SYLLABUS OF SEMESTER SYSTEM

FOR THE TRADE OF

DRAUGHTSMAN CIVIL

Under

Craftsmen Training Scheme (CTS)

(Two year/Four Semesters)

Redesigned in

2014

By

Government of India

Ministry of Labour & Employment (DGE&T)

FORMAT FOR CTS

1. Cover Page

2. Title

3. General Information

4. Week wise contents of TT and TP & WSC of each semester (In tabular form)

6. Tools and Equipments list - broad specification

7. List of the consumable

8. Trade testing and certification

9. Further learning options

10. List of Trade Committee Members

GENERAL INFORMATION

1. Name of the Trade	**DRAUGHTSMAN CIVIL (Engineering Trade)**
2. N.C.O. Code No.	030.20
3. Qualification Pack Code No.	
4. Duration of Training	**Two Years** **(FOUR semesters of six Months each)**
5. Entry Qualification	**10th class Passed**
6. Unit Strength	**20 Trainees (Two Batches-each batch of 20 Trainees)**
7. Space Norms	**a) Class room: 30 sqm.** **b) Workshop: 64 sqm.** **c) Computer lab: 50 sqm.**
8. Power Norms	**a) Class room: 1kw (6000 lumen)** **b) Workshop : 2 kw (30,000 lumen)**
9.At the end of course the trainee will be awarded with National Trade Certificate (NTC)after clearing the All India trade test (AITT).	

10.FINAL ACHIEVEMENTS : At the end of course the Trainees should be able to :-

1. Use and maintain in good condition- drawing instruments, planimeter, slide rule .survey instruments, auto level , digital theodolite , total station, GPS, computer & draft software, plotter & printer etc.
2. Plan and draw in residential buildings from given data
3. Prepare working drawings of all types of buildings from line sketches in CAD
4. Planning, drawing, estimating, and costing of civil work. Drawing plans by using CAD. Making of 3D models of civil work. Giving setting out 0f site, supervision of civil work etc.
5. Prepare proposals for drainages and water supply for a given building including preparation of detailed drawings.
6. Plot the longitudinal section and cross-section for a proposed road and calculate the earth work and materials for road work.
7. Draw the parts of R.C.C. structures and steel sections. Prepare working drawing of R.C.C. structures from given field data
8. Draw from sketches or specifications various types and cross-section of roads culverts, bridges Railways & irrigation structures in CAD
9. Carry out the surveying by using latest equipments.(Auto level, Digital theodolite,Total station, GPS)

11. Job Role :

Options for employment are: -

Employment opportunities for trainee from this trade as Draftsman, Surveyor and Land Surveyor shall be available in Central & State Government Departments. in Railways, C.P.W.D. Military, TCP, P.D.A., P.W.D., HUDA, Housing Board, Land Survey and public health engineering department.

Private sector opportunities shall be as Draftsman, Construction Supervisor with Architect, Civil Engineer, and Civil Contractor, Builders.

Options for self-employment are:

The Trainee shall be able to independently undertake planning, drawing, estimation & costing and supervision of civil construction work. He can set up his own office for above work and also to supply Civil Construction materials

12. Instructors/Trainers	**Training officer/Instructor – 2 no's** **Workshop attendant – 1 no**
13. Instructor's/Trainer's Qualification	**Academic Qualification:** **(a)Passed10th** class under 10+2 system with Science and Mathematics (b) **Technical Qualification:** **-** Degree or Diploma in Civil branch of engineering with 1 or 2 years post qualification experience respectively OR **-**NTC in same or relevant trade with 5 years' post qualification experience OR **-** NAC in same or relevant trade with 4 years' post qualification experience. **(c)Desirable Qualification:** **-**Passed National Craft Instructor Training course in same OR relevant trade.

Syllabus for the Trade of Draughtsman Civil under CTS

First Semester (Semester Code No. –DMC: SEM-I)

