

**Syllabus**

**For  
The Trade of**

**GOLD SMITH**

**Under  
Craftsmen Training Scheme**

**Designed on  
2010**

**By**

**Government of India**

**Ministry of Labour & Employment (DGE&T)**

**CENTRAL STAFF TRAINING & RESEARCH INSTITUTE**

**EN Block, Sector – V, Salt Lake, Kolkata – 700091**

List of Members attended the Trade committee Meeting to design the syllabi for the trade of  
**GOLDSMITH** under CTS on 10<sup>th</sup> & 11<sup>th</sup> June' 2010  
at Central Staff Training and Research Institute, Salt lake, Kolkata

SL NO.	NAME & DESIGNATION S/Shri	REPRESENTING ORGANIZATION WITH FULL ADDRESS	REMARKS
1.	S.D.Lahiri, Director	CSTARI, Kolkata	Chariman
2.	R.N.Bandopadhyay, Jt. Director of Trg.	DGET, New Delhi	Member
3	Asim Roy, Skilled Craftsman & Owner	A.Roy Jewellery, Barrackpore	Member
4	Chandresh Soni, Managing Director	Jewe lCast Techno, Ahmedabad	Member
5	Bivash Ch. Maity General Secretary	Bangiya Swarna Shilpi Samiti Karol Bagh, New Delhi	Member
6	Anup Ghoshal Executive Member	Bangiya Swarna Shilpi Samiti Karol Bagh, New Delhi	Member
7	Tagar Ch. Podder, General Secretary	Bangiya Swarna Shilpi Samiti, Kolkata	Member
8	Sadhan Ch. Shee, Asst. Genl. Secretary	Bangiya Swarna Shilpi Samiti, Kolkata	Member
9	Shashi Bhushan Sen, Secretary	Bangiya Swarna Shilpi Samiti, Kolkata	Member
10	Chitta Ranjan Karmakar Working President	Bangiya Swarna Shilpi Samiti Kolkata	Member
11	Bimal Roy, Vice-President	Bangiya Swarna Shilpi Samiti, Kolkata	Member
12	Baidyanath Roy, Skilled Craftsman	Bangiya Swarna Shilpi Samiti, Kolkata	Member
13	Himanshu Debnath, Skilled Craftsman	Bangiya Swarna Shilpi Samiti, Kolkata	Member
14	Prabir Roy, Skilled Craftsman	Bangiya Swarna Shilpi Samiti, Kolkata	Member
15	Goutam Debnath, Skilled Craftsman	Bangiya Swarna Shilpi Samiti, Kolkata	
16	Ragavendran D	Titan Industries Ltd.	Member
17	Ms. Nita Mukhopadhyay, Manager	SESCO Gold Ltd.	Member
18	Tapas Bhakta, Skilled Craftsman & Owner	Aparna Jewellers Naihati	Member
19	Ranjit Debnath Skilled Craftsman & Owner	B. D. Jems & Jewellers Pvt. Ltd. Kolkata	Member
20	Subrata Kar, Skilled Craftsman & Owner	Kar Jewellers Kolkata	Member
21	Gopi nath Basak, Skilled Craftsman	Kar Jewellers Kolkata	Member
22	Rintu Purkait, Designer	Dasnagar, Howrah	Member
23	P. K. Ghosh, Managing Director	ESCO DIE CASTING (P) Ltd. Kolkata	Member
24.	S. K. Paul, Director	a. paul & Co. Kolkata	Member
25	Ratan Kumar Talukder, Skilled Craftsman	24/15, A.K.Mukharjee Road, Kol-90	Member
26	Uttam Das, Skilled Craftsman	272, R.N.Thakur Road, Kol-77	Member
27	Rabin Debnath Asst. Director of Industrial Trg.	DIT, Govt. of West Bengal, Kolkata	Member
28	Anil Kumar, Joint Director of Training	CSTARI, Kolkata	Member
29	M. C. Sharma, Jt. Director of Training	CSTARI, Kolkata	Member
30	L. K. Mukharjee, Dy. Director of Trg.	CSTARI, Kolkata	Member
31	P. K. Dutta, Asst. Director of Training	CSTARI, Kolkata	Member
32	R. N. Manna, Training Officer	CSTARI, Kolkata	Member
33	P. Biswas, Jr. D/Man	CSTARI, Kolkata	Member

