Syllabus

For the trade of

Architectural Assistant

Under CTS

2002

Designed by

Government of India
Ministry of Labour (D.G.E.&T.)
CEENTRAL STAFF TRAINING AND RESEARCH INSTITUTE
EN – Block, Sector – V, Salt Lake,
Kolkata-700091.

List of the Trade Committee members approved the Syllabus for the trade of " Architectural Assistant" under CTS

Sl. No.	Name of member	Representing Organisation	
1.	Shri H. Somasundaram	Director, C.S.T.A.R.I., Kolkata	Chairman
2.	Samir Kumar Sengupta	Executive Engineer (Planning), Bidhannagar Municipality	Member
3.	Debangshu Banerjee	Senior Architect & Planner, Development Consultants Pvt. Ltd.	Member
4.	Nabarun Biswas	Director (Project & Architect), a b consultant (p) ltd.	Member
5.	R. Chakraborty	Senior Project Manager, Bengal Shrachi Housing Dev. Ltd.	Member
6.	Sabyasachi Bag	Training Officer, Regional Vocational Training Institute Kolkata.	Member
7.	Sanjay Kant	Dy. Director of Trg., C.S.T.A.R.I., Kolkata	Member
8.	Sanjay Kumar	Dy. Director of Trg., C.S.T.A.R.I., Kolkata	Member
9.	M. S. Ekambaram	Asstt. Director of Trg., C.S.T.A.R.I., Kolkata	Member
10.	Prasoon Kumar Ghosh	Senior Draughtsman, C.S.T.A.R.I., Kolkata	Member

GENERAL INFORMATION

1.	Name of the Trade	:	ARCHITECTURAL ASSISTANT
2.	N.C.O. Code No.	:	
3.	Duration of Craftsmen Training	:	One year
4.	Entry Qualification	:	Passed in $10^{th.}$ Class Examination with 40% marks in mathematics or Secondary Standard under 10 + 2 system of Education or its equivalent
5.	Unit Strength	:	16 Trainees
6.	Space required	:	64 Sq. Metre

SYLLABUS FOR THE TRADE OF ARCHITECTURAL ASSISTANT

WEEK NO.	PRACTICAL	THEORY	WORKSHOP SCIENCE AND CALCULATION
1	2	3	4
01	Familiarisation 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. Free hand sketching of simple geometrical objects. Getting ready to draw using the drawing instruments and materials. Layout of drawing sheet. Drawing conventional lines according to BIS code. Folding of sheets.	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. All necessary information for familiarisation with the working of Training Institute. System including store procedures, professional prospects, etc. Drawing instruments, equipment and materials their use, care and maintenance. Introduction to Beuro of Indian Standard (BIS). Code of practice for general and architectural drawing.	Applied trade problems - involving multiplication, division, common fraction addition, subtraction, multi-placation and division. Application of fractions and decimals to trade problems. Ratio and proportion Units – different system and conversion.
02 & 03	Lettering – basics, vertical and inclined, forms and proportions. Types of Lettering – strokes, composition, fonts (Gothic, Roman, etc.), writing sentenses. Construction of plain geometrical figures (lines, angles, triangles, rhombus, quadrilaterals, polygons, ellipses, parabola, hyperbola, etc.)	Importance of lettering, writing of letters and figures sizes, proportion, etc. as per BIS code. Geometrical drawing – definition, construction of plain geometrical figures. Method of construction of spiral and helix.	- do -
04 & 05	Drawing plan, elevation of points, lines, surfaces, solids. Dimensioning techniques. Development of surfaces – truncated pipe (triangular, hexagonal, etc.), cone, pyramid and their section.	Definition of orthographic projections and recommended methods of projection according to BIS codes. Definition of solid projections, sections of solid, their shapes, classification of surfaces, method of development of surfaces.	Algebra – simple equation, problems involving trade.
06	Scales – plain and comparative Orthographic projection of furniture – table, chair, desk, stool chest of drawer, exhibition stand. Simple plan of room and furniture layout.	Principles, representation and construction of different types of scales, graphic scales, recommended scales for drawing with reference to BIS codes. Choice of scales.	-- do --

