**CURRICULUM**

**FOR THE TRADE OF**

# DRAUGHTSMAN CIVIL

**UNDER**

**APPRENTICESHIP TRAINING SCHEME**

सत्यमेव जयते
Government of India

**GOVERNMENT OF INDIA**
**MINISTRY OF SKILL DEVELOPMENT & ENTREPRENURESHIP**
**DIRECTORATE GENERAL OF TRAINING**

# CONTENTS

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**Co-ordinator for the course:** R.N.MANNA, Training Officer, CSTARI, Kolkata

| Sl. No. | Name & Designation Sh./Mr./Ms. | Organization | Remarks |
|---|---|---|---|
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# 2. BACKGROUND

## 2.1 Apprenticeship Training Scheme under Apprentice Act 1961

The Apprentices Act, 1961 was enacted with the objective of regulating the programme of training of apprentices in the industry by utilizing the facilities available therein for imparting on-the-job training. The Act makes it obligatory for employers in specified industries to engage apprentices in designated trades to impart Apprenticeship Training on the job in industry to school leavers and person having National Trade Certificate(ITI pass-outs) issued by National Council for Vocational Training (NCVT) to develop skilled manpower for the industry**.** There are four categories of apprentices namely**; trade apprentice, graduate, technician and technician (vocational) apprentices.**

Qualifications and period of apprenticeship training of **trade apprentices** vary from trade to trade. The apprenticeship training for trade apprentices consists of basic training followed by practical training. At the end of the training, the apprentices are required to appear in a trade test conducted by NCVT and those successful in the trade tests are awarded the National Apprenticeship Certificate.

The period of apprenticeship training for graduate (engineers), technician (diploma holders and technician (vocational) apprentices is one year. Certificates are awarded on completion of training by the Department of Education, Ministry of Human Resource Development.

## 2.2 Changes in Industrial Scenario

Recently we have seen huge changes in the Indian industry. The Indian Industry registered an impressive growth during the last decade and half. The number of industries in India have increased manifold in the last fifteen years especially in services and manufacturing sectors. It has been realized that India would become a prosperous and a modern state by raising skill levels, including by engaging a larger proportion of apprentices, will be critical to success; as will stronger collaboration between industry and the trainees to ensure the supply of skilled workforce and drive development through employment. Various initiatives to build up an adequate infrastructure for rapid industrialization and improve the industrial scenario in India have been taken.

## 2.3 Reformation

The Apprentices Act, 1961 has been amended and brought into effect from 22$^{nd}$ December, 2014 to make it more responsive to industry and youth. Key amendments are as given below:

- Prescription of number of apprentices to be engaged at establishment level instead of trade-wise.

- Establishment can also engage apprentices in optional trades which are not designated, with the discretion of entry level qualification and syllabus.

- Scope has been extended also to non-engineering occupations.

- Establishments have been permitted to outsource basic training in an institute of their choice.

- The burden of compliance on industry has been reduced significantly.

# 3 RATIONALE

(Need for Apprenticeship in DRAUGHTSMAN CIVIL trade)

**A Unique Training Process**

The Apprenticeship system of training is unique in that it is the only formal, structured, and nationally recognized education and training program available that combines the two most common forms of career and occupational learning: classroom instruction with on-the-job training.

Apprentices not only learn occupational skills in the classroom, their learning is expanded to include hands-on, paid, on-the-job training. Students learn and practice all phases of the trade/occupation in real-world applications.

Apprenticeship is a training strategy that, leads to a certificate of completion and nationally recognized skilled worker status. These credentials have explicit meaning, recognition, and respect in the eyes of Central and State Governments and relevant Industries.

The Apprenticeship Programs train men and women to craftsman status. By participating in a program, apprenticeship training shape applicants with character, aptitude, motivation and good personality traits into competent Craftsmen and Craftswomen who have in-demand skill sets, comprehensive knowledge, positive attitudes and superior abilities.

# 4 JOB ROLES: REFERENCE NCO

**Brief description of Job roles:**

**3118.20 Draughtsman, Civil** prepares drawings of buildings, stores **,** high ways, dams, culverts, etc. from sketches, notes or data for purposes of construction or alternations. Takes instructions form **Civil Engineer** studies sketches and calculates dimensions from notes or data. Draws to given scale different elevations, plan, sectional views etc. of desired construction using drawing instruments. Draws detailed drawings of specific portions as required. Indicates types of materials to be used, artistic and structural features, etc. in drawing as necessary. May do tracing and blue printing. May reduce or enlarge drawings. May prepare or check estimate schedules for cost of materials and labour. May prepare tender schedules and draft agreements. May work as **Draughtsman Architectural.**

**3118.50 Draughtsman, Structural** prepares drawings of bridges, steel structures, roof tresses etc. from sketches, designs or data for purposes of construction, alteration or repairs. Studies sketches, data, notes etc. and receives instructions from **Structural** or **Mechanical Engineers** regarding details and types of drawings to be made. Calculates dimensions as necessary from available notes, data etc. and by application of standard formulae. Draws to scale detail, assembly and arrangement drawings showing sectional plan and other views as directed and prints (writes) necessary instructions regarding materials to be used, limits, assembly etc. to clearly indicate all aspects of structure to be manufactured. May prepare estimate and operation schedules for labour and material costs. May prepare tables showing requirements of bars, their numbers, sizes and shapes. May trace and make blue prints.

Reference NCO: **2004 / 3118.20, 3118.50**

# 5. GENERAL INFORMATION

1. **Name of the Trade** **: DRAUGHTSMAN (CIVIL)**

2. **N.C.O. Code No.** : **3118.20, 3118.50**

3. **Duration of Apprenticeship Training (Basic Training + Practical Training):**2years

3.1 **For Freshers :- Duration of Basic Training**: -

a) Block –I : 3 months

b) Block – II : 3 months

**Total duration of Basic Training: 6 months**

**Duration of Practical Training (On -job Training): -**

a) Block–I: 9 months

b) Block–II : 9 months

**Total duration of Practical Training: 18 months**

3.2 **For ITI Passed :- Duration of Basic Training**: - NIL

**Duration of Practical Training (On -job Training): 12 months**

4. **Entry Qualification** : 10th class Passed

5. **Selection of Apprentices:** The apprentices will be selected as per Apprentices Act amended time to time.