## General Information

1. Name of the trade :- **Gold Smith**
2. N C O Code No. :- **7313.28**
3. Entry Qualification :- **Passed 8<sup>th</sup> class Examination  
(Minimum age 14 years)**
4. Duration of Craftsman Training :- **12 months**
5. Space Norms :- **3 sq. mt./trainees (workshop)**
6. Power Norms :- **5 KW (approx.)**
7. Qualification of Instructor: -
  1. **Theory -** Degree in appropriate branch in engineering viz Metallurgy/Mechanical from any recognized University or equivalent with one year experience in the relevant field.

**OR**

Diploma in appropriate branch in engineering viz Metallurgy/Mechanical from any recognized Institute / board or equivalent with two years experience in the relevant field
  2. **Practical :-** NTC/ NAC in the relevant trade with three years experience in the relevant field(which will evolve in future)

**OR**

For practical purpose: Contract faculties with 8 to 10 years experience in the relevant field may be appointed.
8. **Metal to be used :-  
to impart training** Silver- copper alloy / any other suitable materials

# Syllabus for the trade of

## Gold Smith

### Under Craftsman Training Scheme

Duration : 1 year

Week Nos.	Practical	Trade Theory	Workshop Science & Cal.	Drawing
1.	Introduction to the trade and familiarization with the Institute. All necessary guidance to be provided to the new comers to be familiar with the working in Institute including Store Procedures. <i>Importance of safety and general precautions observed in the section.</i> Introduction of first aid and safety kits, safety equipments, operation of fire extinguisher.	Importance of the trade in the development of Economy of the country through MSME Related subjects to be taught, achievement to be made, recreation, medical facilities and other extra curricular activities of the Institute. Introduction to occupational health hazard. Environmental pollution - sources, causes, consequences, mitigation and controls. Introduction to pollution control.	Importance of Science and Calculation to the trade skill and fundamental of Arithmetical operations:- Addition, Subtraction, multiplication and Division – related problems.	Importance of drawing and its knowledge use of Set Squares or Mini Drafter and other drawing instruments.
2.	Types of work done by the trainees in the trade. Familiarisation with the tools, equipments and machineries used in the trade. Care and maintenance of equipments and materials.	Gold mines in India and abroad. Availability of gold. Knowledge of different raw materials used in Gold Smith Industry. Steel rule – Inch and meter. Conversion of inch to mm. and vice versa.	----- Do -----	Lines – Straight, free hand drawing of Triangle, Square and Rectangle.
3.	Allied Trade Training Fitting- Use of vice clamps, holding job in the vice and practice of metal sawing with hacksaw and filing the edges maintaining flatness and squareness of all the faces, marking practice use of odd leg caliper, surface gauge, try-square, marking table, etc.	Introduction and use of different job holding device and marking tools in the Gold Smith trade.	Decimal and Fraction – related problems.	Lines – curved, free hand drawing of circles, arcs.
4.	Filing flat surface and checking flatness and square ness. Filing four edges, checking all dimensions. use of Zero cut, 2 <sup>nd</sup> cut. Making of various shapes.	Files – their types, grades, cut, convexity, specifications, their use and care.	Multiplication and Division of Decimal and Fraction – related problems.	Free hand drawing of polygon and ellipse.
5.	Marking of parallel lines(straight and curved), circles, arcs. Practice of angular filing and checking with gauge. Making of various shapes.	Hacksaw frames and blades – their uses.	---- Do ----	Geometrical construction of different Triangle.

