DRAUGHTSMAN CIVIL

COMPETENCY BASED CURRICULUM

(Duration: 2 Yrs.)

APPRENTICESHIP TRAINING SCHEME (ATS)

NSQF LEVEL- 5

SECTOR – CONSTRUCTION

GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

DRAUGHTSMAN CIVIL

(Revised in 2018)

APPRENTICESHIP TRAINING SCHEME (ATS)

NSQF LEVEL - 5

Developed By

Ministry of Skill Development and Entrepreneurship
Directorate General of Training
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1. BACKGROUND

1.1 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.

1.2 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.

1.3 Reformation

The Apprentices Act, 1961 has been amended and brought into effect from 22nd 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.

2. TRAINING SYSTEM

2.1 GENERAL

Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers range of vocational training courses catering to the need of different sectors of economy/ Labour market. The vocational training programmes are delivered under aegis of National Council of Vocational Training (NCVT). Craftsman Training Scheme (CTS) and Apprenticeship Training Scheme (ATS) are two pioneer programmes of NCVT for propagating vocational training.

Draughtsman Civil trade under ATS is one of the most popular courses delivered nationwide through different industries. The course is of two years (02 Blocks) duration. It mainly consists of Domain area and Core area. In the Domain area Trade Theory & Practical impart professional - skills and knowledge, while Core area - Workshop Calculation and science, Engineering Drawing and Employability Skills imparts requisite core skills & knowledge and life skills. After passing out the training programme, the trainee is being awarded National Apprenticeship Certificate (NAC) by NCVT having worldwide recognition.

Broadly candidates need to demonstrate that they are able to:

- Read & interpret technical parameters/document, plan and organize work processes, identify necessary materials and tools;
- Perform task with due consideration to safety rules, accident prevention regulations and environmental protection stipulations;
- Apply professional skill, knowledge, core skills & employability skills while performing jobs and solve problem during execution.
- Check the job/assembly as per drawing for functioning, identify and rectify errors in job/assembly.
- Document the technical parameters related to the task undertaken.

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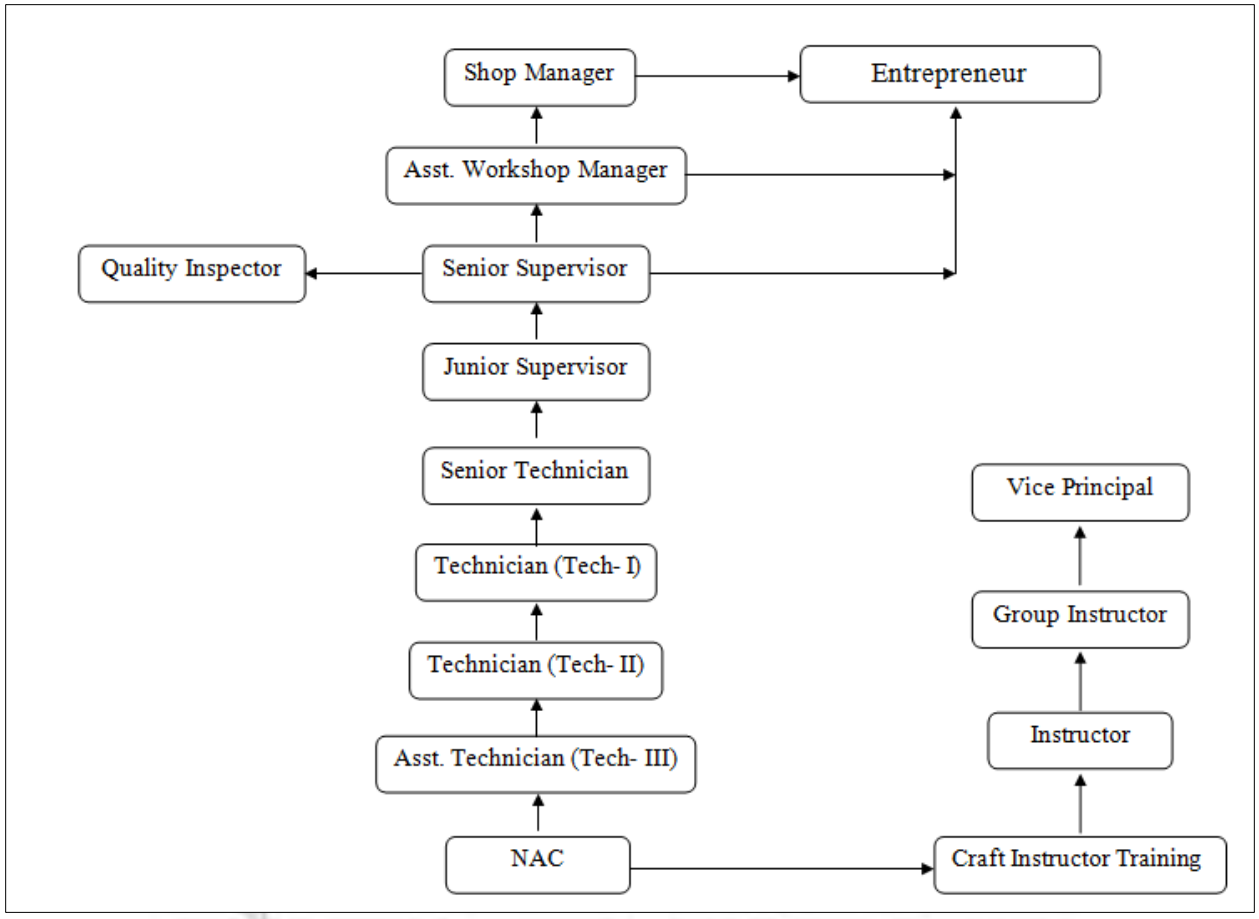
2.2 CAREER PROGRESSION PATHWAYS:

