SYLLABUS
For The Trade of

DRAUGHTSMAN CIVIL

Under.

Craftsman Training Scheme
&
Apprenticeship Training Scheme

Revised in – 2006

Government of India
Ministry of Labour & Employment (DGE&T)
CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE
EN Block, sector – V, Salt Lake,
Kolkata- 700091

List of members attended the Trade Committee Meeting

Sl.No.	Name	Designation/Representing Org.	
	S/Sri		
1.	M.M.Gera	Dy. Director, CSTARI	Chairman
2.	Dr. Arun Kiran Pal	Prof. Deptt. Of Ptg.Engg. Jadavpur University,Kolkata	Member
3.	R. N. Ghosh	Principal, W.B. Survey Instt., Bandel.	Member
4.	P.K. Bose	W.B. Survey & Drg. Employees Association	Member
5.	Prof. U.C.Kumar	NITTTR, Salt lake, Kolkata	Member
6.	Pratul Kr. Goshal	George Telegraph Trg.Instt., Kolkata	Member
7.	Anupam Sarkar	W.B. Survey & Drg. Employees Association	Member
8.	Goutam Kr. Bysak	Council Member, Institution of Surveyors, Kolkata.	Member
9.	Samir Kr. Sengupta	Bidhan Nagar Municipality,SaltLake, Kol.	Member
10.	Dilip Kumar	Sr. Manager Civil, Hindustan Steel Works Construction Ltd., Kolkata	Member
11.	Subrata Saha	Instructor , ITI, Gariahat, Kolkata	Member
12.	Mrs. Manika Banerjee	Instructor, Civil, Don Bosco, Liluah	Member
13.	T.Mukhopadhayay	Dy. Director of Training, CSTARI, Kolkata	Member
14.	S. Kumar	Dy. Director of Training, CSTARI, Kolkata	Member
15.	A.Chakraborty	Asstt. Director of Training, CSTARI, Kolkata	Member
16.	Naren sengupta	Training Officer, RDAT (ER), Kolkata	Member
17.	Swapan Dey	Training Officer, ATI, Kolkata	Member
18.	P.K.Kolay	Training Officer, CSTARI, Kolkata	Member

GENERAL INFORMATION

1.	Name of the Trade	:	DRAUGHTSMAN (CIVIL)
2.	N. C. O. Code No.	:	030.20
3.	Entry Qualification	:	Passed in 10th class examination under 10+2 system of education with Science & Mathematics or its equivalent.
4.	Duration of Craftsman Training.	:	2 Years
5.	Duration of Apprenticeship Training	:	3 Years including 2 years of Basic Training.
	6..Rebate for Ex-craftsmen Trainees in the trade of Draftsmen (Civil)	:	Full (2 Years)
7.	Ratio of Apprentice to Workers	:	1 : 5

NOTE FOR APPRENTICESHIP TRAINING

1. The Practical Training Programme of Apprentices under ATS (Apprenticeship Training Scheme) should be as per the facilities available in the Establishment / Industry.

2. At the end of shop floor training, an apprentice shall appear for a final examination to be conducted at establishment level based on the actual shop floor training received by the apprentices. This examination shall comprise of assessment of work diaries maintained by the apprentices and Viva Voice to be conducted by an external examiner (other than an official directly responsible for shop floor training).

SYLLABUS FOR THE TRADE OF DRAUGHTSMAN CIVIL

UNDER CRAFTSMENSHIP TRAINING SCHEME

Period of training : 2 Years.

Week No.	Trade practical	Trade Theory	Workshop Calculation and Science.
1.	**INDUCTION TRAINING** Familiarization with the Institute. Importance of trade training. Instruments used in the trade. Types of work done by the trainees in the Institute. Types of jobs made by the trainees in the trade. Introduction to safety including fire fighting equipment and their uses etc.	Importance of safety and general precautions observed in the institute and in the section. Importance of the trade in the development of Industrial economy of the country. What is related instruction-subjects to be taught, achievement to be made. Recreational, medical facilities and other extra curricular activities of the Institute. (All necessary guidance to be provided to the new comers to become familiar, with the working of Industrial Training Institute. System including Store procedures, professional prospects etc.	----------
2.	Free hand sketching of simple geometrical objects. Use of drawing instruments and materials. Lay out of drawing sheets. Drawing conventional lines according to B.I. S. code. Folding of sheets.	**INTRODUCTION** Drawing is a language of technicians. Drawing office organisation. Drawing instruments, equipments materials their use, care & maintenance, safety precautions. Introduction to BIS code of practice and Architectural drawings.	Applied trade problems-Involving multiplication division common fraction, addition, subtraction, multiplication & division application of fractions and decimals to trade problems.