Duration: Six Months

Syllabus for TP 01 and TT 01

Week No.	Trade Practical (All drawings are in traditional)	Trade Theory
1 &2	• Orientation of the Trade and Institute. • Awareness about the jobs made by the ex. Trainees. • Techniques of use of Instruments, • Equipments, their care and maintenance. • Method of fixing of drawing sheet on the drawing board • drawing a layout of different size of sheets. • Safety precautions to be observed in the Computer Lab	• Rules and regulations of the Institute and Trade. • List of the subjects to be taught for each semester. • List of the Instruments, equipments and materials to be used during training. • List out the Achievements to be made for each semester.
3 to 4	**Drawing of:-** • Lines, lettering and Dimensioning. • Construction of plain geometrical figures. • Construction of solid geometrical figures,	• Importance of B.I.S. introduction of Code of Practice for Architectural and • Building Drawings (IS: 962-1989). • Layout of drawing. Lines, Lettering, Dimensioning, Scales and Projection
5 to 9	**Drawing of :-** • Projections – Orthographic(Line,plane,Solid in isometric, oblique) and Perspective. • Symbols & conventional representation for materials in sections as per IS 962-1989 for building drawings. • Components of a building.	**Building materials**:- ***Rocks***–. classification,types,uses • ***Stones*** –, classification,types,uses • ***Bricks*** –. Manufacturing classification,types,uses • ***Lime***–classification,types,uses • ***Pozzolanic***, , classification,types,uses • ***Cement*** – Manufacturing classification,types,uses

		• ***Clay Products*** – earthenware, stoneware, porcelain, terracotta, glazing, types,. • ***Mortar*** –. Preparation classification,types,uses • ***Concrete*** –. Preparation classification,types,uses • ***Timber***.. Structure, defect classification, seasoning, uses • ***admixtures*** - for cement mortar & cement concrete, classification,types,uses,
10 to 13	**Drawing of different forms of :-** • Stone masonry-, • Brick Masonry • - Elements, Classification, types of bonds. • Hollow blocks • Composite masonry	**Protective materials**:- • ***Paints***, classification,types,uses • ***varnishes*** – .classification,types,uses • ***Metal***–classification,types,uses • ***Plastics*** –. Classification ,types, uses **Building Construction**:- • ***Masonry***. ***Stone masonry***- terms used -. Classification **–** Tools **–** • ***Brick masonry*** - Technical terms –-bonds, types junctions • ***Hollow block construction —*** types, admixtures added- advantages. • ***Composite masonry :-*** types
14 to 16	**Foundation**:- • Construction details of Shallow & Deep Foundation. • Types of foundations, • Well foundation, • Special foundations , • Pile foundations • Foundation on black cotton soils. etc	**Foundation**:- • ***Soil*** **-** bearing capacity • ***Foundation*** **-** objectives, Requirement, types- • ***shallow*** - spread, isolated or column footing, stepped, combined, continuous, inverted arch, cantilever, grillage, & raft or mat foundation. • ***Deep foundations***- piles –. Well foundations • Machine foundation-general requirements-types- • Cofferdam and caisson

17 &18	**Temporary structures - sub structure:-** • Scaffolding, • shoring • underpinning , • Partition- aluminium frame with glass sheet, timber, straw board. **Details of supporting structures for construction** • Form work for R.C.C structure	***Permanent & temporary structures:-*** • life of structures, • sub structure, • super structure, • load bearing structure, • cavity wall, • framed structure, • ***Scaffolding-*** parts, types- • ***Shoring-*** types. • ***Underpinning.*** purpose, types. • ***Partition –***requirements, types. • ***Form work***
19	**Showing details of treatments in building:-** • Methods of Damp proofing. • Anti-termites • Fire proofing.	**Treatments for building structure**:- • ***DPC***-Sources and effects of dampness, method. • ***Damp proofing materials*** – properties, functions, types, • ***Anti-termite treatment***- objectives & uses, method. • ***Weathering course-*** purpose, materials required- • ***Fire-proofing***. Effect, rules
20 &21	**Draw different forms of :-** • arches, • lintels • sunshades Centring & Shuttering.	• **Arches -** Technical terms-. types ,centring • ***Lintel***- types-wooden, brick, stone, steel & RCC.
22,23	Project work / on the job training	
24	Revision	
25 &26	Examination	

Syllabus for the Trade of Draughtsman Civil under CTS

First Semester (Semester Code No. –DMC:SEM-I)