- Can join Crafts Instructor Training Scheme (CITS) in the trade for becoming instructor in ITIs.
- Indicative pathways for vertical mobility.



2.3 COURSE STRUCTURE:

Table below depicts the distribution of training hours across various course elements during a period of two years (*Basic Training and On-Job Training*): -

Total 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**

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A. Basic Training

For 02 yrs. course :-(**Total 06 months:** 03 months in 1st yr. + 03 months in 2nd yr.)
For 01 yr. course :-(**Total 03 months:** 03 months in 1st yr.)

Sl. No.	Course Element	Total Notional Training Hours	
		For 02 yrs. course	**For 01 yr. course**
1	Professional Skill (Trade Practical)	890	445
2	Professional Knowledge (Trade Theory)		
3	Workshop Calculation & Science	40	20
4	Engineering Drawing		
5	Employability Skills	110	55
	Total (including Internal Assessment)	**1040**	**520**

B. On-Job Training:-

For 02 yrs. Course :-(**Total 18 months:** 09 months in 1st yr. + 09 months in 2nd yr.)

Notional Training Hours for On-Job Training: 3120 Hrs.

For 01 yr. course :-(**Total 12 months**)

Notional Training Hours for On-Job Training: 2080 Hrs.

C. Total training hours:-

Duration	Basic Training	On-Job Training	Total
For 02 yrs. course	1040 hrs.	3120 hrs.	4160 hrs.
For 01 yr. course	520 hrs.	2080 hrs.	2600 hrs.

2.4 ASSESSMENT & CERTIFICATION:

The trainee will be tested for his skill, knowledge and attitude during the period of course and at the end of the training programme as notified by Govt. of India from time to time. The Employability skills will be tested in first two semesters only.

a) The **Internal assessment** during the period of training will be done by **Formative assessment method** by testing for assessment criteria listed against learning outcomes. The training institute have to maintain individual *trainee portfolio* as detailed in assessment guideline (section-2.4.2). The marks of internal assessment will be as per the template (Annexure – II).

b) The final assessment will be in the form of summative assessment method. The All India Trade Test for awarding NAC will be conducted by NCVT on completion of course as per guideline of Govt. of India. The pattern and marking structure is being notified by govt. of India from time to time. **The learning outcome and assessment criteria will be basis for setting question papers for final assessment. The examiner during final examination will also check** individual trainee's profile as detailed in assessment guideline (section-2.4.2) before giving marks for practical examination.

2.4.1 PASS REGULATION

The minimum pass percent for Practical is 60% & minimum pass percent for Theory subjects 40%. The candidate pass in each subject conducted under all India trade test.

2.4.2 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 should be given while assessing for team work, avoidance/reduction of scrap/wastage and disposal of scarp/wastage as per procedure, behavioral attitude, sensitivity to environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency.

Assessment will be evidence based comprising the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment
- Project work

Evidences of internal assessments are to be preserved until forthcoming semester

examination for audit and verification by examination body. The following marking pattern to be adopted while assessing:

Performance Level	Evidence
(a) Weightage in the range of 60 -75% to be allotted during assessment	
For performance in 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.	• Demonstration of good skill in the use of hand tools, machine tools and workshop equipment • Below 70% tolerance dimension/accuracy achieved while undertaking different work with those demanded by the component/job/set standards. • 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	
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.	• Good skill levels in the use of hand tools, machine tools and workshop equipment • 70-80% tolerance dimension/accuracy achieved while undertaking different work with those demanded by the component/job/set standards. • 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	
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.	• High skill levels in the use of hand tools, machine tools and workshop equipment • Above 80% tolerance dimension/accuracy achieved while undertaking different work with those demanded by the component/job/set standards. • A high level of neatness and consistency in the finish. • Minimal or no support in completing the project.

3. JOB ROLE

Brief description of Job roles:

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.**

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.

Plan and organize assigned work and detect & resolve issues during execution. Demonstrate possible solutions and agree tasks within the team. Communicate with required clarity and understand technical English. Sensitive to environment, self-learning and productivity.

