

**SYLLABUS OF SEMESTER SYSTEM
FOR THE TRADE OF
MASON (BUILDING CONSTRUCTOR)**

**Under
Craftsmen Training Scheme (CTS)
(Two Semesters/One Year)**

Redesigned in

2014

By

Government of India

Ministry of Labour & Employment (DGE&T)

GENERAL INFORMATION

1. Name of the Trade : **MASON (BUILDING CONSTRUCTOR)**
2. NCO Code No. : 951.20
3. Qualification Pack Code : CON/Q 0101
4. Duration of Craftsmen Training : Two Semesters (1Year)
5. Entry Qualification : Passed 8th Class under 10+2 system.
6. Unit Strength : 20
7. Space Norms : 80 Sqm
8. Power Norms : 3 KW (20000 lumen)
9. Job Role : To construct any type of masonry work and perform other related works in the field of construction of buildings and other Civil Engineering structures.
10. Instructor's [Qualification](#) with 3 post : NTC/NAC in the trade of Draughtsman Civil years' post qualification experience.
OR
Diploma/Degree in Civil Engg. with 2/1 years' qualification experience respectively.
11. Desirable Qualification : CITS

Week-wise Contents Index of First Semester

Sl. No.	Week No.	Topic		Duration (Weeks)
		Trade Theory	Trade Practical	
1	1	Tools & Equipments	Tools & Equipments	1
2	2-3	Carpentry Tools & Joints	Carpentry Work	2
3	4	Arch Centering, Bricks	Brickwork	1
4	5-8	Brick Masonry	Brick Masonry Work	4
5	9	Cement, Sand & Lime	Pointing Work, Brick Masonry Work	1
6	10-11	Foundations	Forming Door & Window Openings	2
7	12	Arches	Arches	1
8	13-14	Lintels, Hollow Blocks	Construction of Lintels	2
9	15	Pillars	Construction of Pillars	1
10	16	Cavity Walls	Construction of Cavity Walls	1
11	17	Setting out a Building	Setting out a Building	1
12	18-19	Plastering, Moulding	Plastering, Moulding	2
13	20	Architectural Terms, Mixing of Concrete	Plastering Work	1
14	21	Floors	Flooring Practice	1
15	22-26	Project work/ Industrial visit (optional)/Revision/Preparatory Test/Final Examination.		5
Total				26

Syllabus for the Trade of Mason (Building Constructor) under CTS

First Semester (Semester Code : MSN-01)

Duration : Six Months

Syllabus for TT & TP

Week No.	Trade Theory	Trade Practical
1	Importance of safety, general safety precautions-Introduction to Trade-its importance & scope. Uses of different tools & equipments used for masonry work and their types.	Familiarization with Institute, importance of Trade training, instruments & equipments used, nature of job done by Masons.
2	Carpenter's hand tools, their names and uses. Grinding of tools & precautions to be taken.	Marking out for carpentry work. Use of carpenter's hand tools for simple operations like sawing, planing, chiseling, drilling, etc. grinding of tools.
3	Carpentry joints and their uses. Use of nails, screws, dowels, etc.	Making simple carpentry joints. Centering work. Use of nails, screws, nuts & bolts.
4	Purpose of arch centering & form work. Different types of bricks & their sizes. Sizes of mortar joints for different works. Stretcher & header.	Making centering & form work. Turning a brick for stretcher & header faces. Shaping mortar -spreading on the bed-jointing bricks.
5	Technical terms used in brick masonry. Necessity of bonding bricks. Types of mortars, different grades of sand for brick work & plastering. Grades of cement.	Building a 4 ½ " straight wall about 6 courses high with one end stepped and the other racked back. Preparation of various types of mortars.
6	Characteristics of good bricks. Tiles for roofing & flooring. Purpose of wetting bricks & tiles before use.	Building a 4 ½ "quoin wall with one end stepped and the other racked back. Use of plumb rule.
7	Brickwork-racking back & toothing. Differences between English & Flemish bonds. Details of English & Flemish bond for 1 and 1 ½ brick walls. Precautions at quoins.	Construction of 1 & 1 ½ brick wall junctions in English & Flemish bonds. Racking out the joints & finishing it flush.
8	Cross wall-method of construction. Grouting of mortar, jointing and finishing of brickwork. Types of pointing & tools used. Details of bonding & special precautions at 'T', 'L' and cross junctions. Types of copings-weathering & throating.	-do-
9	Types of cement, sand & lime. English & Flemish garden wall bonds. PWD specification on brickwork.	Pointing work-different types. Construction of 1 brick thick walls in English & Flemish garden wall bonds.