Duration: Six Months

Syllabus for Workshop Calculation and Science

Week No.	Workshop Calculation and Science
1 &2	Units- Fundamental, Systems of Units (MKS, FPS & CGS) and their conversion-converts length from FPS to CGS and vice versa-convert mass from FPS to CGS and vice versa
3 to 4	Derived Units –units of Area, Volume and their Conversation-units of weight & its conversion-units of pressure and speed and their Conversation
5 &6	Least common multiple-meaning, LCM of two numbers. Applied problems.
7 to 9	Addition & subtraction of fraction. Multiplication of fractions, applied shop problems. Division of fractions. Simplifications and applied problems.
10 to13	Decimal-meaning, fixing decimal point, conversion of decimal fractions to decimal, conversion of decimal to decimal fraction, compression of decimal, conversion of common fraction to a decimal. Denominator of a fraction considering of multiples of fraction lie powers. Denominator of a fraction consisting of any whole number. Recurring decimal. Addition & subtraction, arrangement of decimal point in the same column.
14 to17	Multiplication of decimals, by whole number, locating decimal point, problems on multiplication of decimal fraction. Division of decimals-by whole number, by another number. Problems on division of decimals. Application of decimals. Problems on decimal number
18&21	***Work***-classification, Newton's law, units of force, computation of work done. ***Power***- computes horse power, calculates mechanical efficiency. and ***Energy***-. Form of energy, mechanical energy, computes potential and kinetic energy, law of conservation of energy. Relationship between Force and Work, BHP, IHP and Efficiency. Problem concerning work, power and energy
22 to 26	Revision & Examination

Syllabus for the Trade of Draughtsman Civil under CTS

Second Semester (Semester Code No. –DMC: SEM-II)

Duration: Six Months

Syllabus for TP 02 and TT 02

Week No.	Trade Practical (Drawings 1 to 17 are in traditional & 16 to 21 are in computer drafting)	Trade Theory
1 to 3	**Making detailed drawing of :-** • Making drawing of CARPENTRY JOINTS: Lengthening,bearing housing,framing, panelling & moulding. • Different Types doors including panelled, glazed and flush door. • Making detailed drawing of windows and ventilators.	• **Carpentry joints** terms, classification of joints, Uses & types of fixtures & fastenings • **Doors –**Parts, Location, standard sizes, types-. • ***Windows***-types, . ***Ventilators***-purpose-types,
4 & 5	**Drawing details of:-** • types of ground & upper floors • Various floor finishing & construction sequence	• **Floors** – Ground floor & upper floor-Types. • **Flooring-** materials used, types •
6 to 8	**Drawing different forms of vertical transportation:- .** • Drawing of straight, open newel dog- legged, geometrical and bifurcated stairs & spiral stairs. • brick, stone, wooden, steel & RCC stairs. • Lift & Escalator	• **Stairs-** Terms. Requirements • .headroom, .Types-(Turning. Materials)- • Planning • **Lift** • **Escalator**
9 to 11	**Drawing details of:-** • pitched roof including king & queen post, • Steel roof trusses. • Wooden roof truss, showing detailed connections.	• **Roofs** & Roof coverings **–** purposes-Elements-. Types:- Flat & pitched • ***Truss-***king post, queen post, mansard, bel-fast, steel, composite. • . ***Shell***-types-north-light & double curved.

		• ***Dome.*** Components parts. • ***Roof coverings*** – objectives, types & uses,
12 &13	**Drawing details of**:- • Line diagram of single storied residential house with a bed room of both pitched and flat roof in • Plan, elevation, and section with aid of line diagrams. • Layout and detailing of residential building • Create a drawing showing setbacks	**Building rules & bye laws:-** • Objectives & importance, • Function& responsibility, • lay out plan & key plan- • composition of submission drawing. • provision for safety. • requirement of green belt and land
14 &15	**Computer practice**:- • Installation of Computer aided Software. Operation of CAD package, • Function Keys & practice of basic commands.	**Computer aided drafting:-** • Operating system ,Hardware & software • Introduction of CAD • Its Graphical User Interface. • Method of Installation • Basic commands of CAD.
16 to 17	**Building Drawing (Residential)** Prepare:- • plan, section and elevation of buildings with specifications for the given line drawing to suitable Scale: • A Reading room with R.C.C flat roof • A House with single bed room and attached bathroom with R.C.C. flat roof.	**Building Planning**:- • Economy & orientation • Provision for lighting and ventilation, , • Provision for drainage and sanitation. • Types of building • Planning & design of residential , public and commercial building
18	• A residential building with two bed rooms with R.C.C. flat roof • House with single bed and hall with partly tiled and partly R.C.C. flat roof. • Two roomed house with RCC slope roof with gable ends • A House with fully tiled roof with hips and valleys • Design and create a double storied residential building (3BHK)	• Types of building • Planning & design of residential , public and commercial building **Prefabricated Structure**:- • Preparation • Method of construction, assembling • Advantages & disadvantages