6.	Threading practice:- (1) Drilling on plate for tapping. (2) Tapping practice. (3) Dieing Practice.	Description and Specification to different types of Hammers.	Conversion of Decimal to Fraction and vice versa – related problems.	--- Do ---
7.	Weighing practice by using physical balance and electronic weighing machine. Precautionary measures to be observed.	Knowledge of extracting pure Gold from ore. Knowledge of fired Pit furnace	Unit and Dimensions used in the country.	--- Do ---
8.	Practice on melting and alloying of metals. Use of carbon rod for stirring. Safety precautions to be observed during melting and alloying. Procedure of fire prevention and fire control originated from Gas and Electric. Safety equipments and their uses. Lighting and adjustment of flames. Pouring metal in ingot. Casting of molten metal as bar.	Calculation of tap drill size. Tap & Dies. Drills, their size and nomenclature	Mass & Weight related calculation to the trade.	Geometrical construction of squares and rectangles
9	Method of making wire from bar (by machine and hand) Practice of wire making both by machine and hand. Checking the diameter of wire with micrometer and wire gauge.	Knowledge of the term carat. Different materials added with Gold to make alloy. Percentage of alloying element to make Gold of different carat (e.g. 22, 20, 18 etc.)	Metals, Non-metals and Alloys – their properties and uses.	Geometrical construction of squares and rectangles
10.	Method of making sheet from bar (by machine and hand). Practice of sheet making by machine and hand. Practice to adjust the gap of rollers of the rolling machine. Checking thickness of sheet by micrometer.	Calculation of different alloying elements according to quality of gold. Knowledge on Hallmark. Different process of melting Gold and metals used as an alloy. Melting temperature of different materials	--- Do ---	Geometrical construction of circles and arcs, Segments, etc.
11.	Practice on measuring and marking wire and sheets as per design. Practice on cutting as per marking.	Different metal forming techniques used in the jewellery making like Engraving, Embossing, doming, bending, wire work, forging, etc.	Percentage – related calculation to the trade.	Geometrical construction of polygon.
12.	Practice to provide desired shape to wires and sheets as per design.	Assaying analysis of Gold and/or other metals.	-----Do-----	Geometrical construction of polygon.
13.	<u>Stamping, Punching, Die Punching.</u> Selection of die and punch as per the required shape, size and design. Practice of preparing desired shape and size in required design by stamping and punching.	Micrometer – construction, principle and use.	-----Do-----	Geometrical construction of ellipse, parabola, etc.
14.	<u>Ball making.</u> Measuring, Setting of gauges, cutting of strips, making oval shapes, joining two oval shaped halves, making a ball, rubbing to bring in perfect round and cleaning.	Least count, method of taking measurement by micrometer. Practice of taking measurement using micrometer.	Physical properties of metals- malleability, ductility, elasticity, etc.	-----Do-----

15.	<u>Chain Making.</u> Measuring, cutting in required length, setting of gauges, Bending of wire in required shape, joining of pieces to make chain.	Different gauges and tools used in the trade for measuring and marking.	--- Do ---	Knowledge of computer operating and name of different parts and its components, accessories. Knowledge about the Start Menu and Shut Down Menu. Practice to operating computer
16.	Practice of thread making (Internal & External), different types of joint making.	Different cutting tools used in the trade.	Ratio and proportions – related calculation to the trade.	Definition of a file; File names. Knowledge about “My Computer”. and “My Documents”. Practice to operating computer
17.	Process of making ring as per design and shape and size. <u>Cavity making.</u> Process of making cavity according to shape and size of stone, etc. Practice of kundan work	Knowledge on different tools used to provide desired shape to wires and sheets	-----Do-----	Microsoft – Word Processing Package Text selection Opening Documents and Creating Documents Saving Documents / Quitting Documents Cursor Control
18.	<u>Laying on wax/resin sheet and assembling.</u> Process of laying different components on wax/resin as per the drawing/design. Process of taking components as arranged on plaster of paris.	Knowledge of Die and Punch, Core and Cavity.	-----Do-----	Printing Documents Using the Interface (Menu, Toolbars) Editing Text (copy, Delete, Move etc.)
19.	<u>Brazing.</u> Process of brazing of the components taken on plaster of paris, Brazing of dissimilar metals.	Solders:- Composition of different materials in solder. Soldering processes – Knowledge on different soldering processes.	Chemical properties of metals	Finding and Replacing Text Spell Check Feature/Auto correct Feature, Grammar Facility Autotext.
20.	<u>Soldering.</u> Process of soldering of the components and practice	Knowledge of Brazing and different process of brazing.	Volume and density of metals – related calculation to the trade. Density of gold in different carat.	Character formatting, and page formatting. Practice on MS Paint brush.
21.	<u>Stringing of beads/ball</u> Different processes of stringing of beads/balls and practice	Equipments & tools used in soldering and brazing (e.g. Gas Burner, Blow pipe, etc.) lighter.	--- Do ---	Practice on MS Paint brush.
22.	Practice of making of hollow tubes. Filling of thin walled tubes with dummy material e.g. resin. Bending of thin walled filled tubes.	Different process of making cavity.	Mensuration:- Square and rectangles- their area and perimeter.	--- Do ---
23.	<u>Enameling. ( Meenakari)</u> Process of grinding, sieving, washing, painting and heating.	Different materials used in meenakari.	Specific Gravity and Archimedes principle-related calculation.	Knowledge on ornament design Free hand design practice of ornament.
24.	Pattern making with molten wax. Procedure of filling wax in the	How to prepare Enamels. Different application	Mensuration :- Triangles, Isosceles,	Free hand design practice of ornament.