1	2	3	4
07	Isometric projection of geometrical solids, combination of objects, furniture, etc.	Principle of isometric & oxonometric projection, difference between isometric drawing and isometric projection. Isometric scale, dimensioning an isometric drawing.	Unit of mass, force, weight, and simple problems.
08	Symbolic representation of architectural materials, doors, windows, plumbing, electrical fittings and wiring symbols.	Importance of using symbols of different fittings and materials. Knowledge about different types of fittings used in plumbing and electrical work.	-- do --
09	Reducing and enlargement of drawing objects by graphical method and by instrument and measured drawing of any object.	Reducing and enlargement technique by graphically and by instrument.	-- do --
10	Perspective Projection – drawing of parallel or one point perspective projection of room with furniture in it. Determining vanishing points, change in perspective by changing vanishing points.	Perspective projection – definition of picture plane, station point, horizontal line, vanishing point, cone of vision, central visual ray, spectator, eye level, focus, Fundamentals – diminution, foreshortening, convergence.	Mesuration: problems related to triangles, rectangles square, circle, regular poly gons etc.
11	Two Point Perspective Projection of a building, perspective division of all area into area of equal sizes. Drawing of perspective view of a simple building by perspective grid.	Method of drawing of two point perspective. Comparative study of perspective by changing the position of spectator, vanishing point. Distortion, limits of exactness, limitation of field of vision.	- do -
12	Three point perspective: bird's eye view. Three point perspective of group of building, Perspective of rounded form, helix, vaults, cylinder and spiral forms, circular openings on wall, arches.	Method of three point perspective, bird's eye view. Perspective of rounded form, helix, vaults, cylinder and spiral forms, circular openings on wall, arches.	Lever – types and problems.
13	Sciography of buildings – shadow of straight overhangs on straight surface, and vice-versa, shadow of circular overhang on straight surface in orthographic, isometric and perspective.	Sciography : pictorial techniques – shades, light blocked, shadows, less light. General rules for sciography and sun-angle.	Heat and temperature - Different thermometer scales, Linear expansion of solids. Unit of heat and related Problems.

1	2	3	4
14	Introduction to inking pens and tracing on paper Graphic Presentation – sketching of set of objects, landscape, mountains. Free hand lettering, experimentation of colouring.	Fundamental guide to communications, Principle of drafting – definition, readability, clarity, accuracy, standards, standardisation, neatness, and efficiency. Detailing – purpose and scale, explanatory note, material used, etc.	- do -
15	Designing of Texture Designing of simple mural and collage art.	Texture – definition, use, scale/degree, effect and quality of texture. Art – introduction, compositions, paper sculpture.	- do -
16	Showing arrangement of bricks in different parts of bonds, in walls, in pillars of various types, glass blocks.	Brick masonry : bricks and brick tiles, principles of construction, bonds in brick masonry, bonds in column, bonds in junctions, ornamental brick work, reinforced masonry, mortar joints, types and their treatment.	Trigonometrical ratios, functions – applied problems, height & distance.
17	Drawing details of stone masonry including stone joints.	Principle of stone masonry construction, classification, terms used. Types of rubble masonry, Ashlar masonry, composite masonry, stone cladding and joints.	- do -
18	Drawing different types of foundation, footing, piles, grillages, raft foundation. Drawing details of damp proof courses. Plinth protection.	General definition of foundation and footing, uses and their types, sizes and minimum requirements for footing and foundation. Bearing capacity of soil. Dampness in building and damp proof course. Sources and effects of dampness. Method of prevention of dampness in building, periodic repair and care of buildings for prevention. Types and use of flooring and methods of construction of floors (sub-floor and floor finish). Components of floor, sub floor, floor covering, basement floor, suspended floor materials for flooring and its construction.	Stress, strain and Young's Modulus and related problems.

1	2	3	4
19	Drawing - form of arches and lintels.	Arches – technical terms – brick and stone centering – lintel, various forms and sizes.	- do -
20	Drawing details of brick, stone, wooden and steel stairs. Preparing drawings of different types of stair.	Stairs: terms, forms, materials, planning and designing of stair. Details of construction of various stairs.	- do -
21	Drawings of carpentry joints: lengthening, bearing, housing, framing, panelling and moulding.	Carpentry Joints: general principles, terms, classification and uses of joints.	- do -
22	Making detailed drawing of different types of door including panelled, glazed and flush door.	Door: parts of door, location, sizes and types including different materials.	- do -
23	Detailed drawing of windows and ventilators and curtain walls, various types and different materials.	Windows and ventilators: including steel windows ventilators and curtain walls – fixtures and fastenings used in doors, windows and ventilators.	
24 & 25	Detailed drawing of different roofs and roof covering including king and queen post roof trusses. Detailed drawing of wooden and steel roof truss showing details of connections.	Roof : types of roofs and roof covering, component parts of roof, terms, roof covering materials, theory of trussing, king and queen post trusses (e.g. shell dom, folded plate, flat shape, etc.)	Calculation on volume and weight of simple solid bodies.
26 – 27	Detailed drawing of single storied residential house with rooms, kitchen, bath, storage, etc. (drawing should be both pitched and flat roof). Drawing of plan, elevation, section with the aid of line diagram. Layout and detailing of residential building.	Wall finishes – internal & external, plasters and paints, permanent finish. Joints of building – construction, position, method of forming, expansion and contraction joints – their spacing and material used. How to start a design – flow chart and bubble diagram.	- do -
28	Preparation of drawing with plumbing and sewerage distribution and fittings of small and medium sized house, types of water tanks, septic tanks.	Water supply system – average water consumption, for various buildings. Water distribution in a domestic building, sanitation and disease, pollution, plumbing drainage and sewerage disposal. Use of pump. Terms used in Public Health Engineering.	Centre of gravity, moment of inertia for different sections