3.	Free hand sketching of geometrical models. Lettering and numbering, vertical & inclined	Importance of lettering, printing of letters and figures sizes, proportion etc. as per B. I. S. code	----do----
4 & 5	Printing of single stroke lettering both inclined & vertical, printing of double stroke lettering both inclined & vertical, printing of name plates.	Forms and proportions for single stroke lettering. Lettering stencils.	-- do -
6 & 7	Construction of plane geometrical figures (Lines, angles, triangles, rhombus, quadrilaterals, polygons etc.)	Geometrical drawing. Definitions, construction of plain geometrical figures. Orthographic projection, dihedral angles and recommended methods of projection according to B. I. S. codes.	Ratio and proportion in trade problems. Units-Different system and conversion.
8 & 9.	Construction of ordinary scales, plain, comparative diagonal, vernier & scale of chords.	Principles, representation and construction of different types of scales, graphic scales, recommended scales for drawing with reference to B. I. S. codes.	Algebra-simple equations and transposition. Problems involving trade problems, quadratic equations and problems connected to trade.

----------T E S T ----------

Achievement from 1st week to 9th week

The trainees should be able to :

1. Use drawing instrument, their care and maint.
2. Lay out of sheets and folding of sheets.
3. Print all types of lettering and using of stencils.
4. Construct, read and use of plain, comparative, diagonal, vernier scales.
5. Construct plain geometrical figures.

1	2	3	4
10 & 13	Drawing plan and elevation of points, lines, surfaces and solids. Dimensioning, technique.	Dimensioning technique, order of finishing, technical sketching, technique of sketching model drawing, orthographic sketching etc.	Unit of force, weight, equations of motion. Laws of motion, problems.
14 & 15.	Sketching from models. Drawing orthographic sketches including dimensioning.	Conventional signs and symbols as per B.I.S Bricks-characteristics of good bricks, hollow bricks and manufacture of bricks.	----do---
16.	Conventional signs and symbols used in engineering drawing including conventional bricks.	Tiles, terracotta, stone ware and earthen ware. Sand types, characteristics, cement, lime.	Areas of triangles, rectangles, square, circle, regular, polygons etc. and problems, logarithms.
17 & 19	Showing arrangement of bricks in different parts of bonds, in walls, pillars coping drawing of shoring.	**INTRODUCTION** Sequence of construction of a building. Names of different parts of building. Bricks masonaary-principles of construction of bonds. Tools and equipment used. Scaffolding.	----do-----
20.	Drawing of scaffolding. Drawing details of stone masonary including stone joints.	Stone masonary, terms used, principles of construction, classification, composite masonary and strength of walls. **Timber:** Structure- Indian timber uses.	Calculation on volume and weight of simple solid bodies, such as cubes, squares etc. Simpson's Rule and problems.
21 & 22.	Drawing different types of foundation, footing, piles, grillages, foundation raft & well foundation.	Foundation: - Purpose, causes of failure of foundation, bearing capacity of soils, dead and live loads, examination of ground. Types of foundation. Drawing of footing foundation, setting out of building on ground excavation, shorting & simple machine foundations.	------do------

Achievement from 10th week to 22nd week :-
The Trainees should be able to :-

1. Solve simple problems on projecting of points, lines, surfaces & solids.
2. Draw sketches from models (plan, section and Elevation).
3. Have thorough knowledge in conventional signs and symbols.
4. Have correct concept and sketch the arrangement of bricks in different types of bonds in building and in foundation.
5. Prepare drawing of stone masonry and scaffolding.