	pattern. Mould making with plaster of paris with the help of wax pattern. Melting Gold and casting in the mould, cleaning of moulded components.	method used in meenakari.	equilateral, Right angled, etc. – their area and perimeter.	
25.	Buffing, Polishing, Finishing and drying. Process of buffing ornaments, care to be taken while buffing. Process of Polishing and finishing and practice.	Faults in Gas burners, their effects, causes and correction.	-----Do-----	Free hand design practice of ornament.
26.	<u>Electro plating (deposition or removal)</u> Process of Rhodium, use of steam m/c, practice on Electro Rhodium process, Process of handling acids. Care to be taken during handling of acids. Striping of gold / rhodium.	Threads and joints used in Gold Smith trade.	Pythagoras theorem. Properties of triangles-related calculation.	Practice to operate computer. Knowledge of computer aided design
27.	<u>Scraping, cutting.</u> Setting of m/c to scrap/cut as per design. Setting of Indexing head, scraping/cutting as per design. Filing to remove sharpness. Technique of cleaning files. Method of making and use of emery mandrels, emery sticks, Emery bonds of 120,180,400,600,800 and pink emery papers.	Process of melting wax. Melting temperature of wax, different methods of filling wax in the pattern removal of Blow holes.	Refractory material – Silica sand, Bricks, Mica (Abhra), use of refractory material in the trade.	Knowledge on computer aided design Demonstration and practice on Jewelry designing through software.
28.	<u>Engraving, Embossing.</u> Practice on different process of Engraving and Embossing as per design and final weighing.	Methods to fill molten Gold in the mould, removal of blow holes.	Mensuration – Circles, area, circumference-related calculation..	-----Do-----
29.	<u>Setting and crimping.</u> Process of setting stone on the cavity and crimping.	Ingredients used during polishing	Mensuration – Circles, area, circumference-related calculation	-----Do-----
30.	Handling of Acids and aqua-regia. Process of extracting Gold and other precious metal from scrap or old ornaments.	Knowledge on materials used in Rhodium process – e.g. Rhoduna-SL-P. Different Acids used in Rhodium process and their usefulness. Knowledge on health hazards caused from acids.	Heat and Temperature:- definition, different scales of temperature their conversion and related problems	Designing different jewellery / ornaments by applying Jewelry designing software.
31.	<u>Estimation and Costing.</u> Estimating amount of Gold and other material required to make on ornament of desired shape and size. Procedure to calculate cost of an ornament of desired metal, shape and size.	Necessity of jewelry filing and use of different types of jewellery files. Necessity of Emery polish and use of different kind of emery papers used.	--- Do ---	-----Do-----
32.	Making of ear rings with hooks in different designs	Use of dust collector. Techniques for collection of dust during filing, scraping, etc.	Effect of heat on different metals. Mode of heat transfer – conduction, convection etc.	-----Do-----
33.	Making of ear rings with threads in different designs	Knowledge on different process of engraving and embossing.	Calculation of weight of metal required for making specific length and dia/thick of wire on sheet.	Reading of Gold Smith catalogue.

