. 6 -26 mm set of 10 pcs.	10 Nos.
46.	Spanner adjustable	15 cm	10 Nos.
47.	Box spanner	Set 6-25 mm set of 8 with Tommy bar.	10 Nos.
48.	Glass magnifying	7 cm	10 Nos.
49.	Clamp toolmaker	5 cm and 7.5 cm set of 2.	10 Nos.
50.	Clamp “C”	5 cm	10 Nos.
51.	Clamp “C”	10 cm	10 Nos.
52.	Scraper flat	15 cm.	10 Nos.
53.	Scraper triangular	15 cm	10 Nos.
54.	Scraper half round	15cm	10 Nos.
55.	Chisel	cold 9 mm cross cut 9 mm diamond.	10 Nos.
56.	Chisel	cold 19 mm flat	10 Nos.
57.	Chisel	cold 9 mm round nose.	10 Nos.
58.	Motorized +Tennon Saw	----	10 Nos.
59.	Hand hammer	1 kg. with handle Ball Peen	10 Nos.
60.	Hacksaw	frame fixed 30 cm.	10 Nos.
61.	Mallets Wooden	----	10 Nos.
62.	V-Block, Files, mallets, screwdrivers,	----	10 Nos.

	chisels, etc.		
63.	Hand Drilling Machine	Rated input power: 600W, Power output: 301W, Rated torque: 1.8 Nm	10 Nos.
64.	Metal Saw	No-Load Speed: 3,800 rpm, Saw blade diameter 355 mm, Saw blade bore 25.4 mm	10 Nos.
65.	Straight Grinder HEAVY DUTY with attachments	No-Load Speed: 10000 – 30000 rpm, Rated power output: 380W	10 Nos.
66.	Professional Air Blower	Power consumption: 820 W, No-load speed: 16000rpm, Flow rate: 0-4.5 m3/s	10 Nos.
67.	Jig Saw Portable	Input Power: 900W, No-load speed: 11,000 rpm, Disc Diameter: 100	10 Nos.
68.	Hammer Drill Wired	Drill type: hammer, optimum power transfer	10 Nos.
69.	Hand Held Sander / Polisher	No Load Speed: 11000 rpm	10 Nos.
70.	Digital Dial Torque Wrench	Range: 20 to 280 Nm	10 Nos.
71.	Lifting Tackle/Sling	1 Ton×2mtr	10 Nos.
72.	Impact Wrench	½ inch drive	10 Nos.
73.	Laser Light Pen	---	10 Nos.
74.	Surface Plate	Cast iron	10 Nos.
75.	Digital Screw Pitch Gauge	Working voltage: 3.0 V / DC, Measure precision: 0.1 degree	10 Nos.
76.	Laser Distance Measurement Instrument	Levelling Accuracy (Vial): +/- 0.2degree, Measuring Accuracy Typical: +/- 1/16 inch (1.5 mm)	10 Nos.
77.	Palm Scale	Capacity-500gms, Least Count-0.1g	10 Nos.

78.	Allen Screwdriver Wrench Tool	6Pcs T Handle Ball Ended Hex Key	10 Nos.
79.	Universal Quick Adjustable Multi-function Wrench Spanner	Range: 6-32mm	10 Nos.
80.	Double Ended Wrench Hex Socket Spanner	8 In 1, Range: 6-32mm	10 Nos.

Note: -

1. *All the tools and equipment are to be procured as per BIS specification.*
2. *Internet facility is desired to be provided in the class room.*

ABBREVIATIONS

CTS	Craftsmen Training Scheme
ATS	Apprentice ship Training Scheme
CITS	Craft Instructor Training Scheme
DGT	Directorate General of Training
MSDE	Ministry of Skill Development and Entrepreneurship
NTC	National Trade Certificate
NAC	National Apprentice ship Certificate
NCIC	National Craft Instructor Certificate
LD	Locomotor Disability
CP	Cerebral Palsy
MD	Multiple Disabilities

LV	Low Vision
HH	Hard of Hearing
ID	Intellectual Disabilities
LC	Leprosy Cured
SLD	Specific Learning Disabilities
DW	Dwarfism
MI	Mental Illness
AA	Acid Attack
PwD	Person with disabilities