1	2	3	4
23.	Drawing details of damp proof courses. Plinth protection.	Dampness in building and damp proof course. Method of prevention of dampness in building. Mortar-types, proportion & mixing. Plastering & pointing. White washing & distempering.	Reading & plotting of simple graph. Trigonometrical ratios & functions, applied problems on height and distance.
24.	Drawing details of ground floors-concrete, brick on edge, tiled, timber, patent stone, mosaic and steel floor.	Types of ground floor and methods of constructing granolithic, mosaic, brick tiles etc. floors.	---do---
25. & 26	Drawing forms of arches, lintels and centering/ Shuttering.	Arches-technical terms forms-brick and stone centering –lintel. Market forms and sizes.	Solution of triangles
27 & 28	Making drawings of Carpentry joints : Lengthening, bearing, housing, framing, panelling & moulding.	Carpentry joints-terms, classification of joints.	Stress, strain, young' s modules and problems.
29 &30	Making detailed drawing of different types of door including panelled, glazed and flush door.	Door : parts of door, Location, sizes, and types.	---do---

31	Making detailed drawings of windows and ventilators.	Windows and ventilators: including steel window and ventilators-fixtures and fastenings used in doors. Window and ventilators.	Lever-types and problems.
32 & 33	Drawing details of pitched roof including king and queen post, roof trusses. Drawing details of a steel roof truss, showing details connections.	Roof : Pitched roof types, roof covering, component parts of roof. Theory of trussing, king and queen post trusses.	Heat and temperature, different thermometric scales. Linear expansion of solids.

Achievement from 23rd week to 33rd week

The Trainees should be able to :-

1. Have knowledge to prevent the structure with DPC.
2. Draw different types of floors.
3. Draw various types of arches & lintels.
4. Draw different types of doors and windows including knowledge of Carpentry joints.
5. draw different types of roofs with all details.

34 & 35.	Drawing details of upper floors, wooden, floors, stone-jack, arch, madras terrace and brick nagged.	Classification and construction of upper floors including waterproofing, general Principles of construction of masonry & R. C. C..	Heat and temperature-different thermometric problems.
36 & 37.	Drawing details of brick stone wooden & steel stairs. Preparing drawings of details of parts of wooden stair. Preparing drawings of straight, open newel, dog legged geometrical and bifurcated stairs & spiral stairs.	**Stairs :** Terms, forms, materials, planning and designing of stairs. Details of construction .	Unit of heat, problems on work, power and energy and units. Horsepower, watt, simple problems.

38 to 43	Drawing details of single storied residential house with single room (Drawing should be of both pitched and flat roof). Drawing plan, elevation, section with aid of line diagrams. Lay out and detailing of a residential building.	Residential building. Principles of planning. Orientation-local building by law as including BIS code, types of residential building, rooms., services, utilities which constitute as dwelling house. Estimating. Method and find out quantities for a single storied residential building.	Sound: - Characteristic of sound. Light :- Laws of reflection, refraction, simple problems.
44 to 45	Drawing perspective views of building including colouring, shading.	Perspective view-types. Method of construction, technique of colouring and shading.	**Magnetism** :- Properties, magnetic angle, field book areas
46 to 47	Inking & tracing. Use of Leroy set, Printing of letters. Preparing Blue prints & Ammonia prints	Inking & tracing, operating of Leroy set & care of its accessories. Method of preparing Blue prints or Ammonia prints, . Folding of prints.	Revision of all critical problems and use or scientific calculator & practice.
48.	**Allied Trade Training** :- a) **Plumbing :-** Use of plumbing tools.	Safety precaution & elementary first aid, forge and fuel. Lighting fire. Common hand tools-their description and use. Description of plumbing operations.	Finding out the surface area & volumes etc. Using primordial, trapezoidal formula and also Simpson' s Rule.
49	**b) Carpentry:-** Use of carpenter's hand tools involving sawing, planning & chiselling. Marking out & making simple joints used in doors and trusses.	Safety precautions & elementary first aid- carpenter's hand tools, their names, description and use. Common joints. Use of nails, screws, hinges, dowels etc. Preparation of glue & putty. Grinding & sharpening of tools. Their care & maintenance. Use of different types of joints. Properties and uses of different timbers used in construction work.	Basic Electricity.