**6. Rebate to ITI Passed out Trainees : one year** for the trade of **Draughtsman Civil**

*Note: Industry may impart training as per above time schedule for different block, however this is not fixed. The industry may adjust the duration of training considering the fact that all the components under the syllabus must be covered. However the flexibility should be given keeping in view that no safety aspects is compromised.*

# 6. COURSE STRUCTURE

**Training duration details: -**

| Time (in months) | 1-3 | 4-12 | 13-15 | 16-24 |
|---|---|---|---|---|
| Basic Training | Block– I | ----- | Block – II | ------ |
| Practical Training (On - job training) | ---- | Block – I | ------ | Block – II |

| Components of Training | Duration of Training in Months | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| **Basic Training Block - I** | | | | | | | | | | | | | | | | | | | | | | | | |
| **Practical Training Block - I** | | | | | | | | | | | | | | | | | | | | | | | | |
| **Basic Training Block - II** | | | | | | | | | | | | | | | | | | | | | | | | |
| **Practical Training Block - II** | | | | | | | | | | | | | | | | | | | | | | | | |

# 7. SYLLABUS

## 7.1 BASIC TRAINING
## (BLOCK – I & II)
## DURATION: 06 MONTHS

### GENERAL INFORMATION

1) **Name of the Trade** : **DRAUGHTSMAN CIVIL**
2) **Hours of Instruction** : 1000 Hrs. (500 hrs. in each block)
3) **Batch size** : 20
4) **Power Norms** : 2 KW for Workshop
5) **Space Norms** : 1) 64 Sq.Mt. for Workshop
   2) 50 Sq. Mt. for Computer Lab.
6) **Examination** : The internal assessment will be held on completion of each Block.
7) **Instructor Qualification** :

**i)** Degree/Diploma in **CIVIL Engg.** from recognized university/Board with one/two year post qualification experience respectively in the relevant field.

**OR**

ii) NTC/NAC in the trade of **DRAUGHTSMAN CIVIL** with three year post qualification experience in the relevant field.

Preference will be given to a candidate with Craft Instructor Certificate (CIC)

8) **Tools, Equipments & Machinery required** : - As per Annexure – I

## 7.1.1 DETAIL SYLLABUS OF CORE SKILL

### A. Block– I
### Basic Training

| Topic No. | Workshop Calculation | Duration (in hours) | Workshop Science | Duration (in hours) |
|---|---|---|---|---|
| 1 | Ratio & Proportion : Simple calculation on related problems. | **30** | Material Science: properties - Physical & Mechanical, Types – Ferrous & Non - Ferrous, introduction of Iron, Cast Iron, Wrought Iron, Steel, difference between Iron and Steel, Alloy steel, carbon steel, stainless steel, Non - Ferrous Alloys | **20** |
| 2 | Percentage : Introduction, Simple calculation. Changing percentage to decimal and fraction and vice - versa | | Mass ,Weight and Density : Mass, Unit of Mass, Weight, difference between mass and weight, Density, unit of density, specific gravity of metals. | |
| 3 | Algebra : Addition, Subtraction, Multiplication, Division, Algebraic formula, Solving Linear equations (with two variables). | | Work, Power and Energy : work, unit of work, power, unit of power, Horse power of engines, mechanical efficiency, energy, use of energy, potential and kinetic energy, examples of potential energy and kinetic energy | |
| 4 | Mensuration : Area and perimeter of square, rectangle, parallelogram, triangle, circle, semi circle, Volume of solids –cube, cuboid, cylinder and Sphere. Surface area of solids –cube, cuboid, cylinder and Sphere. | | Heat & Temperature : Heat and temperature, their units, difference between heat and temperature, boiling point, melting point, scale of temperature, relation between different scale of temperature, Thermometer, pyrometer, | |

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| | | | transmission of heat, conduction, convection, radiation. | |
| 5 | Trigonometry:<br>Trigonometrical ratios, measurement of angles.<br>Trigonometric tables | | Basic Electricity :<br>Types of current - AC, DC, their comparison, voltage, resistance, their units.<br>Conductor, insulator, Types of connections –series, parallel, electric power, Horse power, energy, unit of electrical energy. | |
| 6 | | | Levers and Simple Machines:<br>levers and its types.<br>Simple Machines, Effort and Load, Mechanical Advantage,<br>Velocity Ratio, Efficiency of machine, Relationship between Efficiency, velocity ratio and Mechanical Advantage. | |

**B. Block- II**
**Basic Training**

| Topic No. | Workshop Calculation | Duration (in hours) | Workshop Science | Duration (in hours) |
|---|---|---|---|---|
| 1 | Area of cut-out regular surfaces: circle and segment and sector of circle.<br>Area of irregular surfaces.<br>Application related to shop problems. | 30 | Temperature measuring instruments.<br>Specific heats of solids & liquids. | 20 |
| 2 | Volume of cut out solids: hollow cylinders, frustum of cone, block section.<br>Volume of simple machine blocks.<br>Material weight and cost problems related to trade. | | Thermal Conductivity, Heat loss and heat gain. | |
| 3 | Finding the value of unknown sides and angles of a triangle by Trigonometrical method. | | - Forces definition.<br>- Compressive, tensile, shear forces and simple problems.<br>Stress, strain, ultimate strength, factor of safety.<br>- Basic study of stress strain curve for MS.<br>- Shear force and bending moment diagrams | |
| 4 | Finding height and distance by trigonometry. | | Velocity, Acceleration & Retardation.<br>Related problems. | |
| 5 | Application of trigonometry in shop problems. (viz. taper angle calculation). | | Circular Motion: Relation between circular motion and Linear motion, Centrifugal force, Centripetal force | |