10	Foundation: Definition, purpose, types, important terms, causes of failure of foundations.	Forming a door opening in a wall of English bond. Bonding of jambs & reveals.
11	Construction of sill with oversailing courses-gauge rod-its purpose. Method of fixing door & window frames. Hold fasts & dowels-purpose and method of fixing. PWD specification on the above.	Forming a window opening in a wall in English bond. Construction of sill with oversailing courses. Use of gauge rod. Fixing door & window frames.
12	Arches: Purpose, technical terms & types. Setting out an arch. Tummel & template for preparing voussoirs & key bricks. Method of constructing centering for an arch.	Spanning of opening with a semicircular arch, making centering, cutting of templates for voussoirs & preparing voussoirs, setting uprights of arch. Construction of arch & removing centering.
13	RCC lintels: Materials required, method of construction, precast lintels, method of construction of formwork, details of reinforcement.	Pre-casting a lintel-compacting, curing & setting the same in position. Checking for equal bearing.
14	Hollow blocks: Glazed, sand, lime bricks. Uses, merits & demerits.	Spanning of opening by casting a lintel in site. Construction of shuttering & supports with uprights and wedges. Bending bars & placing reinforcement. Mixing, placing & compacting concrete.
15	Pillars: Necessity, types, relation between cross section & height. Details of reinforcement for square & rectangular pillars.	Construction of detached pillars with footings-square & rectangular types.
16	Cavity wall: Technical terms, advantages, constructional details, precautions to be taken at the bottom of cavity, provision of weep holes & ties, special care at junctions & openings. Scaffolding: Definition,, types, parts, PWD specifications.	Construction of cavity walls, setting out both leaves, provision of wall ties, use of cavity rods.
17	Steps in setting out & marking centre line, excavation line & other lines-use of dead man-checking accuracy & precautions. Windows & ventilators: Including steel windows & ventilators, fixtures & fastenings used.	Setting out a building: Obtaining first, second, third & fourth lines, marking diagonals, setting out cross walls & offsets. Marking excavation lines & fixing of plinth & floor levels.
18	Plastering: Tools used, necessity of screeds & their fixing, steps in plastering. Concrete: Ingredients, selection of materials, various ratios of mix, their uses, measuring of materials for mixing.	Plastering of walls-setting of spots-applying mortar-use of screeds & floats.

19	Moulding: Types, purposes, making & using a mould.	Fixing of screeds to soffits of door & window openings-reversing the screeds & squaring.
20	Architectural terms used in connection with classical mouldings such as architrave, apex, etc. Hand & machine mixing of concrete-laying and curing of concrete. Water-cement ratio. PWD specifications.	Plastering of ceiling: Application of mortar, strengthening and finishing (Improvise a roof with stone or concrete slab for the purpose of demonstration).
21	Floors: Types, constructional details such as consolidation of bed, sand filling, concrete base & finishing. Granolithic flooring. Local Municipal byelaws.	Flooring practice: Formation of slope, application of slurry for finishing, setting out of skirting, formation of spots for skirting, use of screeds, formation of curve at the junction of skirting & floor.
22-26	Project work/ Industrial visit (optional)/ Revision/ Preparatory Test & Examination.	