50..	**c) Wiring (Electrical) :-** Wiring in different system	Safety precautions and elementary first aid. Artificial respiration and treatment of electrical shock. Elementary electricity. General idea of supply system. Wireman's tool kits. Wiring materials. Electric fittings. System of wiring. Wiring installation for domestic lighting.	**Magnetism:-** Properties, magnetic angle, field book areas. Revision of all critical problems and use scientific calculator & practice.

Achievement :-

The Trainees should be able to: -

1. Draw upper floors including general principles of construction.
2. Draw and design staircases.
3. Draw plan, section and elevation of residential buildings (single and double storied) with help of sketches, and line diagrams.
4. Follow principle of planning, local building by laws with BIS standards.
5. Draw perspective view of building including colouring practice & shading.
6. Make inking, Lerroy set printing of letters and tracing including practice of Blue prints and Ammonia prints.

51 & 52	**PRACTICE IN BUILDING CONSTRUCTION DRAWING** Construction of straight walls in English bond half and full brick thick with a right angled quoin, one end toothed and the other end racked back. Construction of cross walls.	**Saf ety Precautions** :- Tools- their description., uses and their care.	------do-----
53.	Forming a door or window opening, method of fixing door or window frame to wall with hold fast.	Details of different bonding wall and section according to BIS.	------do----
54 &	**SURVEYING**	**Introduction:-** Chain surveying principles-	Centre of gravity,

55	Surveying of a building site with chain Entering field book & plotting. Calculating the area of site. (Practice should also be given on existing building from measurement and producing drawings from these dimensions taken). Surveying of a building site with plane table. Prismatic compass & its use.	Instruments employed, use, care & maintenance. Field problems. Field book plotting. Introduction to plane table survey. Instruments employed, use, care & maintenance. Prismatic compass. Planimeter and pentagraph.	moment and moment of inertia for different sections.
56 & 57	Handling of levelling instrument. Differential levelling. Surveying of a building site with chain & level with a view to computing earth work. Setting out level. Plotting of longitudinal cross-sections of a proposed road from given reduced levels marking, suitable formation levels & calculation of earth work. Plotting of Block & Block levelling and drawing of contours.	Instruments and accessories- their uses and description level book. Differential levelling. Application of chain and levelling to building construction. Plotting, preparation of contour computing earth work by spot level and contours. Setting out work.	Survey practical.
58	Cross-sections showing the different types of roads.	**Road:-** Introduction to roads, general principles of alignment. Classification and construction of different types of roads.	Various types of load & supports, Bending moment, shearing force, cantilever & simply supported beams, overhang beams.
59.	Drawing typical cross-sections of railway tracks embankment, layout plans of railway platforms, Marshalling yards sidings, loop lines. Signalling points &	Indian Railways- their gauges, construction of permanent ways . Different rail sections. Use of stone balest in railways track. Use and types of slippers, types of signals, fixtures & fastening in	-----do---

	crossing. Electric Railways tracks.	Railway Tracks including base plates and fishplates.	
60 & 61	Preparing drawing of a masonary culvert and take out vari9ous quantities of items of work & prepare abstract of cost. Preparing drawing of an arched bridge.	**Bridges :-** Introduction to bridges, component parts of a bridge. Classification of culverts (I.R.C.) Bridges- types, location of a bridge. Tunnels rules used for the sizes of different members.	-----do----

ACHIEVEMENT

The Trainees should be able to :-

1. Have general idea on Blacksmith, Carpentry and Wiring.
2. Survey a plot of land with chain and plain table and plot the same. Able to calculate area of site with planimeter. Reducing and enlarging with pantograph.
3. Set up and read a levelling instrument, find difference of level between two points by fly levelling, surveying of building site with chain and plain table, setting out level of earth work and carrying out block levelling, plotting of longitudinal and cross section of a road from given reduced levels. Calculation of earth work plotting of block levels and drawing of contour maps from given data.
4. Preparing drawing details of types of road, C.S. of the railway tracks, culverts and bridges. Estimate the quantities masonary culverts and abstract the same.