34 & 35.	Making of finger rings of different shapes, sizes and designs with plain top.	Knowledge of different tools and machineries used in engraving and embossing operation.	Elasticity of metals – modulus of elasticity	Revision
36.	Making of finger rings of different shapes, sizes and designs with stone setting on top.	Knowledge on properties and qualities of different stones.	Cone, Frustum, Sphere, Spherical Segment – related calculation to trade	Revision
37 to 38.	Making of bangles of different designs on solid plate.	Precaution to be observed while working with aqua-regia, occupational health hazards of the trades, causes, and remedies.	-----Do-----	Revision
39 to 41.	Making of hollow tube bangles of different designs filled with dummy materials	Knowledge of Estimation and Costing of an ornament as per given design.	Revision	Revision
42.	Making of pendants of different designs with loop.	----- Do -----	Revision	Revision
43 to 45	Making of chains of different designs with loop and 'S' type hook.	Revision	Revision	Revision
46 to 48	Making of necklace of different designs with loop and 'S' type hook.	Revision	Revision	Revision
49	Project Work			
50 & 51	Revision			
52	Test			



**LIST OF TOOLS AND EQUIPMENTS REQUIRED  
FOR THE TRADE OF  
GOLDSMITH UNDER CTS  
(for a batch of 16 trainees)**

SL. NO.	DESCRIPTION OF TOOLS	QUANTITY
1.	6" 2 - cut file (Flat, Half Round, Square, Triangle and round)	17 nos. each
2.	Needle file	1 set
3.	Zero cut file	1 set
4.	File cleaning brush	4 nos.
5.	Pin vice	4 nos.
6.	Hand Hack Saw Frame with blade 6 inch and 1ft. blade	17 nos.
7.	Drawing Bush-No. 3 & 5	As required
8.	Ring clamp with screw	4 nos.
9.	Ring mandrel	4 nos.
10.	Set Square 30°, 60° & 45°	4 nos. each
11.	Cutting Pliers (Small, Med, Big.)	4 nos. each
12.	Nose Plier small	16 nos.
13.	Gold Smith File set (a set of 10 nos.)	16 sets
14.	Divider	16 nos.
15.	Compass	16 nos.
16.	Steel rule 6"	16 nos.
17.	Table lamp	8 nos.
18.	Blow pipe	17 nos.
19.	Dust mask	4 nos.
20.	Burnisher straight & curve	1 no. each
21.	Degree gauge ( Angle Gauge )	2 nos.
22.	Optivisor	16 nos.
23.	Apron	17 nos.
24.	Ball & cross burr	2 nos. each
25.	Tripoli & Rouge (common)	16 no. each
26.	Felt buff and stick	2 nos. each
27.	Small buff-yellow and white	2 nos. each
28.	Prepolish wheels-hard and soft	2 sets each
29.	Centre punch	16 nos.
30.	Steel square & ruler	16 nos. each
31.	Bench Block	1 no.
32.	Ceramic soldering board	1 no.
33.	Ring clamp with screw (Wooden)	1 no.
34.	Ring clamp with Wedge	1 no.
35.	Steel square	1 no.
36.	Steel rule 12"	1 no.
37.	Scriber	1 no. each
38.	Ring size stick	1 no.
39.	Ring size bunch	1 no.
40.	Tweezers	1 no. each
41.	Wooden hammer (mallet)	1 no.
42.	Tweezers - straight, self lock (straight & bent)	1 no. each
43.	Soldering pick	1 no.
44.	Burner small	16 nos.
45.	Job Holder	16 nos.
46.	Gauge-Finger	1 set
47.	Gauge - Bangles	1 set
48.	Bangle Rod (2", 2 ½", 3", 3 ½", 4")	2 nos. each
49.	Ring Rod (4 Sizes)	2 nos. each
50.	Forceps	16 nos.
51.	Hammer 1 kg, 0.5 kg, 100 gm, 50 gm, 10 gm.	4 nos. each