1	2	3	4
29 – 31	Drawing details of RCC members. Rectangular beams, lintel chajjas, slab, stair including column with footing and continuous columns showing disposition and reinforcement, preparing bar bending schedules.	Introduction to RCC uses, materials proportions and form work, including bending of bars and construction reference to BIS code. Reinforced brick work. Materials used for RCC. Construction selection of materials – course aggregate, fine aggregate cement – water reinforcement, characteristics. Theory of single RCC beams, bond in RCC beams. Forms of rivets, proportions, types of riveted joints, types of welded joints, connections and their symbols. Introduction to structural drafting. Arrangement of drawing standard to represent nuts, bolts and structural steel sections.	Finding out the surface area & volumes etc. using prismoidal trapezoidal and Simpson's Rules.
32 & 33	Preparation of drawing of a 3-storied residential building with electrical and mechanical services.	Elementary electricity. General idea of supply system. Wireman's tool kits. Wiring materials, wiring of domestic lighting. Purpose, types and uses of HVAC, fire fighting Equipment and lift.	Electricity – Ohm's law, parallel and series connection and problems.
34 – 36	Preparation of estimate for residential buildings. Writing of specifications of a small building.	Estimation – introduction, types of estimate standard method of taking out quantity, labour and material detailed and abstract estimate. Analysis of rates of simple item work. Specification – definition, general aspects, purpose and rules.	- do -
37 – 40	Project work: Working drawing of a residential building – plan with standard symbols for electrical wiring, fittings, plumbing, air-conditioning, ventilations, roof plans, etc. Elevation – exterior, interior, typical sections, schedules for doors, windows & finishes with all details as per by-laws of Municipal / corporation.	Residential Building: Principle of planning. Orientation – local building by-laws as included in National Building code, types of residential building, rooms, services,utilities which constitute a dwelling house.	Loads – various types of bending moment, shear force cantilever and simply supported beams.

1	2	3	4
41 – 42	Interior designing of a residential building.	Interior design of work spaces, living spaces, public spaces, office interior, reception interior, restaurant interior, shop interior, surface treatment with colours.	- do -
43	Drawing of construction details of panelling, partitions, false ceiling – acoustical, thermal, ordinary, built in furniture, building finishes.	Construction, materials and uses of panelling, partitions, false ceiling, furniture.	- do -
44 – 47	Architectural Model making – drawing of reduced to actual scale of model. Preparation of model of a small residential building. Photography of models.	Introduction of making models, planning, equipment and materials, hints, precautions, aids & tips, construction of contours, representation of materials on model, special effects sealed items, colour techniques, interior of model.	Simple estimate in connection with trade, rate of analysis including RCC and RBC.
48 – 51	Knowledge of window software. Elementary command of AutoCAD. Free hand working practice on AutoCAD Creating a building plan in AutoCAD	Computer – introduction and general terms used. Window command and their uses. AutoCAD commands and use of different tools in the tool bar. Instructions for practical operations.	Deputation.
52	---------- R E V I S I O N & F I N A L T E S T -----		

ACHIEVEMENT

The Trainees should be able to

i) Use and maintain drawing instruments, drafting machine, pantograph, etc.
ii) Draw perspective view of building including colouring practice and shading
iii) Draw and design stair cases
iv) Construct the wall, doors and windows in different types
v) Draw plan, elevation, section and views of residential buildings.
vi) Make inking Leroy set printing of letters and tracing
vii) Make design of building following principle of planning, local building by-laws as per BIS
viii) Draw interior layout of different spaces with colour scheme
ix) Know about structure of column, beam, RCC, slab, lintel, riveted and welded connections
x) Prepare model of a residential building
xi) Use personal computer – CAD system
xii) Draw two-dimensional Architectural drawings by use of AutoCAD.