62 to 64	Drawing of different types of irrigation structures-viz. Dams Barrages, weir etc. with the help of given sketch & data. Longitudinal section of Distributaries at different R.D. types of outlets and regulators	1. **Introduction of Water Resources Engineering**. Definition of terms used in irrigation. 2. Hydrology like duty delta, intensity of irrigation, Hydrograph, peak flow, runs off, catchments area CCA, corps like, Rabi, Kharif etc. 3. Storage/ diversion head works definitions : Types of Dam-Masonry, concrete & Composite Dams gravity Dam, Arch and Buttress Dams, Earth and Rock fill dams. a) Reservoir-types of Reservoirs viz. single purpose and multi-	Loads-Various types, bending moment, shearing force, cantilever, simply supported beams & overhanging beams.

		purpose, area / capacity curves of Reservoir. **b)Canals:-**Canals, classification of canals and distribution system, canal structures viz. Head Regulators, Cross Regulators, Canal Outlet, Escape, etc. Drawing of canal alignment including longitudinal and cross sections of canals with the given data. Types of Cross Drainage Works viz. Aqueducts. Super-passage, Syphon Aqueducts, Syphon Super passage, Level crossing, Irrigation, Culvert- Inlets and Outlets,General Description, Element of Water Power development and Various civil engineering structure of Hydro-Electric Schemes, i.e., fore bay. Penstock, Turbines, power House etc.	
65 & 66	**Public Health & Sanitation.** Preparation of drawings showing various pipe joints for underground drainage, method of sanitary fittings in multi-storeyed building. Manholes and septic tank. Water supply system.	Introduction-terms used in public health engineering. System of sanitation-house plumbing, sanitary fittings etc. Types of supply system and purification of water.	Problems on over-hanging beams, point of contra-flexure, problems related to trade.
67 to 69	Drawing details of RCC members. Rectangular beams, lintel chajjas, slab, stair including column with footing & continuous columns showing disposition of reinforcement, preparing bar bending, schedules. Method of floor and roof finishing.	Introduction to R.C.C. uses, materials proportions and form work, including bending of bars and construction reference to BIS code. Reinforced brickwork. Materials used for RCC, construction selection of materials course aggregate, fine aggregate cement – water, reinforcement, characteristics. Method of mixing concrete- hand and machine, Slump test.	-----do---
70	Drawing forms of rivet heads and types of riveted joints.	Forms of rivets, proportions. Types of riveted joints.	Analysis of perfect frames (Graphical Method)
71	Drawing of different types of steel, Roof	Design of Riveted connection, failure of Riveted joints.	----do---

	tresses, Girders etc.		
72 to 74	Drawing the various standard steel sections and built up sections used for girders and stanchion including compound columns and strut standard connections to girders, types of sheets piles, steel trough etc.	Introduction to structural drafting. Arrangements of drawing ,standard drawing practice to represent thread, nuts, bolts and structural steel sections. Reference to BIS code. Type designs.	use & practises, with plan meter and pantograph.
75 to 78	Preparation of estimate for residential buildings, canals distributaries, outlets culverts & public Health Works.	**Building Estimating.** Types of estimate, standard method of taking out quantity, labour & material detailed & abstract estimate. Analysis of rates for simple items of work. Schedule of rates, specifications.	Bending stress, simple reflection, column rivet etc. Problems.
79 to 83	Preparation of the working drawing of public buildings such as rest house, hospital, high school, cinema, theatre workshop building of an ITI. Tracing & Blue Printing.	Residential building, Planning of building, Local by-laws including B I.S. code. Types of residential building rooms, service utilities which constitute a dwelling house. Building by-laws of State urban Development authorities/Boards, Improvement trust etc.	Simple estimate in connection with trade ,rate of analysis including R.C.C. and R.B.C.
84 to 88	i) Elementary DOS & Window (Disc 0perating system) ii) Knowledge of editor ii) Knowledge of window software iv) Elementary command of Auto CAD v) File Management of Auto CAD drawing. vi) Practice about co-ordinate system vii) Practice on Geometrical drawing and 2 D Drafting. viii) Editing of drafting. ix) Creating Library	i) What is a Computer :- General terms used in Computer ii) Elementary DOS commands iii) Window command and their uses iv) Auto CAD commands and use of different Icons of Auto CAD. v) Knowledge about different co-ordinate systems. vi) Knowledge about geometrical drawing and 2 D Drafting vii) Knowledge about different edit commands viii) Knowledge about different codes of system ix) Knowledge about 3 d Drafting x) Basic knowledge about Layout and printing of drawing.	