## 7.1.2 DETAIL SYLLABUS OF PROFESSIONAL SKILLS & PROFESSIONAL KNOWLEDGE

### A. Block –I

### Basic Training

| Week No. | Professional Skills (275 hrs.) | Professional Knowledge (120 hrs.) |
|---|---|---|
| 1 | • Orientation of the Trade and Institute.<br>• Techniques of use of Instruments,<br>• Equipments, their care and maintenance.<br>• Method of fixing of drawing sheet on the drawing board<br>• drawing a layout of different size of sheets.<br>• Safety precautions to be observed in the Computer Lab<br>**Drawing of:-**<br>• Lines, lettering and Dimensioning.<br>• Construction of plain geometrical figures.<br>• Construction of solid geometrical figures. | • Rules and regulations of the Institute and Trade.<br>• List of the subjects to be taught for each semester.<br>• List of the Instruments, equipments and materials to be used during training.<br>• List out the Achievements to be made for each semester.<br>• Importance of B.I.S. introduction of Code of Practice for Architectural and<br>• Building Drawings (IS: 962- 1989).<br>• Layout of drawing. Lines, Lettering, Dimensioning, Scales and Projection |
| -2- | **Drawing of :-**<br>• Projections – Orthographic (Line, plane, Solid in Isometric, oblique) and Perspective.<br>• Symbols & conventional representation for materials in sections as per IS 962-1989 for building drawings.<br>• Components of a building. | **Building materials**:-<br>• ***Rocks***– classification, types, uses<br>• ***Stones*** – classification, types, uses<br>• ***Bricks*** –. Manufacturing classification, types, and uses<br>• ***Lime***–classification, types, uses<br>• ***Pozzolanic***- classification, types, uses<br>• ***Cement*** – Manufacturing, classification, types, uses<br>• ***Clay Products*** – earthenware, stoneware, porcelain, terracotta, glazing, types,.<br>• ***Mortar*** –. Preparation Classification, types, uses<br>• ***Concrete*** –. Preparation Classification, types, uses.<br>• ***Timber***. Structure, defect classification, seasoning, uses<br>• ***admixtures*** - for cement mortar & cement concrete, classification, types, uses, |
| -3- | **Drawing of different forms of :-**<br>• Stone masonry-,<br>• Brick Masonry<br>• - Elements, Classification, types of bonds.<br>• Hollow blocks<br>• Composite masonry | **Protective materials**:-<br>• ***Paints***- classification, types ,uses<br>• ***varnishes*** – .classification, types, uses<br>• ***Metal***–classification, types, uses<br>• ***Plastics*** –. Classification ,types, uses<br>**Building Construction**:-<br>• ***Masonry***.<br>***Stone masonry***-terms, used -. Classification – |

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| | | Tools –<br>• ***Brick masonry*** – Technical terms –-bonds, types junctions<br>• ***Hollow block construction*** –– types, admixtures added advantages.<br>• ***Composite masonry :-*** types |
| 4. | **Foundation**:-<br>• Construction details of Shallow & Deep Foundation.<br>• Types of foundations,<br>• Well foundation,<br>• Special foundations ,<br>• Pile foundations<br>• Foundation on black cotton soils. etc | **Foundation**:-<br>• Construction details of Shallow & Deep Foundation.<br>• Types of foundations,<br>• Well foundation,<br>• Special foundations ,<br>• Pile foundations<br>• Foundation on black cotton soils, etc |
| 5. | **Temporary structures - sub structure:-**<br>• Scaffolding,<br>• shoring<br>• underpinning ,<br>• Partition- aluminium frame with glass sheet, timber, straw board.<br>**Details of supporting structures for construction**<br>• Form work for R.C.C structure | ***Permanent & temporary structures:-***<br>• life of structures,<br>• sub structure,<br>• super structure,<br>• load bearing structure,<br>• cavity wall,<br>• framed structure,<br>• ***Scaffolding-*** parts, types-<br>• ***Shoring-*** types.<br>• ***Underpinning.*** purpose, types.<br>• ***Partition –***requirements, types.<br>• ***Form work*** |
| 6. | **Showing details of treatments in building:-**<br>• Methods of Damp proofing.<br>• Anti-termites<br>• Fire proofing. | **Treatments for building structure**:-<br>• ***DPC***-Sources and effects of dampness, method.<br>• ***Damp proofing materials*** – properties, functions, types,<br>• ***Anti-termite treatment*** objectives & uses, method.<br>• ***Weathering course-*** purpose, materials required-<br>• ***Fire-proofing***. Effect, rules |
| 7. | **Draw different forms of :-**<br>• arches,<br>• lintels<br>• sunshades<br>Centring & Shuttering. | • **Arches -** Technical terms-. types ,centring<br>• ***Lintel***- types-wooden, brick, Stone, steel & RCC. |
| 8. | Detailing of carpentry joints for doors, windows and ventilators | • **Carpentry joints** terms, classification of joints, Uses & types of fixtures & fastenings<br>• **Doors –**Parts, Location, Standard sizes, types.<br>• ***Windows***-types,<br>. ***Ventilators***-purpose-types, |

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| 9. | Detailed drawings of wooden flooring. | • **Floors** – Ground floor & upper floor-Types.<br>• **Flooring-** materials used, types |
| 10. | **Drawing different forms Of vertical movements:-**<br>• As per shape-Drawing of straight, open-newel, Dog-legged, Geometrical and Bifurcated, circular, spiral stairs, etc.<br>• AS per material-Brick, stone, wooden, steel, R.C.C. stairs. | • **Stairs-**Terms, requirements<br>• Planning and designing of stair and details of construction.<br>Basic concept of Lift and Escalator**.** |
| 11. | **Drawing of different forms of:-**<br>• Slopped/Pitched Roof Truss – King Post and Queen Post roof trusses showing detailed connections.<br>• Steel roof trusses showing detailed connections.<br>• Wooden roof trusses showing detailed connections. | • **Roofs & Covering of Roofs-** Purposes- Elements, Types-Flat, Pitched<br>• **Truss-**King Post, queen post, Mansard, Bel-fast, steel, composite.<br>• **Shell-** Types-North-light & double curved.<br>• **Dome**- Component parts.<br>**Roofs & Coverings-** Objectives, Types & uses. |
| 12. | **Drawing details of:-**<br>• Line diagram of single storied residential Building with attached Bath of both pitched & flat roof.<br>• Making Plan, Elevation & Section with the aid of Line diagram of the Building Plan.<br>• Layout and detailing of Residential Building.<br>• Creating a Drawing of Building Plan- Showing set backs.<br>• Showing Layout Plan & Key Plan. | **Building:-**<br>• Principle of Planning.<br>• Objective and importance.<br>• Functions and responsibility.<br>• Orientation.<br>• Local Building Bye- Laws as per ISI Code.<br>• Layout Plan & Key Plan.<br>• Submitted in composition of Drawing.<br>• Provision for safety.<br>• Requirement of green belt and land. |
| 13. | • Preparation of Plan drawing, Section of two storied residential building | **Computer Aided Drafting:-**<br>• Operating system ,Hardware & software<br>• Introduction of CAD<br>• Its Graphical User Interface.<br>• Method of Installation<br>• Basic commands of CAD.<br>• Exposure to latest version of Architectural Desktop and training. |
| | **Internal Assessment 03days** | |