52	Boxes, small, med	
53	Flask	16 sets
54	Bowl	4 nos.
55	Hydrometer	32 nos.
56	Goggles	4 nos.
57	Gloves	17 nos.
		17 pairs
<b>MACHINES</b>		
1.	Sheet Rolling Machine 8" and 5" (manual)	1 no. each
2.	Wire drawing machine 8" and 5" (manual)	1 no. each
3.	Iron Anvil with wooden block 2.5" to 3" sq.	2 nos.
4.	Work Bench block	16 nos.
5.	Die cutter	4 sets
6.	Furnace - 1 KW, 1200° C	1 nos.
	a) Crucible - (10, 20, 50 and 100 gm.)	4 nos. each
	b) Long tongue	2 nos.
	c) Carbon rod	2 nos.
	d) Reza (8", 10", 12", 16")	2 pcs. each
7.	Wire drawing die (assorted 6 in a set)	3 sets
8.	Plier - Med. (for wire drawing)	16 nos.
9.	Kanchla (Die)	16 nos.
10.	Iron Rod 18"	16 nos.
11.	Press Plate 4"	24 nos.
12.	Diamond Cutting Machine- 1 ½ H.P.	2 nos.
	a) Tools assorted 16 min.	16 sets
13.	Hand Engraving machine	2 nos.
14.	Engraving Tool	16 nos.
15.	Ball making M/C (manual)	2 nos.
	a) Chakki - Top x Bottom	2 sets
	b) Buffalo horn Tokna-killla	2 sets
16.	Die Punch M/C with die sets 5 ton and 1 ton	1 no each
17.	Die press (casting) 0.5 ton and 1 ton	1 no each
18.	Wax Injection Moulding 2 kg wax capacity	1 nos.
19.	Burn out Furnace 2.5 KVA	1 no
20.	Casting vacuum M/C for Plaster of paris 2 H.P.	2 nos.
21.	Steam Generator Autoclave	1 no.
22.	Ultrasonic cleaning machine 250 watt 9 litre capacity	1 no.
23.	Electro plating Bath (gold and rhodium) with temperature control medium size	1 set
24.	Plating unit : Rectifier	1 no.
25.	Heater	2 nos.
26.	Steam Cleaner 10 ltr.	1 no.
27.	Platinised titanium plate	2 sets
28.	Enamelling Hemal Zista	16 sets
29.	Mortar & pestle	16 sets
30.	Polishing machine with dust collector 1 HP	2 nos.
31.	Magnetic polisher 500 gm.	1 nos.
32.	Flexible shaft motor	2 nos.
33.	Buffing machine	1 no.
34.	Vacuum polisher	1 no.
35.	Vulcanizer with timer and temperature control	1 no.
36.	Faceting machine	1 no

COMPUTER HARDWARE & SOFTWARE		
1.	Pentium-IV or latest version computer with all necessary accessories/Dual core	04 nos.
2.	Laser printer	01 nos.
3.	1 KVA off line UPS with 30 mins. Back up	04 nos.
4.	WINDOWS - XP	02 nos.
5.	MS office - XP	02 nos.
6.	Software package for Jewellery Design(latest version) educational version	1 no
7.	Designing books & CD	As required
8.	Computer chair & Table	4 nos. each
9.	Printer table	1 no.
10.	White Board	1 no.
FURNITURE		
1	Steel cup board medium	As required
2	Lockers for students	As required
3	Working Table (3ft.x2ft.x1ft. high) for Gold Smith	1 no. for each student
4	Chairs and Tables for classroom	As required
5	Chairs and Tables for faculties	As required
CONSUMABLES		
1.	Silver grains/any other suitable alloy	100 gm
2.	Copper	300 gm
3.	Solder-medium	As required
4.	Solder - soft	As required
5.	Silicon cylinder	As required
6.	Bristle end brush	As required
7.	Drill bits Of different sizes	10 each
8.	Mandrels-Emery. screw. threaded	5 each
9.	Flux dish	As required
10.	Flux	50 gm
11.	Plaster of paris	3 kg
12.	Wax	200 gm
13.	flask	6 nos
14.	Gaskets	As required
15.	Rubber sprue	As required
16.	Aluminum die plate	As required
17.	Gold potassium cyanide	As required
18.	Rhodium Sulphate	As required
19.	Borax	As required
20.	Asbestos Plate	As required
21.	SRS Powder	As required
22.	Silicon and Natural rubber	As required