	x) 3 D Drafting xi) Lay out and printing of drawing		
89 to 94	Practice of Building Drawing and structural Drawing Using Auto CAD.	Knowledge about Architectural Desk top and creating modelling.	Revision Test
95	Evaluation of project work	-------do------	
96 to 98	Industrial Tour to local civil engineering drawing offices to become familiar with the office procedures, standards and drawings being prepared there, or visit different drawings organisation, project, site, construction work set.	---------do--------	-----do----- -----do-----
99 to 101	Project work-Isometric view, perspective view. Light tracing, copying, valuation of new and old building.	-------do--------	
102 & 103	REVISION AND EVALUATION OF PROJECT WORK	----------	----------
104	----------	FINAL TEST	----------

ACHIEVEMENT
The Trainees should be able to :-

1. Prepare working drawings of various type of irrigation structures such as sluice accquenduct.
2. Prepare working drawing of various drawings and sanitary proposal, connected with building.
3. Make drawing details of bar bending in different parts of buildings.
4. Draw different steel sections used in building, girders, bridges etc.
5. Prepare estimates for all types of residential buildings.
6. Learn the standard office procedures drawings.
7. Prepare working drawing of public buildings.
8. To operate computer and able to draw various drawing using Auto CAD

FINAL ACHIEVEMENTS :-

The trainees should be able to :-

1. Use and maintain in good condition-drawing instruments, drafting machine, pantograph, planimeter, slide rule etc.
2. Construct and use plain, ink and colour residential buildings from given data.
3. Plan and draw in pencil, ink and colour residential buildings from given data.
4. Prepare working drawings of all types of buildings from line sketches in pencil, ink and colour.
5. Draw from sketches or specifications various types of culverts, bridges or irrigation structures.
6. Prepare proposals for drainages and water supply for a given building including preparation of detailed drawings.
7. Prepare detailed estimate and abstract for a given building or bridge..
8. Prepare tracings and ammonia prints of a given drawing.
9. Survey with chain and plain table a given side. Plot the same and calculate its area.
10. Prepare differential levelling and plot the earthwork from given reduced levels.
11. Plot the longitudinal and cross-section from given field data for a proposed road and calculate the earth work and materials for road work..
12. Draw the parts of R.C.C. structures and steel sections. Prepare working drawing of R.C.C. structures and bar bending schedule.
13. Learn standard office work and drawings by visit8ing local civil engineering drawings and design offices.

LIST OF TOOLS & EQUIPMENT
(FOR A BATCH OF 16 TRAINEES)

Sl. No	Description	Quantity
	Trainee's Kit	
1.	Box drawing instrument containing one 15 cm compass with pin point, pin point & lengthening bar, one pair spring bows, rotating compass with interchangeable ink and pencil points, drawing pens with plain point & cross point, screw driver and box of leads.	16
2.	Protractor celluloid 15 cm semi-circular	16
3.	Scale card board-metric set of eight A to H in a box 1:1, 1:2, 1:2:5, 1:5, 1:10, 1:20, 1:50, 1:100, 1:200,1:500, 1:1000, 1:2000, 1:1250,1:6000, 1:38 1/3, 1:66 2/3	16 sets
4.	Scale – Metric and section wooden 30 cm long marked with eight scales – 1:1, 1:2, 1:2:5, 1:10,1:20, 1:50, 1:100, 1:5	16 sets
5.	Scales plotting box wood 6 metric scales 30 cms long with off set scales.	16 sets
6.	Set square transparent 2 mm thick with bevelled edges 45 degree 20 cm.	16 sets
7.	Set square celluloid 2 mm thick with bevelled edges 60 degrees 25 cm.	16
8.	Board drawing 1250 mm x 900 mm	16
9.	Square T 1250 mm / Mini drafter	16
10.	Erasing shield small size.	16
11.	Template-Architects and builders	16