Syllabus for the Trade of Mason (Building Constructor) under CTS

First Semester (Semester Code : MSN-01)

Duration : Six Months

Syllabus for Workshop Calculation & Science

Week No.	Workshop Calculation & Science
1-2	Site problems involving multiplication & division of whole numbers.
3-4	Addition, subtraction multiplication & division of fractions.
5-6	Application of fractions to site problems
7-8	Decimals: Addition, subtraction, multiplication & division. Conversion of decimal to fraction and vice-versa. Site problems.
9	Square root of perfect squares-whole numbers & decimals.
10	Metric System: Measurement of length, breadth & height in metric units.
11-12	Measurement of weight in metric system. Unit conversion. Problems.
13-14	Ratio and proportion: Problems to find out quantities of materials for various mortar & concrete mixes.
15-16	Mensuration: Areas & perimeters of rectangles, squares and triangles.
17-18	Areas & perimeters of circles, sectors, segments, quadrilaterals, trapezium, parallelogram & rhombus.
19	Problems on areas & perimeters of polygons such as pentagons, hexagons & octagons.
20	Volume & surface area of simple geometrical solids such as cubes & prisms.
21	Mensuration applied to area & volume of brickwork. Calculation of cement & sand required.
22-26	Revision & Examination.

Syllabus for the Trade of Mason (Building Constructor) under CTS

First Semester (Semester Code : MSN-01)

Duration : Six Months

Syllabus for Engineering Drawing

Week No.	Engineering Drawing
1 - 2	Sketching of tools.
3	Sketching of various carpentry joints.
4 - 5	Sketching of jointing devices and the joints made with them. Sketching of arch centering, door frames with joints, etc.
6 - 8	Drawing: a language of communication. Properties of lines, angles, triangles & circles. Drawing practice of these geometrical figures including pictorial views.
9	Freehand sketching of simple solids such as cubes, cuboids, cylinders and views of these objects when viewed perpendicular to their surfaces or axes.
10 - 12	Freehand sketching of bricks, queen closers, king closers and bats.
13	Preparation of freehand sketches in plan & elevation of 4 ½" wall-Quoins & Junctions.
14 -15	Preparation of freehand sketches of rat trap bond and other ornamental panels.
16	Use of drawing instruments-'T' square, drawing board, etc. Printing of letters & numbers.
17	Drawing of simple geometrical problems involving lines, squares & polygons.
18	Construction & reading of plain scales. Reading of tapes & foot rules.
19	Drawing architectural drawings such as ovolo, cavetto, bolten, scotia, cyma recta, cyma reversa, astragal, etc.
20	Different types of lines & symbols used in building drawings.
21	Simple isometric scaled drawings, isometric views of simple objects such as cubes, cuboids, square & rectangular prisms and pyramids.
22 - 26	Revision & Examination.

Week-wise Contents Index of Second Semester

Sl. No.	Week No.	Topic		Duration (Weeks)
		Trade Theory	Trade Practical	
1	1	Drainage System, Roofs	Setting out a Drainage Line	1
2	2-5	House Drainage System	House Drainage System	4
3	6	Septic Tank	Fixing of Washbasin, WC, Sink, etc.	1
4	7	Stone Masonry	Stone Masonry	1
5	8	RCC Work, Reinforced Brickwork	Construction of Stone wall	1
6	9	Ashlar Masonry	Flooring, Roof Finishing	1
7	10	--	Brick Masonry/Stone Masonry Work	1
8	11	Lifting appliances, Moulding of Stones	Moulding Work	1
9	12	--	Rubble Masonry Work	1
10	13	Marble Floors	Marble Work	1
11	14	--	Construction of Compound Wall	1
12	15-16	Circular Walls/Pillars	Circular Walls/Pillars	2
13	17	Hollow Block Masonry	Hollow Block Masonry	1
14	18	RCC Work-Construction Details	Roof Construction	1
15	19	External & Internal Finishes	External & Internal Finishes	1
16	20	Stairs	Flooring Practice	1
17	21	Glazed Tiles, Construction & Expansion Joints	Laying out a Stair	1
18	22-26	Project work/ Industrial visit (optional)/Revision/Preparatory Test/Final Examination.		5
Total				26