19 to 21	**Building Drawing (Public)** Prepare:- • A Primary health center for rural area with R.C.C roof. • A Village Library building with R.C.C flat roof • A small Restaurant building with R.C.C flat roof • A Single storeyed School building with R.C.C flat roof • A Small workshop with north light steel roof truss (6 to 10m Span) over R.C.C. Columns • Service plans • A Bank building with R.C.C flat roof.	• ***Parks & play ground-*** Types of recreation, landscaping. etc • ***Concepts of design of earthquake resisting buildings-*** requirements resistance , safety, , flexible building elements, special requirements, base isolation techniques
22,23	Project work / on the job training	
24	Revision	
25,26	Examination	

Syllabus for the Trade of Draughtsman Civil under CTS

Second Semester (Semester Code No. –DMC:SEM-II)

Duration: Six Months

Syllabus for Workshop Calculation and Science

Week No.	Workshop Calculation and Science
1 & 2	Average and percentage of error-percentage increases & decreases. Computing the multiplying factor based on the percentage change
3 to 5	Ratio & proportion
6 to 8	Averages-rule of finding the average of two or more quantities of the same kind, total of the quantities from average value. Percentages and fractions-meaning, two essential magnitudes, representing percentage as decimals-as equivalent ratio. Converting any fraction into percentage, converting decimals into percentages
9 & 10	Properties of Engineering Materials -Physical, Mechanical & Chemical. Density, bulk density, specific gravity, porosity, water absorption, permeability, chemical resistance, fire resistance, weathering resistance, thermal conductivity, durability
11 to 14	SIMPLE STRESSES AND STRAINS APPLICATION OF STRESS AND STRAIN IN ENGINEERING FIELD-relationship among the term stress, strain & modulus of elasticity-importance of modulus of elasticity and factor of safety on loaded structures. ***Stress***-classifies stresses-computes stress under different load conditions. ***Strain***-calculates strain developed on bodies of various states-hook's law-calculates safe working load and ultimate load to arrive at factor of safety for loaded structure-relates modulus of elasticity and factor of safety-problems relating stress, strain & modulus of elasticity.
15 to 17	**Algebra**: Addition, Subtraction, Multiplication, Division, Algebraic formula, Linear equations (with two variables), quadratic equations
18 & 19	GEOMETRICAL PROPERTIES OF SECTIONS-properties of lines, angles, triangles, polygons & circles. Apply these in marking and layout work in shop floor.
20 & 21	Properties of regular polygons, circles parallelogram, parabola and ellipse. Determination of sides, area of triangle, quadrilateral & polygons.
22 to 26	Revision & Examination

Syllabus for the Trade of Draughtsman Civil under CTS

Third Semester (Semester Code No. –DMC: SEM-III)

Duration: Six Months

Syllabus for TP 03 and TT 03

Week No.	Trade Practical (Drawings are in computer drafting)	Trade Theory
1 to 3	**Drawing details of RCC members with reinforcement** • Details of Bending of bars, crank, covers etc, • Lintel &, chajjas • Rectangular beams(doubly & Singly reinforced) • stair - details of step	**Reinforced cement concrete structure:-** • introduction, • Bar bending , details as per IS Code. • chajjas • Beams and columns • Stairs
4 to 6	***Draw Reinforced details of RCC members***:- • bar-bending schedule • Details of one-way slab & two-way slab, • T-beam, Inverted beam, cantilever, retaining wall, • column with footing & continuous columns showing disposition of reinforcement • details of step etc. • RCC framed structure, portal frame, B.I.S. Code 456-2000 and its application,	• One-way slab & two-way slab, • Innovative construction • Safety against earthquake • grade of cement , steel-behaviour & test • bar-bending schedule • Retaining wall • R.C.C. Framed structure.
7 to 9	**Drawing of different types of**:- • steel sections, rivet, bolts, etc • .section and elevation of girders, • Structural Joints • plate girders roof trusses, stanchion etc.	**Steel structures:-** • Conmen forms of steel sections • Structural fasteners , Joints • tension & compression member- • classification, fabrication • . Construction details