General Outfit

	Geometrical Models (Wooden) as per given below			
	(i) Cube 08 cm sides		2	To be made i the Institute
	(ii) Rectangular parallel piped 8 cm x 15 cm	2		
	(iii) Sphere 8 cm dia.	2		
	(iv) Light circular core 8 cm dia base 15 cm vertical height		2	
	(v) Square pyramid 8 cm side base and 15 cm vertical height		2	
	(vi) Cylinder 8 cm dia. 15 cm height		2	
	(vii) Prisms triangular 8 cm sides triangle and 15 cm length		2	
	(viii) Prism hexagonal 8 cm sides hexagon and 15 cm length.		2	

2.	French curves-transparent plastic set of 12	4 nos.
3.	Flexible curves 80 cm long	8 nos.
4.	Elliptic trammel with ink and pencil for not less than 10 cm minor axis complete in a case.	1 no.
5.	Radius curve metric-3 mm to 15 mm	4 nos.
6.	Clinograph wooden 18 cm	1 no.
7.	Drafting Machine-Vertical type complete with drawing board adjustable table and pair of metric scales 30 cm and 40 cm long.	4 nos.
8.	Drafting Machine-Horizontal type complete with drawing board size adjustable table with pair or metric scales 30 cms and 40 cms.	4 nos
9.	Brass parallel rulers in a case	4 nos
10	Calculator Scientific	4 nos

11	Planimeter sliding bar pattern 70 cm complete In case with magnifier and instructions reading in metric units.	1 no.
12.	Pentagraph –brass-complete in wooden case with accessories 60 cms.	1 no.
13.	Beam compass with fine adjustments with ink and pencil points and two chromium plated weights 30 cm in wooden case.	2 nos.
14.	Proportional dividers 15 cm.	4 nos.
15.	Lerroy printing set.	2 nos.
16.	Tracing table with plate glass 1250 x 900 cms.	1 no.
17.	Printing frame 45 cm x 60 cm & 80 cm x 60 cm	1 no.
18.	Weighting triangle with tape 1250x900 cms.	2 nos.
19.	Ammonia box 120 cm x 35 x 35 cms.	1 no.
20.	Stencils-complete set 6 H.	2 sets.
21.	Table drafting for boards.	2 sets.
22.	Stools draughtsman high.	2 sets.
23.	Table working blue printing 2 m x 10 m	2 sets.
24.	PC-Latest Version - for Auto CAD	5 nos.
	a) Plotter	1 No.
	b) Printer (Desk Jet/ Leaser Jet)	1 No.
25.	Almirah steel (Major)	2 nos.
26.	Interlock, interchangeable brass stencils with brush in a box.	4 nos.
27.	Pastle and mortar-Porcelain 3 mm, 6 mm, 12 mm, 18 mm	2 nos
28.	Print Trimmer cutting edge 100 cm	1 nos
29.	Chest of drawers 8 drawers (Standard)	4 nos.
30.	Draughtsman table.	16 nos
31.	Draughtsman stool	16 nos.
32.	Instructor's table (big size, full secretariat)	1 no.
33.	Instructor chair.	2 nos.
34.	Architect Desk top (latest)	5 nos.
35.	Server	1 no.
36.	UPS 5KV	2 nos.
37.	Computer table	5 nos.
38.	Chair	10 nos.
39.	Furniture for server, printer plotter.	1 no each

SURVEY INSTRUMENTS

Sl .No.	Description	Quantity
1.	Land measuring chain 30 meters with 10 arms.	4
2.	Steel tape 30 meters long in a leather case	2
3.	Ranging rods wooden fitted with iron shoe 2 meters long.	16
4.	Optical square PWD pattern	4
5.	Optical square box type circular	1
6.	Dumpy level-builder 25 cm local length x 23 mm complete with box and accessories and stand.	2
7.	Levelling staff 4 meters reading to 5 mm telescopic type	1 telescopic 2 set Piece
8.	Plain table with stand and accessories – Alidade, trough compass, sprit level 6", U-forks and plumb bob etc.	2 sets
9.	Prismatic compass with stand	2 nos

LIST OF TOOLS FOR ALLIED TRADE USED IN CONSTRUCTION WORK ETC.