Syllabus for the Trade of Mason (Building Constructor) under CTS

Second Semester (Semester Code : MSN-02)

Duration : Six Months

Syllabus for TT & TP

Week No.	Trade Theory	Trade Practical
1	Purpose of drainage, different systems, their advantages & disadvantages, method of collection, carriage & final disposal of wastage, various types of constructions required. Roofs: Classification, parts, trussed roof, covering materials.	Drainage: Setting out a drainage line including position of manhole & gully trap. Practice in setting up and reading of dumpy level.
2	House drainage system-normal layout of drainage. Traps-gully, nahani, etc.-their description. Purpose & method of fixing sanitary fittings such as WC, urinal, washbasin, kitchen sink, etc. construction of surface drains and laying its surface with bricks.	Laying out drainage to required gradients with the help of dumpy level and/or boning rod and laying its surface with bricks.
3 - 4	Drainage pipes: Types, materials, sizes, gradient for different diameters, method of laying & jointing, importance of water tightness, concrete base and covering.	Laying of concrete foundation for drainage pipes and jointing. Checking of alignment. Cutting the pipe to the required length. Covering of drain pipe with concrete as per PWD specification.
5	Manhole: Standard sizes, necessity, details of construction and benching. Provisions of footrests, drops & cover.	Laying out foundation concrete and construction of manhole. Method of providing footrests, forming of drain and benching.
6	Septic tank: Purpose, parts and method of construction. Bonding & waterproofing of tank walls. Method of lining field drains with bricks. Shoring for deep trenches. Safety precautions.	Fixing of brackets for washbasin and flushing cistern. Fixing of WC pan, kitchen & bathroom traps, sinks, etc. fixing of vent pipe to walls.
7	Stone masonry: Importance of stone, conversion & dressing. Types of dressing as per ISI specification. Types of stone.	Stonework, method of cutting stone in required size from a block. Selection of face & bed.
8	Introduction to RCC: Uses, materials, properties and formwork, bending of bars & construction. Reference to ISI code. Reinforced brickwork. Brief description of slabs, beams, lintels, stairs, columns, etc.	Construction of stone wall.
9	Ashlar masonry. Types of joint used in ashlar such as chamfered, beveled, etc. through stones & bond stones.	Flooring and roof finishing practice.
10	Practice on brick/stone masonry work.	

11	Lifting appliances such as lifting tackles, skips, chains, lewis, etc. Precautions in using them. Steps in preparing & moulding stone. Preparation of sheet metal mould.	Cutting a sheet metal profile for architectural moulding. Applying the sheet metal mould in forming the mould in stone.
12	Construction of a rubble masonry wall.	
13	Marble floor: types, constructional details. Construction of attached piers & buttresses.	Marble work: Method of cutting and setting on stair, floor, wall & pillar.
14	Construction of compound wall with attached piers and coping.	
15	Circular walls: Details of construction. Purpose-made bricks.	Construction of a 4 ½"/9" thick circular brick wall.
16	Setting out and construction of circular gate pillars with brick/stone/tile/concrete.	Construction of circular gate pillars with brick/stone/tile/concrete.
17	Hollow block masonry: Laying of hollow blocks for walls & columns. Use of structural clay tile for partition. Precast concrete partition, metal lathe partition and concrete block partition.	Construction of hollow block walls.
18	RCC work: Mixing, laying, compacting, curing, thumb rule for percentage of reinforcement for lintels, slabs, beams & columns. Necessity hook & cranking. Shear reinforcement.	Construction of roof with prefabricated hollow blocks of beams and slabs
19	Types of external & internal finishes such as rough cast, pebble, dash and stucco-materials used & method of finishing-factors to be kept in mind, PWD specification on the above.	External/internal finishes-practice. Fixing cement concrete jelly.
20	Stairs: Technical terms, relation between tread & rise, types of stairs, construction details of brick, stone & RCC stairs. Spiral stairs with precast concrete steps. Formwork & shuttering-their removal-precautions-PWD specifications.	Flooring: Mosaic, terrazzo, and tile flooring. Laying out a stair on the ground.
21	Use of glazed tiles for wall facing, steps in fixing, precautions. Construction & expansion joints-method of filling-repair of cracks.	Laying of glazed tiles, fixing the thread, filling between ends, plumbing, setting out a jamb, bonding, marking & cutting tiles.
22-26	Project work/ Industrial visit (optional)/ Revision/ Preparatory Test & Examination.	