## B. Block –II
## Basic Training

| Week No. | Professional Skills (275 hrs.) | Professional Knowledge (120 hrs.) |
|---|---|---|
| 1. | **Drawing of residential Building prepare :-**<br>• Plan, elevation & section of building with specification for the given line diagram to suitable scale.<br>• A reading room with R C C flat roof slab.<br>• A House of single storied residential building with single bed room and attached toilet with R. C. C. flat roof slab. | **Building planning:-**<br>• Economy and orientation<br>• Provision for lighting and ventilation.<br>• Provision for drainage and sanitation.<br>• Types of building.<br>• Planning and designing of residential, public and commercial building. |
| 2- | • A residential building with double bedroom with R.C.C. flat roof slab.<br>• House with single bed and hall with partly tiled and partly R C C flat roof slab.<br>• Two roomed house with R.C.C. slope roof with gable ends.<br>• A house with fully tiled roof with hips and valleys.<br>• Design and create a double storied residential building with triple bed room and its accessories. | **Prefabricated structure:-**<br>• Preparation.<br>• Method of construction and assembling.<br>• Advantages and disadvantages. |
| -3- | **Drawing details of R C C members with reinforcement.**<br>• Rectangular beams (single reinforced & double reinforced).<br>• Lintels, chajjas, slabs.<br>• Stair- details of step.<br>• Columns with footings.<br>• Continuous columns showing disposition of reinforcement.<br>• Preparing bar bending schedules.<br>• Details of one way slab and two way slab.<br>• T-beam, inverted T-beam, cantilever, retaining wall.<br>• R C C detailing - framed structure, portal frame, ductile detailing, B.I.S code-456-2000 & its application. | **R C C structure:-**<br>• Introduction to R C C uses.<br>• Materials – proportions.<br>• Form work.<br>• Bar bending details as per I. S. Code.<br>• Reinforced brick work.<br>**Materials used for R C C:-**<br>• Construction.<br>• Selection of materials- course aggregate, fine aggregate, cement, water and reinforcement,<br>• Characteristics.<br>• Method of mixing concrete- machine mixing and hand mixing.<br>• Slump test.<br>• Structure- columns, beams, slabs- one way and two way slab.<br>• Innovative construction.<br>• Safety against earthquake.<br>• Grade of cement, steel behaviour and test.<br>• Retaining wall.<br>• R C C framed structure. |

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| 4 | **Drawing different types of :-**<br><br>• Steel sections, rivet, bolts etc.<br>• Section and elevation of girders.<br>• Structural joints.<br>• Plate girders, roof trushes, stanchion etc. | **Steel structures:-**<br><br>• Common forms of steel sections.<br>• Structural fasteners, joints.<br>• Tension and compression member.<br>• Classification fabrication.<br>• Construction details. |
| 5. | **Public health and sanitation:-**<br><br>• Drawings of showing various pipe joints for underground drainage.<br>• Types of sanitary fittings in multi-storied building.<br>• Water supply system.<br>• Plumbing system of new technology. Public health & sanitation.<br>• R C C square overhead tank supported by four columns.<br>• Rapid sand filter.<br>• Preparation of service plan (drainage plan) for isolated building & in sewer system.<br>• Drawing of toilet fixtures. | **House drainage of building:-**<br><br>• Introduction.<br>• Terms used in PHE.<br>• Systems of sanitation.<br>• System of house drainage.<br>• System of house Plumbing, sanitary fittings etc.<br>• Purification of water.<br>• Types of sewer appurtenance.<br>• Manholes & septic tank.<br>• New technology of plumbing System. |
| 6. | **Roads:-**<br><br>• Drawing& showing of road structure and component parts.<br>• Preparing a drawing of Cross-sections showing the different types of of roads-according to location and materials.<br>• Preparing a drawing of road curves and gradient. | **Roads:-**<br><br>• Introduction.<br>• History of highway development.<br>• General principles of alignment.<br>• Classification and construction of different types of roads.<br>• Components parts.<br>• Road curves and gradient.<br>• Curves-types, designation of curves.<br>• Setting out simple curve by successive bisecting from long chords.<br>• Simple curve by offsets from long chords.<br>• Road drainage system. |
| 7. | **Bridge:-** preparing drawing of<br><br>• Different types of culvert.<br>• Preparing drawing of an arched bridge.<br>• Steel connection detailing and generation of fabrication drawing<br>• Preparation of construction / Fabrication drawings<br>**Draw plan and sectional views of the following:-**<br><br>• R C C slab culvert with splayed wing walls.<br>• Steel foot over bridge across a highway.<br>• Two span Tee Beam Bridge with square returns. | **Bridges & Tunnels:-**<br><br>• Introduction to bridges.<br>• Components parts of bridge.<br>• Classification of culverts.<br>• IRC loading.<br>• Selection of type and location.<br>• Factors governing the ideal site.<br>• Alignment of bridge-<br>• Foundation-selection-caisson.<br>• Coffer dam- types.<br>• Types of super structure.<br>• Substructure-piers, abutments, wing walls-<br>• Classification of bridge.<br>• Tunnels- rules used for the sizes of different members. |