10 to 13	**Public Health & Sanitation**. • Drawings of showing various pipe joints for underground drainage, • Types of sanitary fittings in multi-storeyed building. • Manholes and septic tank. • Water supply system. • Plumbing System of New technology. Public Health & sanitation. • R.C.C square overhead tank supported by four columns • Rapid Sand Filter • Preparation of service plan(drainage plan)for isolated building & in sewer system • Drawings of toilet fixtures	**House drainage of building**:- • Introduction , • Terms used in PHE • Systems of sanitation • System of house drainage • plumbing, sanitary fittings etc • Purification of water. • Types of sewer appurtenance • Systems of plumbing • Manholes & Septic tank • New technology of Plumbing System.
14 to 17	**Roads:-** • Drawing showing road structure and Component parts • Preparing a drawing of Cross-sections showing the different types of roads- according to location & materials • Preparing a drawing of road curves & gradient	**Road:-** • Introduction, • History of highway development. • general principles of alignment. • Classification and construction of different types of roads- • Component parts • road curves & gradient • Curves-types, designation of curves, • setting out simple curve by successive bisection from long chords, • simple curve by offsets from long chords,
18 & 19	**Bridge:-**Preparing drawing of • Different types of culvert • Preparing drawing of an arched bridge. Draw plan and sectional views of the following • R.C.C Slab Culvert with splayed wing walls • Steel Foot over bridge across a highway • Two span Tee Beam Bridge with square returns	**Bridge**:- • Component parts. • IRC loading, • Selection of type and location, • Factors governing the ideal site • Alignment of bridge- • Foundation -selection-caisson. • Coffer dam- types. • Types of super structure, • Substructure-piers, abutments, wing walls- • Classification of bridge

20 & 21	**Railway:-** • Draw typical cross section of rail sections • Typical cross-section of railway tracks cutting & embankment(single lane & double lane) • Layout of Signalling points & crossing	**Railways :-** • Rail gauges, Functions, Requirements, Types, Sections, Length of rail, • Welding of rail, wear of rail, • Coning of wheels, hogged rail, bending of rail, creep of rail, • Causes and prevention of creep. • Sleeper and ballast-function-types-requirement-materials-rail • Fixtures, Fastenings and plate laying- rail • Joints-types-fish plate-fish bolt-spikes-chairs and keys-bearing plate-block-elastic, base plate • Anchors and anti-creepers, • Construction of permanent ways.
22,23	Project work / on the job training	
24	Revision	
25,26	Examination	

Syllabus for the Trade of Draughtsman Civil under CTS

Third Semester (Semester Code No. –DMC:SEM-III)

Duration: Six Months

Syllabus for Workshop Calculation and Science

Week No.	Workshop Calculation and Science
1 to 3	Basic electricity, ohm's law, Parallel and series connection
4 & 5	Lever- types & proplems
6 & 7	CENTROID Centroid of Symmetrical shapes (solid / hollow square, rectangular, circular, I Sections) - Centroid of Asymmetrical shapes (triangular, semi circular, quadrant, trapezoidal, parabolic sections)
8	Centre of Gravity and Equilibrium – locates the centre of Gravity of regular and irregular bodies. Discriminates among the three states of Equilibrium.
9 to 11	Mensuration :- Area regular and irregular Surface area and volumes of rectangular parallelopoids, cylinders, pyramids and spheres.
12	Determination of area of circles, sectors, segments and ellipse.
13 & 14	More problems in mensurations
15 & 16	Laws of motion, Speed and velocity
17 to 19	Trigonometry basic ratio and use of trigonometric table. Problems, Height and Distance
20 & 21	Logarithms- Problems
22 to 26	Revision & Examination

Syllabus for the Trade of Draughtsman Civil under CTS

Fourth Semester (Semester Code No. –DMC: SEM-III)

Duration: Six Months

Syllabus for TP 04and TT 04

Week No.	Trade Practical	Trade Theory
1 to 3	**Drawing of different types of irrigation structures: –** • Dams, barrages, weir etc. • Longitudinal section of distributaries.with the help of given sketch & data. • head regulators • Types of cross drainage work • Hydro electric project	**Irrigation Engineering:-** • Terms used in irrigation. • Hydrology like duty, delta, base period, intensity of irrigation, • hydrograph , peak flow, run off, catchment area, CCA, corps like, rabi, kharif etc. • . Storage/ diversion head work definition: types . • Reservoir –types of reservoirs, area, and capacity of reservoir • Dams , weir & barrage- types purposes • Hydro electric project • Canals:-, classification and distribution system, canal structures • . Types of cross drainage works
4 to 6	**Estimating and Costing:-** • General Principle of estimating & costing • Methods of measurement techniques • Preparation of detailed Estimate :-Calculation of quantities of items of single storied and double storied building • Preparation of abstract of estimate by prevailing rates • Rate analysis:- Preparation of rate analysis of major items :-RCC,PCC, Wood works, Stone & Brick masonry, & Plastering	**Estimating and Costing** :- • Introduction • Purpose and common techniques • Construction drawing • Measurement techniques • Estimate-necessity, importance, types-approximate and detailed estimate-main and sub estimates, revised, supplementary, maintenance / repair estimate-taking off quantities- method • Rate analysis and Specifications • Labour and materials • Schedule of rate • Estimating of irregular boundaries by trapezoidal and Simpsons formulae