N. B. Social Studies : The syllabus has already been approved and is same for all the trades.

List of Tools and Equipment (for a Batch of 16 Trainees) for the Trade of ARCHITECTURAL ASSISTANT

Sl. No.	Name of the tools / equipment	Quantity
1.	Box drawing instrument containing one 15 cm. compass pin point, pin point and lengthening bar, one pair spring bows, rotating compass with interchangeable ink and pencil points, drawing pens with plain point and cross point, screw driver and box of leads (0.2, 0.3 and 0.4 mm.)	16 nos. + 1 no.*
2.	Protractor celluloid 15 cm. semi-circular	16 nos. + 1 no.
3.	Architectural Scale 30 cm. and 12 inches long	16 nos. + 1 no.
4.	Set square transparent 20 cm., 2 mm. thick, 45° with bevelled edges	16 nos. + 1 no.
5.	Set square transparent 25 cm., 2 mm. thick, 60° with bevelled edges	16 nos. + 1 no.
6.	Board Drawing 1250 mm. X 900 mm.	16 nos. + 1 no.
7.	Square 'T' 1250 mm.	16 nos. + 1 no.

* 1 no. tool / equipment is for Trade Instructor

General Outfit

8.	Geometrical models (Mount Board) as per given below:	
	i) Cube 08 mm. sides ii) Rectangular parallel piped 8 cm. X 15 cm. iii) Sphere 8 cm. diameter iv) Light circular core 8 cm. dia. base and 15 cm. vertical height v) Square pyramid 8 cm. side base and 15 cm. vertical height vi) Cylinder 8 cm. dia. 15 cm. long vii) Prism triangular 8 cm. sides triangle and 15 cm. length viii) Prism hexagonal 8 cm. sides hexagon and 15 cm. length	2 nos. each prepared by trainees.
9.	Template – Circle and ellipse	4 nos.
10.	French Curves – transparent plastic set of 12 nos.	4 nos.
11.	Flexible curves 80 cm. long	4 nos.
12.	Drafting Machine – vertical type complete with drawing board adjustable table with pair of metric scales 30 cm. and 40 cm.	1 no.
13.	Drafting Machine – horizontal type complete with drawing board adjustable table with pair of metric scales 30 cm. and 40 cm.	1 no.
14.	Calculator (scientific)	8 nos.

Sl. No.	Name of the tools / equipment	Quantity
15.	Proportional dividers 15 cm.	4 nos.
16.	Tracing table with plate glass 1250 X 900 cms.	1 no.
17.	Printing frame 45 cm. x 60 cm. and 80 cm. x 60 cm.	1 no.
18.	Ammonia box 120 cm. x 35 x 35 cm.	1 no.
19.	Stencils – complete set 6 H	2 sets
20.	Interlock interchangeable brass stencil with brush in box	2 nos.
Furniture		
21.	Chest of drawer (6 drawers Standard)	2 nos.
22.	Draughtsmen table	16 nos
23.	Draughtsmen stool	16 nos.
24.	Instructor's table	1 no.
25.	Instructor's chair	2 nos.
26.	Steel Almirah	2 nos.
27.	Dual desks	8 nos.
28.	Working table 2 m. x 10 m.	2 nos.
29.	Chalk board	2 nos.
Equipment and furniture for CAD training (can be provided in computer section)		
30.	Personal Computer, compatibility with AutoCAD (single user) with 15" colour monitor	8 nos.
31.	AutoCAD software (Licensed latest version)	
32.	Inkjet Printer (A3 size)	1 no.
33.	UPS (0.5 KVA)	9 set
34.	Computer table	16 nos.
35.	Operator chair	16 nos.
36.	Printer table	1 no.

Sl. No.	Name of the tools / equipment	Quantity
37.	Storage cabinet	1 no.
38.	Book shelf	1 no.
39.	Air conditioner 1.5 ton	2 nos.

Samples for Architectural Laboratory (may be collected from companies as free)

i) Sanitary wares
ii) Bends
iii) Sockets
iv) Water supply fittings
v) Junctions
vi) Traps
vii) Wash basins
viii) Sinks
ix) Water closets
x) Doors, ventilators, windows and their fittings
xi) Woods, ply boards
xii) Decorative laminates
xiii) Floors & tiles
xiv) Formic or sunglasses