1. Shovel 2
2. Pan M.S. 25 cms. Dia 6
3. Farma wooden for measuring aggregates 1
4. Bucket G.I. 35 cm. Dia 4
5. Mason's plumb rule with spirit level 4
6. Mason's square 30 cm x 30 cm 4
7. Sieve for sand 1 mm/100 x 60 cm 1
8. Trowel 25 cm x 10 cm 4
9. Sieve for sand 22 mm/100 x 60 cms. 1

10. Tool caulking set CB 6	2 sets
11. Brick hammer with handle	4
12. Rule fold wooden 60 cms.	4
13. 15 cm painting trowel	4
14. Line pins corner block	4 pair each
15. Motor Board	4
16. Wire brush	4
17. Wooden float	4
18. Steel float	4
19. Spirit level 30 cms	4
20. Chisel 5 cm hammer headed	
21. Bolster	4
22. Claw hammer	4
23. Spade	4
24. Measuring tape steel 30 meters.	4
25. Laddar aluminium 3 meters	4
26. Pickaxe	2
27. Hammer 250 gms.	1
28. Crow bar 3 cm dia. 1.5.lag	2
29. Hand hammer 1 Kg.	2
30. Binaculars	2
31. Surveyors' Umbrella	2 nos.
32. Light tracing board fitter with glass and frame and lamp	2 nos.

SUGGESTED REFERENCE BOOK

1.	Building construction	S.K.Bose, A.K.Roy
2.	A Test Book of Building Construction	S.K.Sharma & B.K.Kar
3.	Materials of Construction	R.S.Despande
4.	Building Construction	W.C. Huntigton
5.	Building Materials	S. Rajaraman
6.	Engineering Materials	N. Chowdhury
7.	Engineering Materials	K.P. Roy Chowdhury
8.	A Text Book of Surveying	R.S.Despande
9.	A Text Book of R.C..C. Design	R.S. Despande
10.	Elements of Public Health Engineering	K.N. Duggal
11.	Water Supply & Sanitary Engineering	Chatterjee
12.	A Text Book of Highway Engineering	Shahni & Iyringar
13.	Irrigation Engineering	S. Sahasrabudhi
14.	Quantity Survey and Valuation	B.N. Dutta
15.	Railways	N. Chowdhury
16.	A Text Book of Applied Mechanics & Strength of Materials.	D.R. Malhotra
17.	Applied mechanics	A.Ghosh (Mazumdar)
18.	Engineering Drawing	N.D. Bhatt
19.	Geometrical Drawing for Beginners.	D.N.Ghose

SYLLABUS FOR THE TRADE OF DRAUGHTSMAN (CIVIL) UNDER APPRENTICESHIP TRAINING SCHEME

Period of Training: 3 Years

1. The period of Apprenticeship Training for this trade is 3 years consisting of Basic Training for a period of two years and Shop Training for the training period of 1 year.

2. The content of syllabus for Basic Training is exactly the same as that of Craftsman Training in the Trade .All freshers must undergo 2 yrs. Basic Training before Shop Floor Training.

TRADE THEORY – 3RD Year

I. Reinforced & Preliminary Prestressed Concrete

Advantages of reinforced concrete over other tyoes of construction. Bonding and placing of reinforcement.Mixing , laying and consolidation of concrete. Finishing of R.C.C. surface.

II. Surveying

Theodolite Survey-Types of theodolite, uses, methods of plotting, checks adjustment of errors.

Open and closed traverse and their application to engineering problems. Calculation Of area from traverses. Determination of heights.

Setting Out Work- Setting out building, culverts, centre liners of dams, bridges and slope of earth Work.

iii. Estimating and Costing

Analysis of rates of typical items, abstracting and building, specifications, contracts & valuation.

iv. **Railways**

Permanent way, station and yards, Points & crossing.

V .Graphic Static

Theory & Problems on Simply – Supported. Canti-lever & over hanging, girders, roof trusses & simple framed structure.

TRADE PRACTICAL – 3rd Year

1. R.C.C. Drawing including building, roads, bridges and structural drawing.

II. **Surveying**

Theodolite and hill roads, and building survey.