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| 8. | **Railways:-**<br><br>• Draw typical cross section of rail sections<br>• Railway tracks -embankment layout plans of railway platform.<br>• Typical cross section of railway track cutting and embankment (single track and double track).<br>• Layout of signaling points and crossings. | **Railways:-**<br><br>• Permanent way.<br>• Rail gauges, functions, requirements, types, sections, length of rail.<br>• Welding of rail, wear of rail.<br>• Coning of wheels, hogged rail, bending of rail, creep of rail.<br>• Causes and prevention of creep.<br>• Sleeper and ballast- function, types, requirement and materials of rail.<br>• Fixtures, fastenings and plate Laying - rail.<br>• Joints-types-fish plate-fish bolt-spikes-chairs and keys-bearing, plate-block-elastic, base plate.<br>• Anchors and anti-creepers.<br>• Construction of permanent way.<br>• Railway station and yard. |
| 9. | **Drawing different types of irrigation structures:-**<br><br>• Dams, Barrages, weir, etc,<br>• Longitudinal section of distributaries-with the help of given sketch and data.<br>• Head Regulators<br>• Types of cross drainage work. | **Irrigation Engineering :-**<br><br>• Terms used in irrigation.<br>• Hydrology like duty, delta, base period, intensity of irrigation.<br>• Hydrograph, peak flow, run off, catchment area, CCA, Rabi crop, Kharif crop, etc.<br>• Storage/Diversion head work-characteristics, Types.<br>• Reservoir-types of Reservoirs, i.e., single purpose and multi-purpose, area, and capacity and curves of Reservoir.<br>• Dams, Barrages & weir-types, purposes.<br>• Hydro-electric project like Forebay, Penstock, Turbines, Power house, etc.<br>• Canals:-classification and distribution system, canal structures.<br>• Types of cross drainage works like Aqua duct, Super passage, Siphon, Level crossing, inlet and outlet, etc. |
| 10. | **Estimating & Costing:-**<br><br>• General principle of estimating & costing.<br>• Methods of measurement techniques.<br>• Preparation of detailed estimate;-Calculation of quantities of items of single storied and double storied building.<br>• Preparation of abstract of estimate by prevailing rates.<br>• Rate analysis:-<br>• Preparation of rate analysis of major items-R C C, P C C, works, brick works & stone masonry & plastering.<br>• Problems on preparation of preliminary or | **Estimating and costing:-**<br><br>• Introduction.<br>• Purpose of common techniques.<br>• Drawing of construction.<br>• Measurement techniques.<br>• Estimate-necessity, importance, types-approximate and detailed estimate-main and sub estimates, revised, supplementary, maintenance/repair estimates-taking off quantities-method.<br>• Rate analysis of typical items and their specifications.<br>• Labour and materials. |

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|---|---|---|
| | approximate estimates for building projects. | • Schedule of rates.<br>• Estimating of irregular boundaries by trapezoidal and Simpson's formulae. |
| 11. | **Surveying:-**<br>• Equipment and instrument used to perform surveying.<br>• Distance measuring with chain and tape.<br>• Entering Field book and plotting.<br>• Calculating the area of site.<br>• **Plane Table**<br>• Surveying of a Building site with Plane Table.<br>**Compass survey:-**<br>• Field work of prismatic compass survey.<br>• Plotting of prismatic compass survey.<br>• Testing and adjusting the compass.<br>• Observation of bearings.<br>• Bearing a line.<br>• F.B.,B.B., R.B.,W.C.B. of a Line, Traverse and also check the close traversing. | **Surveying:-**<br>• Introduction, history and principals of chain survey.<br>• Instrument employed.<br>• Use care maintenance and common terms.<br>• Classification aquracy types.<br>• Main divisions (plain and geodetic).<br>• Chaining.<br>• Speed in field work and office work.<br>**Plane table survey:-**<br>• Instrument used in plane table survey.<br>• Care and maintenance of plane table survey.<br>**Compass survey:-**<br>• Instrument and its setting up.<br>• Bearing and each included angle of close traverse.<br>• Local attraction.<br>• Magnetic declination and its true bearing.<br>• Precaution in using prismatic compass. |
| 12. | **Leveling:-**<br>• Handling of leveling instruments and their settings.<br>• Temporary adjustment of a level.<br>• Simple leveling.<br>• Differential leveling (fly leveling).<br>• Leveling Book for entry in data for Field work.<br>• Reduction of levels-height of collimation method and rise & fall method-comparison of methods.<br>• Problems on reduction of levels.<br>• Missing data and how to fill it up–calculations & Arithmetical check in various problems and its solution.<br>• Types of leveling. | **Leveling:-**<br>• Dumpy level, auto level- introduction, definitions.<br>• Principle of leveling.<br>• Leveling staffs, its graduation and types.<br>• Minimum equipment required.<br>• Types, component parts and function.<br>• Temporary and permanent adjustment, procedure to setting of.<br>• Level and horizontal surface. Datum, benchmark, focusing and parallax.<br>• Deduction of levels (means reduced levels).<br>• Types of leveling.<br>• Application to chain and Leveling Instrument to Building construction.<br>• Contouring:-definition-characteristic-methods.<br>• Direct and indirect methods.<br>• Interpolation of contours-contour gradient-uses of contour plan and map. |
| 13. | ----------Do---------- | ----------Do---------- |
| | **Internal Assessment 03 days** | |

# 7.1.3 EMPLOYABILITY SKILLS

## GENERAL INFORMATION

| | | | |
|---|---|---|---|
| 1) | **Name of the subject** | **:** | **EMPLOYABILITY SKILLS** |
| 2) | **Applicability** | **:** | ATS- Mandatory for fresher only |
| 3) | **Hours of Instruction** | **:** | **110 Hrs. (55 hrs. in each block)** |
| 4) | **Examination** | **:** | The examination will be held at the end of two years Training by NCVT. |
| 5) | **Instructor Qualification** | **:** | |

**i) MBA/BBA with two years experience or graduate in sociology/social welfare/Economics with two years experience and trained in Employability skill from DGET Institute.**