	• Problems on Preparation of Preliminary/Approximate Estimates for building projects. • Familiarisation of estimation soft ware • Doing estimating with software Estimation of earthwork of irregular boundaries	
7	**Wiring Electrical:-** Preparing drawing- • Electrical wiring plan with all fittings showing in drawing. • Wiring in different system	**Wiring Electrical** :- • Safety precaution and elementary first aid. • Artificial respiration and treatment of electrical shock • Elementary electricity. • General ideas of supply system. • Wireman's tools kit. Wiring materials. Electrical fittings. • System of wirings. Wiring installation for domestic lightings.
8 to 9	***Surveying***:- • Equipment and Instrument typically used to perform surveying • Distance measuring (chaning) • Field book and plotings • Observation of bearings	***Surveying:-*** • Introduction,Histery. and principle • Objectives. and uses • common terms used and definitions • classification, accuracy, types • Main divisions (plane & geodetic) • Chaining, bearing & meridian. • Speed in field and office work, • Plani meter and pantograph
10 to 12	***Levelling***:- • Handling of levelling instruments & their settings • Temporary adjustment of a level • Simple levelling • Differential levelling (Fly levelling) • Levelling field book • Reduction of levels – Height of collimation and Rise and Fall method – Comparison of methods – • Problems on reduction of levels –	***Levelling-*** • auto level introduction, definition • Principle of levelling • Levelling staffs, its graduation & types • Minimum equipment required • Types,Commenent part and function • Temporary and permanent adjust ment, procedure in setting up. • Level& horizontal surface. Datum Benchmark, Focussing & parallax • Deduction of levels • types levelling • Contouring ;-Definition –- Characteristics Methods .

	• Missing entry calculations: Problems. • Types of levelling – • Check levelling – • Profile levelling or Longitudinal , plotting the profile • Contouring :- Direct and Indirect methods • topography map, contours drawing • Solve trigonometric problems	• Direct and Indirect methods • Interpolation of Contour – Contour gradient – Uses of Contour plan and Map.
13 to 14	**Theodolite survey:-** • Operating & setting up a Thedolite. • Complete the collimation checks on the instrument in the field • Observation of readings and sighting the points from the instrument. • Direct, indirect and Deflection angle • Measurement of horizontal angles by-Repetition method & Reiteration method.	**Theodolite survey**:- • introduction to Thedolite, • identification & understanding of parts, • Types, technical terms. • Temporary and permanent adjustments, procedure in setting up, • Fundamental lines and relation • Method of measurement of horizontal& vertical angles, • Repetition & reiteration systems. • Types of field book, adjustment of • Errors while laying a given angle by repetition,
15	• Practice in measuring vertical angles, • setting out given vertical angles, • booking. • Setting out a straight line over & across obstacles, prolonging lines	• method of setting out straight lines, establishing • Latitude and departure • Consecutive co-ordinates and independent co-ordinates. • Instrumental errors, their elimination, • permanent adjustment, care & maintenance of thedolite. • Method of running a traverse, different methods of measuring angles & bearings.
16	• establishing lines at given angles with given lines, • Running a closed traverse over a given area, booking, calculating the • ordinates and plotting the	• Method of plotting traverses-Gales • traverse system, checking of measurements of closed & open traverse, use of traverse tables, • closing errors and its adjustment.

	traverse. Simple problems- Transition curves • Running an open traverse, calculate & plot the same	• Technical terms in connection with simple triangulation-base line
17 to 19	**Total Station:-** • Application of survey using TS • Field procedure for co-ordinate measurement- • field procedure to run open and closed traverse • Transfer or establish BM • Perform stakeout / Demarcation of building lay out /plot lay out/roads/ alignment • Measure remote distance and elevation • Calculate 2D / 3D area on field/site • Calculates surface volume field/site • Procedure for down load and up load data. • Simple survey map using Auto CAD	**Total Station:-** – • Introduction • components parts, accessories used, • characteristics, features, • advantages and disadvantages • principle of EMD • Working and need • Setting and measurement • Electronic, display & Data reading, • Rectangular and polar co-ordinate system • Terminology of open and closed traverse
20 & 21	**GPS Awareness:-** • Practical application of GPS • Components of GPS data processing • GPS signal. Code and biasis • Techniques of GPS observing • Set up and use GPS equipment • Use GPS for a static survey, in real time(RTK) mode • Record and process results to obtain a set of co-ordinates. • comparison of GPS with GIS,CAD	**GPS:-** • Introduction of GPS system. • Co- ordinate and time system. • Satellite and conversional geodetic system. • GPS. Signal, code, and biases • Role of TRANSIT in GPS development. • GPS segment organisation. • GPS survey methods. Basic geodetic co-ordinate • Ground support equipment, signals • Tracking devises & system • Time measurement and GPS timing • Definition and application of Remote sensing,Photogrammetry, Arial photography, satellite images, • Pattern recognition and digital signal
22,23	Project work / on the job training	
24	Revision	
25,26	Examination	