Syllabus for the Trade of Mason (Building Constructor) under CTS

Second Semester (Semester Code : MSN-02)

Duration : Six Months

Syllabus for Workshop Calculation & Science

Week No.	Workshop Calculation & Science
1 - 3	Simple cost comparison between facing bricks & common bricks. Cost comparison between walls built in English/Flemish/garden wall bonds/cavity walls.
4 - 5	Problems on areas. Allowances for simple rectangular window & other openings.
6 - 8	Weight of walling supported by lintels and arches-simple problems.
9	Calculation of rise & span for arches.
10	Volume of brickwork in mass retaining walls.
11	Volume of stonework or concrete work required for a given piece of work.
12	Mensuration applied to area of marble works.
13 - 14	Calculation of length & weight of steel reinforcement from detailed RCC drawings.
15 -17	Calculation of quantities of cement, sand, aggregate & reinforcement for a given RCC work.
18 - 19	Calculation of quantities of various materials for brick/tile/cement concrete/terrazzo flooring. Quantities of materials required for skirting.
20	Calculation of length of drainage pipe & materials for foundation & covering concrete.
21	Calculation of materials required for a manhole from given drawing.
22 - 26	Revision & Examination.

Syllabus for the Trade of Mason (Building Constructor) under CTS

Second Semester (Semester Code : MSN-02)

Duration : Six Months

Syllabus for Engineering Drawing

Week No.	Engineering Drawing
1 - 2	Isometric views of simple objects such as cubes, cuboids, square & rectangular prisms and pyramids.
3 - 4	Projections of solids.
5	Code of practice for general engineering drawing as per ISI.
6	Drawing to scale: a) 4 ½" stepped wall, b) 4 ½" wall racked back, c) 9" walls in English & Flemish bonds showing stepped end, racking back & tothing.
7 - 8	Drawing to scale: a) 4 ½" quoin wall with stepped end & racking back, b) 4 ½" junction wall, c) 9" quoin wall in English & Flemish bonds, d) 9" Flemish bonded wall junction, e) 9" wall in garden wall bond, f) 13 ½" main wall in garden wall bond & 9" cross wall in English/Flemish bond.
9	Drawing to scale: 18" wall in English garden wall bond.
10	Hexagonal & octagonal pillars showing bonds and cavities.
11	Preparation of drawing showing timbering in trenches.
12	Preparation of drawings showing methods of setting out simple segmental, circular & elliptical arches.
13 -14	Drawing of setting out a building showing the centre line, width of excavation, foundation concrete, footings & superstructure. Checking of accuracy.
15 - 16	Interpretation of building drawing. Preparation of plan, elevation & section of a simple building.
17	Reading of a building plan showing drainage line, position of manhole, etc.
18	Constructional details of hollow block roof with precast RCC joints.
19	Drawing of manhole and inspection chamber with details.
20	Stonework: Drawing of random rubble, coursed rubble & ashlar masonry. Layout of stairs.
21	Drawing of stone pillar showing architectural moulding.
22 - 26	Revision & Examination.