**And**

**Must have studied in English/Communication Skill and Basic Computer at 12th /diploma level**

**OR**

**ii) Existing Social Study Instructor duly trained in Employability Skill from DGET Institute.**

## 7.1.3.1 SYLLABUS OF EMPLOYABILITY SKILLS

### A. Block – I
### Basic Training

| Topic No. | Topic | Duration (in hours) |
|---|---|---|
| | **English Literacy** | **15** |
| **1** | **Pronunciation :**<br>Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech) | |
| **2** | **Functional Grammar**<br>Transformation of sentences, Voice change, Change of tense, Spellings. | |
| **3** | **Reading**<br>Reading and understanding simple sentences about self, work and environment | |
| **4** | **Writing**<br>Construction of simple sentences Writing simple English | |
| **5** | **Speaking / Spoken English**<br>Speaking with preparation on self, on family, on friends/ classmates, on know, picture reading gain confidence through role-playing and discussions on current happening job description, asking about someone's job habitual actions. Cardinal (fundamental) numbers ordinal numbers. Taking messages, passing messages on and filling in message forms Greeting and introductions office hospitality, Resumes or curriculum vita essential parts, letters of application reference to previous communication. | |
| | **I.T. Literacy** | **15** |
| **1** | **Basics of Computer**<br>Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of computer. | |
| **2** | **Computer Operating System**<br>Basics of Operating System, WINDOWS, The user interface of Windows OS, Create, Copy, Move and delete Files and Folders, Use of External memory like pen drive, CD, DVD etc, Use of Common applications. | |
| **3** | **Word processing and Worksheet**<br>Basic operating of Word Processing, Creating, opening and closing Documents, use of shortcuts, Creating and Editing of Text, Formatting the Text, Insertion & creation of Tables. Printing document.<br>Basics of Excel worksheet, understanding basic commands, creating simple worksheets, understanding sample worksheets, use of simple formulas and functions, Printing of simple excel sheets | |
| **4** | **Computer Networking and INTERNET**<br>Basic of computer Networks (using real life examples), Definitions of Local Area Network (LAN), Wide Area Network (WAN), Internet, Concept of Internet (Network of Networks),<br>Meaning of World Wide Web (WWW), Web Browser, Web Site, Web page and Search Engines. Accessing the Internet using Web Browser, Downloading and Printing Web Pages, Opening an email account and use of email. Social media sites and its implication. | |

| | | |
|---|---|---|
| | Information Security and antivirus tools, Do's and Don'ts in<br>Information Security, Awareness of IT - ACT, types of cyber crimes. | |
| | **Communication Skill** | **25** |
| **1** | **Introduction to Communication Skills**<br>Communication and its importance<br>Principles of Effective communication<br>Types of communication - verbal, non verbal, written, email, talking on phone.<br>Non verbal communication -characteristics, components-Para-language<br>Body - language<br>Barriers to communication and dealing with barriers.<br>Handling nervousness/ discomfort.<br>Case study/Exercise | |
| **2** | **Listening Skills**<br>Listening-hearing and listening, effective listening, barriers to effective listening guidelines for effective listening.<br>Triple- A Listening - Attitude, Attention & Adjustment.<br>Active Listening Skills. | |
| **3** | **Motivational Training**<br>Characteristics Essential to Achieving Success<br>The Power of Positive Attitude<br>Self awareness<br>Importance of Commitment<br>Ethics and Values<br>Ways to Motivate Oneself<br>Personal Goal setting and Employability Planning.<br>Case study/Exercise | |
| **4** | **Facing Interviews**<br>Manners, Etiquettes, Dress code for an interview<br>Do's & Don'ts for an interview | |
| **5** | **Behavioral Skills**<br>Organizational Behavior<br>Problem Solving<br>Confidence Building<br>Attitude<br>Decision making<br>Case study/Exercise | |

## B. Block– II
## Basic Training

| Topic No. | Topic | Duration (in hours) |
|---|---|---|
| | **Entrepreneurship skill** | **15** |
| 1 | **Concept of Entrepreneurship**<br>**Entrepreneurship**- Entrepreneurship - Enterprises:-Conceptual issue Entrepreneurship vs. Management, Entrepreneurial motivation. Performance & Record, Role & Function of entrepreneurs in relation to the enterprise & relation to the economy, Source of business ideas, Entrepreneurial opportunities, The process of setting up a business. | |
| 2 | **Project Preparation & Marketing analysis**<br>Qualities of a good Entrepreneur, SWOT and Risk Analysis. Concept & application of Product Life Cycle (PLC), Sales & distribution Management. Different Between Small Scale & Large Scale Business, Market Survey, Method of marketing, Publicity and advertisement, Marketing Mix. | |
| 3 | **Institutions Support**<br>Preparation of Project. Role of Various Schemes and Institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non financing support agencies to familiarizes with the Policies /Programmes & procedure & the available scheme. | |
| 4 | **Investment Procurement**<br>Project formation, Feasibility, Legal formalities i.e., Shop Act, Estimation & Costing, Investment procedure - Loan procurement - Banking Processes. | |
| | **Productivity** | **10** |
| 1 | **Productivity**<br>Definition, Necessity, Meaning of GDP. | |
| 2 | **Affecting Factors**<br>Skills, Working Aids, Automation, Environment, Motivation<br>How improves or slows down. | |
| 3 | **Comparison with developed countries**<br>Comparative productivity in developed countries (viz. Germany, Japan and Australia) in selected industries e.g. Manufacturing, Steel, Mining, Construction etc. Living standards of those countries, wages. | |
| 4 | **Personal Finance Management**<br>Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance. | |
| | **Occupational Safety, Health & Environment Education** | **15** |
| 1 | **Safety & Health**<br>Introduction to Occupational Safety and Health importance of safety and health at workplace. | |

| | | |
|---|---|---|
| 2 | **Occupational Hazards**<br>Basic Hazards, Chemical Hazards, Vibro-acoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health, Occupational hygienic, Occupational Diseases/ Disorders & its prevention. | |
| 3 | **Accident & safety**<br>Basic principles for protective equipment.<br>Accident Prevention techniques - control of accidents and safety measures. | |
| 4 | **First Aid**<br>Care of injured & Sick at the workplaces, First-Aid & Transportation of sick person | |
| 5 | **Basic Provisions**<br>Idea of basic provision of safety, health, welfare under legislation of India. | |
| 6 | **Ecosystem**<br>Introduction to Environment. Relationship between Society and Environment, Ecosystem and Factors causing imbalance. | |
| 7 | **Pollution**<br>Pollution and pollutants including liquid, gaseous, solid and hazardous waste. | |
| 8 | **Energy Conservation**<br>Conservation of Energy, re-use and recycle. | |
| 9 | **Global warming**<br>Global warming, climate change and Ozone layer depletion. | |
| 10 | **Ground Water**<br>Hydrological cycle, ground and surface water, Conservation and Harvesting of water | |
| 11 | **Environment**<br>Right attitude towards environment, Maintenance of in -house environment | |
| | **Labour Welfare Legislation** | **5** |
| 1 | **Welfare Acts**<br>Benefits guaranteed under various acts- Factories Act, Apprenticeship Act, Employees State Insurance Act (ESI), Payment Wages Act, Employees Provident Fund Act, The Workmen's compensation Act. | |
| | **Quality Tools** | **10** |
| 1 | **Quality Consciousness :**<br>Meaning of quality, Quality Characteristic | |
| 2 | **Quality Circles :**<br>Definition, Advantage of small group activity, objectives of quality Circle, Roles and function of Quality Circles in Organization, Operation of Quality circle. Approaches to starting Quality Circles, Steps for continuation Quality Circles. | |
| 3 | **Quality Management System :**<br>Idea of ISO 9000 and BIS systems and its importance in maintaining qualities. | |
| 4 | **House Keeping :**<br>Purpose of Housekeeping, Practice of good Housekeeping. | |
| 5 | **Quality Tools**<br>Basic quality tools with a few examples | |