Syllabus for the Trade of Draughtsman Civil under CTS

Fourth Semester (Semester Code No. –DMC:SEM-IV)

Duration: Six Months

Syllabus for Workshop Calculation and Science

Week No.	Workshop Calculation and Science
1 to 4	SHEAR FORCE AND BENDING MOMENT-method of finding B.M. & S.F.-problems on B.M. & S.F., position and amount of max. B.M. & S.F. B.M. & S.F. for combined concentrated & U.D.L. partially covering the span.
5 & 6	SHEAR FORCE AND BENDING MOMENT IN BEAMS. B.M. & S.F. for simply supported, cantilever and overhanging beams-points of contra-flexures.
7 to 9	Heat- uses of different temperature measuring instruments-effects of heat under different conditions-calculate the heat gained and heat lost-different modes of transmissions. Distinguishes between heat and temperature. Converts scales of temperature °C to °F and vice versa. Effects of Heat, Quality of Heat and Transference of Heat.
10	Magnetic substance – permanent magnet.
11 & 13	Magnet and magnetism. Laws of magnetic attraction and repulsion
14 to 17	Areas of regular and irregular sections- Computation of Areas of Irregular figures- End Ordinate rule, Mid Ordinate rule, Average Ordinate rule,
18 to 21	Calculation of areas and volumes:- Trapezoidal rule, Simpson's rule- Problems- Volumes of regular and irregular solids- Computation of Volumes of irregular solids- End Area rule, Mid Area rule, Average Area or Mean Area rule, Trapezoidal rule, Simpson's or Prismoidal rule
22 to 26	Revision & Examination

TRADE : DRAUGHTSMAN CIVIL

LIST OF TOOLS & EQUIPMENTS

A. TRAINEES TOOL KIT FOR 20 TRAINEES AND ONE INSTRUCTOR

SL. No.	Name of items	Quantity
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.(0.2,0.3,0.4 mm).	21 Nos.
2.	Protractor celluloid 15 cm semi- circular.	21 Nos.
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	21 Nos.
4.	Scales plotting box wood 6 metric scales 30 cms long with offset scales.	21 Nos.
5.	Set square transparent 20 cm, 2 mm thick with bevelled edges 45 degree .	21 Nos.
6.	Set square celluloid 25 cm,2mm thick with bevelled edges 60 degrees.	21 Nos.
7.	T-Square 1250mm/Mini drafter/ Parallel Bar	21 Nos.
8.	Template –Architects and builders	21 Nos.

TRADE: DRAUGHTSMAN CIVIL (CTS)

LIST OF TOOLS & EQUIPMENTS

B. GENERAL MACHINERY SHOP OUTFIT:

SL.No.	Name of items	Quantity
1	Geometrical models(wooden/plastic) as per given below: i) Cube 08 cm sides. ii) Rectangular parallel piped 8cmX15cm iii) Sphere 8cm dia. iv) Right circular cone 8 cm dia base and 15 cm vertical height v) Square pyramid 8cm side base and 15 cm vertical height vi) Cylinder 8 cm dia. 15 cm height. vii) Prisms triangular 8 cm sides triangle and 15 cm length. viii) Prism hexagonal 8 cm side's hexagon and 15 lengths	04 each
2	Templates – Circle, Ellipse, furniture, etc.	04
3	French curves - transparent plastic set of 12	04
4	Flexible curves 80 cm long	04
5	Radius curve metric 3 mm to 15 mm	04
6	Brass parallel rulers in a case	04
7	Calculator Scientific (Non-programmable)	04
8	Proportional dividers 15 cm	04

C. LIST OF SURVEYING INSTRUMENTS

SL. No.	Name of items	Quantity
1	**Steel tape** 30 meters long.	04
2	**Digital Theodolite** latest model With all accessories (Features:-Based on laser technology, Two large LCD panel with easy to read ,Automatically compensates tilt in two direction and compensates vertical angles. High integrated electronic board and IC elements)	02
3	Instrument for **Total Station** with latest model, With all accessories (Graphic LCD display on both side.Multy function key board on both side. Able to interchange data between GPS and Total station without any data conversion. Minimum 8 hours rechargeable li-ion battery .Poles and Prism 2Nos each)	02
4	Hand held GPS (latest model) with standard specification	02
5	Auto level With all accessories	02