List of Tools & Equipments for the trade of Mason (Building Constructor) under CTS**A. Trainee's Kit for 20 Trainees and One Instructor**

Sl. No.	Description	Quantity
1	Bolster 4" (100mm)	21
2	Pitching tool (mason)	21
3	Chisel (mason) Hammer headed punch	21
4	-do- ½" (12mm)	21
5	-do- 1" (25mm)	21
6	-do- Cross cut type	21
7	-do- ¾" (18mm)	21
8	-do- 1 ½" (35mm)	21
9	Club hammer 1 ½"/1pbs.	21
10	Hammer (mason) brick (600-800gm)	21
11	Helmet	21
12	Leather gloves	21
13	Goggles	21
14	Plumb level 36" (1m)	21
15	Pins (Line)	21
16	Plumb bob	21
17	Steel square	21
18	Plastering trowel-double	21
19	Wooden float	21
20	Trowel-brick 10" (25cm) long	21
21	Trowel-pointing 6" (15cm)	21
22	Tasla (tin) pan	21
23	Wooden straight edge 4'	21
24	Bucket	21
25	Engineering Instrument Box	21
26	Protractor 15 cm full circular	21
27	Card board/ plastic metric scale set- A to H	21
28	Celluloid set square 45° & 60°	21
29	Drawing board 1250 x 900 mm	21
30	T square 1250 mm/ Mini drafter	21
31	Erasing shield small size	21
32	Architect's & builder's template	21
33	Drawing machine (Horizontal type)	21
34	French curve- set of 12	21

Note: Sl. Nos. 25 to 34 need not be provided, if the institute has Surveyor/Architecture/Draughtsman Civil/Draughtsman Mechanical/other similar trades.

B. General Outfit

Sl. No.	Description	Quantity
1	Spade	12
2	Shovel	12
3	Measuring steel tape 15m	3
4	Measuring tape 30m	2
5	Ladder 2-4m	3
6	Sledge hammer 4kg	3
7	Drum (45gallons)	3
8	G.I. pipe 1" (25mm) ϕ	200
9	Hose pipe	60m
10	G.I. pipe ½" (12mm) ϕ	200
11	Cellotax board	3
12	Spirit level 6" (15cm)	20
13	Bar bending & cutting tools	2 sets
14	Spirit level 12" (30cm)	5
15	Screw driver	5
16	Pocket steel tape 6' long	20
17	Four-fold foot rule 2' (60cm)	20
18	Pickaxe	5
19	Crowbar 1.5m long	3
20	Scraper	20
21	Snip straight 10" (25cm)	5
22	Carpenter tool kit of 20 sets (a) Handsaw (b) Mortise chisel (c) Tenion saw (d) Firmer chisel (e) Mallet (f) Carpenter claw hammer (g) Hand brace with bits (h) Plane	1 1 1 1 1 1 1 1
23	Wheel barrow	5
24	Tubular scaffolding	As required
25	Steel measuring boxes (0.6 cft & 1.2 cft)	4 each
26	Adjustable steel props	30
27	Flat 4' x 4' x 6'	10
28	Bending rods	3
29*	Dumpy level with stand & staff	3
30	Spanner set	1
31	Steel shuttering 400 sqm	2 sets
32	Bench grinder	2
33	Drilling machine	2

Note: Dumpy level need not be provided, if the institute has Surveyor/Draughtsman Civil trade.

List of Consumables for the Trade of Mason (Building Constructor) under CTS

Sl. No.	Consumables
1	Drawing sheet-A1 & A2 size
2	Drawing pencil-HB, 2H, etc.
3	Eraser
4	Adhesive tape
5	Machine made drawing paper
6	Xerox paper A4 size
7	Bricks-traditional bricks, standard bricks, special bricks, purpose-made bricks for circular walls, etc.
8	Stone blocks- random rubble, ashlar, flagstone, etc.
9	Tiles-different shapes & sizes
10	Hollow blocks
11	Cement
12	Sand-different grades
13	Lime
14	Coarse aggregate-different sizes
15	Steel reinforcement bars-different diameter
16	Wood for carpentry work
17	Sheet metal, etc.

Trade Testing and Certification

Same as for other Similar Engineering Trades.

Further Learning options

After successful completion of CTS Course in the trade of **Mason**, the trainees have the option to continue their further studies by joining the ATS Course in the same trade, which is of one year's duration.

List of Trade Committee Members