## 7.2 PRACTICAL TRAINING (ON-JOB TRAINING)
## (BLOCK – I & II)
## DURATION: 18 MONTHS (9 months in each block)

## GENERAL INFORMATION

1) **Name of the Trade** : **DRAUGHTSMAN CIVIL**

2) **Duration of On-Job Training** : a) Block–I: 9 months
b) Block–II : 9 months

**Total duration of Practical Training: 18 months**

3) **Batch size** : a)Selection of Apprentices as per apprenticeship guidelines.
b) Max. 20 trainees per group

3) **Examination** : i) The internal assessment will be held on completion of each block
ii) NCVT exam will be conducted at the end of 2nd year.

4) **Instructor Qualification** :

**i)** Degree/Diploma in **CIVIL**Engg. from recognized university/Board With one/two year post qualification experience in the relevant field.

**OR**

ii) NTC/NAC in the trade of **DRAUGHTSMAN CIVIL** with three year post qualification experience in the relevant field.

Preference will be given to a candidate with Craft Instructor Certificate (CIC)

5) **Tools, Equipments & Machinery required** : - As per Annexure – II

## 7.2.1 BROAD SKILL COMPONENT TO BE COVERED DURING ON- JOB TRAINING

## A. BLOCK – I

1. **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.
2. **Drawing details of:-**
   - types of ground & upper floors
   - Various floor finishing &construction sequence
3. **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
4. **Drawing details of:-**
   - pitched roof including king & queen post,
   - Steel roof trusses and Wooden roof truss, showing detailed connections.
5. **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
6. **Computer practice**:-
   - Installation of Computer aided Software. Operation of CAD package,
   - Function of Keys & practice of basic commands.
7. **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.
8. **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
9. Design and create a double storied residential building (3BHK)
   - Types of building
10. Planning & design of residential, public and commercial building
11. **Prefabricated Structure**:-
    - Preparation
    - Method of construction, assembling
    - Advantages & disadvantages
12. ***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

**13. Roads:-**

- Drawing showing road structure and Component parts
- Preparing a drawing of Cross-sections showing the different types of road saccording to location & materials
- Preparing a drawing of road curves & gradient

**14. Bridge:-**Preparing drawing of

- Different types of culvert
- Preparing drawing of an arched bridge.

**15.** 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

## B. BLOCK – II

**1. 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.

2. **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

3. **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
- 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

4. **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 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.

5. **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

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.
7. **Drawing of different types of**:-
   - steel sections, rivet, bolts, etc
   - .section and elevation of girders,
   - Structural Joints
   - plate girders roof trusses, stanchion etc.
8. **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

***9.*** **Surveying: -**
   - Equipment and Instrument typically used to perform surveying
   - Distance measuring (chaining)
   - Field book and plotting
   - Observation of bearings

***10.*** **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 –
   - 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

***11.*** **Theodolite survey:-**
   - Operating & setting up a Theodolite.
   - 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.
- Practice in measuring vertical angles,
- setting out given vertical angles,
- booking.
- Setting out a straight line over & across obstacles, prolonging lines.
- establishing lines at given angles with given lines.
- Running a closed traverse over a given area, booking, calculating them.
- ordinates and plotting the traverse. Simple problems- Transition curves
- Running an open traverse, calculate & plot the same

12. Instrument of total station-basic concept.
13. Basic concept of GPS/GNSS, remote sensing system, sensors, etc.

# 8. ASSESSMENT STANDARD

## 8.1 Assessment Guideline:

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while undertaking assessment. Due consideration to be given while assessing for team work, avoidance/reduction of scrape/wastage and disposal of scarp/wastage as per procedure, behavioral attitude and regularity in training.

The following marking pattern to be adopted while assessing:

**a)** Weightage in the range of 60-75% to be allotted during assessment under following performance level:

For this grade, the candidate with occasional guidance and showing due regard for safety procedures and practices, has produced work which demonstrates attainment of an acceptable standard of craftsmanship.

In this work there is evidence of:

- good skill levels in the use of hand tools, machine tools and workshop equipment
- many tolerances while undertaking different work are in line with those demanded by the component/job.
- a fairly good level of neatness and consistency in the finish
- occasional support in completing the project/job.

**b)** Weightage in the range of above75%- 90% to be allotted during assessment under following performance level:

For this grade, the candidate, with little guidance and showing due regard for safety procedures and practices, has produced work which demonstrates attainment of a reasonable standard of craftsmanship.

In this work there is evidence of:

- good skill levels in the use of hand tools, machine tools and workshop equipment
- the majority of tolerances while undertaking different work are in line with those demanded by the component/job.
- a good level of neatness and consistency in the finish
- little support in completing the project/job

**c)** Weightage in the range of above 90% to be allotted during assessment under following performance level:

For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.