TRADE: DRAUGHTSMAN CIVIL (CTS)

D. LIST OF TOOLS & EQUIPMENTS

FOR

COMPUTER LAB

SL. No.	Name of items	Quantity
1	Personal computer with latest configuration min. 19 inch LED Screen and graphic card with latest operating system.	20
2	Laptop with latest configuration	02
3	Plotter A1 size	01
4	Printer (Desk jet / Laser jet) with scanner (multipurpose)	01
5	Server work station with latest configuration	01
6	Broad Band connection	01
7	UPS 5 KV	02
8	Computer Table	20
9	Computer Chair.	20
10	Furniture for server, printer, plotter	01each
11	White Board (6’ x 4’)	02
12	DLP Projector (2000 lumens or higher)	02
13	First Aid Box	01
14	Screen for Projector (motorized)	02
15	Fire Extinguisher	01
16	Air Conditioner 2.0 Ton	02
17	Wall Clock	01
18	Document Camera / Visualiser	02
19	Smart Board / Inter Active Board	02
21	Steel Cupboard 180 x 90 x 45 cm	02
22	Steel Cupboard 120 x 60 x 45 cm	02
23	Book Shelf	02

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E. LIST OF FURNITURE

SL. No.	Name of items	Quantity
1	Trainer's / Instructor's table (big size full secretariat) (6 feet x 4 feet)	01 Nos.
2	Trainer's / Instructor's table	01 Nos.
3	Chair for Trainer / Instructor	02 Nos.
4	Class room chairs (armless)	20 Nos.
5	Class room table single / Dual desk	20 /10 Nos
6	Almirah steel (major) 6" / higher	02 Nos.
7	Drawing table with Board 1250mm X 900mm & draughtsman stool	20 Nos.

F.LIST OF THE CONSUMABLES

Sl.No.	Consumables	For trainees	For trainer /Units
1	DRAWING SHEET 120 GSM	As required (I &II-Semester)	
2	GRAPH SHEET 80 GSM	As required	
3	MACHANICAL PENCILS	One number per semester (I &II-Semester)	
4	PENCIL LEAD (HB,H,2H)	Two numbers per semester (I &II-Semester)	
5	ERASER (Non Dust)	Two numbers per semester (I &II-Semester)	
6	CELLO TAPE (wonder made)	One number per semester (I &II-Semester)	
7	WHITE BOARD MARKER (Blue, red, black, green)	-	As required
8	DVD's (RW) & PEN DRIVE (16 GB minimum)	One number per course	One number
9	POCKET HARD DISK (1 TB minimum)	-	One number
10	A 4 & A 3 SHEET Ream 90 GSM	As required (III,IV-Semester)	As required
11	TRACING PAPER ROLL 90 GSM	As required (III,IV-Semester)	
12	LAB EXERCISES BOOK	One number per semester	

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Trade Testing and Certification

The trainees have to undergone through an All India Trade Test (AITT) examination conducted by National Council for Vocational Training (NCVT), India, after completion of the required period of technical training. The students will also be awarded with National Trade Certificate (NTC), after clearing the All India Trade Test (AITT) entrance. The successful completion of the Industrial Training Institute (ITI) programmes wide spreads the employability opportunities of the students in numerous public as well as private sector organizations. It also enables them to stand their business at their own accord.

APPRENTICESHIP TRAINING

1. The practical training programme of apprentices under ATS(Apprenticeship training scheme) should be as per the facilities available in the establishment/ Industries.

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 external examiner

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Further Learning Options

After successful completion of CTS Course in the Trade of DCM, the trainees have the option to continue their further studies by joining the CITS Course in the same Trade.

One can pursue higher studies like diploma in engineering after completing the engineering trading course in ITI. Specialized short-term courses for certain trades are also offered in Advanced Training Institutes (ATIs) that hone the candidates' skill. Many industries/ companies accept ITI graduates only as apprentices and they train the candidates for a period of 6 months to 1-2 years. However the period of training the admission of the candidates may vary from one company to the other. These candidates may be considered suitable for employment only after the training period. Candidates after the completion of their trades may be directly recruited by the companies.

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List of Trade Committee Members

Sl.No	NAME& DESIGNATION S/SHRI	REPRESENTING ORGANIZATION	REMARKS
1			
2			
3			
4			
5			
6			
7			