In this work there is evidence of:

- high skill levels in the use of hand tools, machine tools and workshop equipment
- tolerances while undertaking different work being substantially in line with those demanded by the component/job.
- a high level of neatness and consistency in the finish.
- minimal or no support in completing the project

## 8.2 FINAL ASSESSMENT- ALL INDIA TRADE TEST (SUMMATIVE ASSESSMENT FOR TWO YEARS TRADE)

| SUBJECTS | Marks | Sessional Marks | Full Marks | Pass Marks | Duration of Exam. |
|---|---|---|---|---|---|
| Practical | 300 | 100 | 400 | 240 | **08 hrs.** |
| Trade Theory | 100 | 20 | 120 | 48 | 3 hrs. |
| Workshop Cal. & Sc. | 50 | 10 | 60 | 24 | 3 hrs. |
| Engineering Drawing | 50 | 20 | 70 | 28 | 4 hrs. |
| Employability Skill | 50 | | 50 | 17 | 2 hrs. |
| **Grand Total** | **550** | **150** | **700** | **-** | |

Note: - The candidate pass in each subject conducted under all India trade test.

# 9. FURTHER LEARNING PATHWAYS

- On successful completion of the course trainees can opt for Diploma course (Lateral entry). [Applicable for candidates only who undergone ATS after CTS]
- On successful completion of the course trainees can opt for CITS course.

**Employment opportunities:**

On successful completion of this course, the candidates may be gainfully Employed as Draughtsman, Surveyor, Construction Supervisor in the following industries:

1. Building & construction and Structural Fabrication industries
2. Service industries like road transportation and Railways.
3. In public sector (Central and State) and private industries in India & abroad. .
4. Self employment

**ANNEXURE – I**

## 10. TOOLS & EQUIPMENT FOR BASIC TRAINING

## INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONAL KNOWLEDGE

## TRADE: DRAUGHTSMAN CIVIL

## LIST OF TOOLS & EQUIPMENTS FOR 20 APPRENTICES

### A : TRAINEES TOOL KIT:-

| Sl. No. | Name of the items | Quantity (indicative) |
|---|---|---|
| 1. | Box drawing instrument containing one 1.5 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 No, |
| 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 *45* degrees. | 21 Nos. |
| 7. | T-Square 1250mm/Mini drafter' Parallel Bar | 21 Nos. |
| 8. | Template -Architects and builders | 21 Nos. |

### B : TOOLS INSTRUMENTS AND GENERAL SHOP OUTFITS

| Sl. No. | Name of the items | Quantity (indicative) |
|---|---|---|
| 9. | Geometrical models(wooden/plastic) as per given below;<br>i) Cube 08 cm sides.<br>ii) Rectangular parallel piped 8cmX15cm<br>iii) Sphere 8 cm dia.<br>iv) Right circular cone R cm dia base and 15 cm vertical height<br>v) Square pyramid Mem side base and 15 cm vertical height<br>vi) Cylinder 8 cm dia. 15 cm height.<br>vii) Prisms triangular S cm sides triangle and 15 cm length.<br>viii) Prism hexagonal 8 cm side's hexagon and 15 lengths | 04 each |
| 10. | Templates - Circle. Ellipse, furniture, etc | 04 Nos. |
| 11. | French curves - transparent plastic set of 12 | 04 Nos. |
| 12. | Flexible curves 80 cm long | 04 Nos. |
| 13. | Radius curve metric 3 mm to 15 mm | 04 Nos. |
| 14. | Brass parallel rulers in a case | 04 Nos. |
| 15. | Calculator Scientific (Non-programmable) | 04 Nos. |
| 16. | Proportional dividers 15 cm | 04 Nos. |

## C : GENERAL MACHINERY INSTALLATIONS:-

| Sl. No. | Name & Description of Machines | Quantity (indicative) |
|---|---|---|
| 1. | Steel tape 30 meters long. | 04 Nos. |
| 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 directions and compensates vertical angles. High integrated electronic board and IC elements) | 02 Nos. |
| 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 Nos. |
| 4 | Hand held GPS (latest model) with standard specification | 02 Nos. |
| 5 | Auto level With all accessories | 02 Nos. |

## 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 Nos. |
| 2 | Laptop with latest configuration | 02 Nos. |
| 3 | Plotter A1 size | 01 Nos. |
| 4 | Printer (Desk ]et / Laser jel) with scanner (multipurpose) | 01 Nos. |
| 5 | Server work station with latest configuration | 01 Nos. |
| 1 | Broad Band connection | 01 Nos. |
| 7 | UPS 5 KV | 02 Nos. |
| 8 | Computer Table | 20 Nos. |
| 9 | Computer chair | 20 Nos. |
| 10 | furniture for server, printer, plotter | 01 each |
| 11 | While Board ( 6' x 4* \| | 02 Nos. |
| 12 | DLP Projector (2000 lumens or higher) | 02 Nos. |
| 13 | first Aid Box | 01 Nos. |
| 14 | Screen for Projector ( motorized) | 02 Nos. |
| 15 | Fire Extinguisher | 01 Nos. |
| 16 | Air Conditioner 2.0 Ton | 02 Nos. |
| 17 | Wall Clock | 01 Nos. |
| IK | Document Camera / Visualiser | 02 Nos. |
| W | Smart Board Inter Active Board | 02 Nos. |
| 21 | Steel Cupboard I8O x 90 x 45 cm | 02 Nos. |
| 22 | Steel Cupboard 120 x 60 x 45 cm | 02 Nos. |

**Note: In case of basic training setup by the industry the tools, equipment and machinery available in the industry may also be used for imparting basic training.**

**ANNEXURE – II**

## 11. INFRASTRUCTURE FOR ON-JOB TRAINING

## TRADE: DRAUGHTSMAN CIVIL

## For Batch of 20 APPRENTICES

Actual training will depend on the existing facilities available in the establishment. However, the industry should ensure that the broad skills defined against On-Job– Training part (i.e. 9 months + 9 months) are imparted. In case of any short fall the concerned industry may impart the training in cluster mode / in any other industry / at ITI.

**ANNEXURE-III**

## 12. GUIDELINES FOR INSTRUCTORS AND PAPER SETTERS

1. Due care to be taken for proper & inclusive delivery among the batch. Some of the following some method of delivery may be adopted:

A) LECTURE
B) LESSON
C) DEMONSTRATION
D) PRACTICE
E) GROUP DISCUSSION
F) DISCUSSION WITH PEER GROUP
G) PROJECT WORK
H) INDUSTRIAL VISIT

2. Maximum utilization of latest form of training viz., audio visual aids, integration of IT, etc. may be adopted.

3. The total hours to be devoted against each topic may be decided with due diligence to safety & with prioritizing transfer of required skills.