Perform TPM (Total Production Management), TQM (Total Quality Management) and record keeping system.

Reference NCO:

1. **NCO-2015: 3118.0200**
2. **NCO-2015: 3118.0500**

4. NSQF LEVEL COMPLIANCE

NSQF level for Draughtsman Civil trade under ATS: **Level 5**

As per notification issued by Govt. of India dated- 27.12.2013 on National Skill Qualification Framework total 10 (Ten) Levels are defined.

Each level of the NSQF is associated with a set of descriptors made up of five outcome statements, which describe in general terms, the minimum knowledge, skills and attributes that a learner needs to acquire in order to be certified for that level.

Each level of the NSQF is described by a statement of learning outcomes in five domains, known as level descriptors. These five domains are:

a. Process
b. professional knowledge,
c. professional skill,
d. core skill and
e. Responsibility.

The Broad Learning outcome of Draughtsman Civil trade under ATS mostly matches with the Level descriptor at Level- 5.

The NSQF level-5 descriptor is given below:

LEVEL	Process required	Professional knowledge	Professional skill	Core skill	Responsibility
Level 5	Job that requires well developed skill, with clear choice of procedures in familiar context.	knowledge of facts, principles, processes and general concepts, in a field of work or study	a range of cognitive and practical skills required to accomplish tasks and solve problem by selecting and applying basic methods, tools, materials and information.	Desired mathematical skill, understanding of social, political and some skill of collecting and organizing information, communication.	Responsibility for own work and Learning and some responsibility for other's works and learning.

5. GENERAL INFORMATION

Name of the Trade	DRAUGHTSMAN CIVIL
NCO-2015	3118.0200, 3118.0500
NSQF Level	Level – 5
Duration of Apprenticeship Training (Basic Training + On-Job Training)	Two years (02 Blocks each of one year duration).
Duration of Basic Training	a) Block –I : 3 months b) Block – II : 3 months **Total duration of Basic Training: 6 months**
Duration of On-Job Training	a) Block–I: 9 months b) Block–II : 9 months **Total duration of Practical Training: 18 months**
Entry Qualification	Passed 10th Class with Science and Mathematics under 10+2 system of Education or its equivalent
Selection of Apprentices	The apprentices will be selected as per Apprenticeship Act amended time to time.
Instructors Qualification for Basic Training	As per ITI instructors qualifications as amended time to time for the specific trade.
Infrastructure for Basic Training	As per related trades to ITI
Examination	The internal examination/ assessment will be held on completion of each block. Final examination for all subjects will be held at the end of course and same will be conducted by NCVT.
Rebate to Ex-ITI Trainees	01 year
CTS trades eligible for Draughtsman Civil Apprenticeship	1. Draughtsman Civil 2. Civil Structural

Distribution of training on Hourly basis: (Indicative only)
A. Basic Training

Total hours (40 hrs./ wk X 26 wks.)	**Trade practical**	**Trade theory**	**Work shop Cal. &Sc.**	**Employability skills**
1040 Hours	890 Hours		40 Hours	110 Hours

B. On-Job Training – 3120 Hrs.

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.*
- *For imparting Basic Training the industry to tie-up with ITIs having such specific trade and affiliated to NCVT.*

6. LEARNING OUTCOME

6.1 GENERIC LEARNING OUTCOME

The following are minimum broad Common Occupational Skills/ Generic Learning Outcome after completion of the Draughtsman Civil course of 02 years duration under ATS.

Block I & II:-

1. Recognize & comply safe working practices, environment regulation and housekeeping.

2. Understand and explain different mathematical calculation & science in the field of study including basic electrical. *[Different mathematical calculation & science -Work, Power & Energy, Algebra, Geometry & Mensuration, Trigonometry, Heat & Temperature, Levers & Simple machine, graph, Statistics, Centre of gravity, Power transmission, Pressure]*

3. Interpret specifications, different engineering drawing and apply for different application in the field of work. *[Different engineering drawing-Geometrical construction, Dimensioning, Layout, Method of representation, Symbol, scales, Different Projections, Machined components & different thread forms, Assembly drawing, Sectional views, Estimation of material, Electrical & electronic symbol]*

4. Select and ascertain measuring instrument and measure dimension of components and record data.

5. Explain the concept in productivity, quality tools, and labour welfare legislation and apply such in day to day work to improve productivity & quality.

6. Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.

7. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.

8. Plan and organize the work related to the occupation.

6.2 SPECIFIC LEARNING OUTCOME

Block – I

1. Draw in free hand sketches of hand tools used in civil work.
2. Draw plane figure applying drawing instruments with proper layout and the method of folding drawing sheets.
3. Construct plain scale, comparative scale, diagonal scale and vernier scale.
4. Draw orthographic projections of different objects with proper lines, lettering and dimensioning.
5. Draw Isometric / Oblique / Perspective views of different solid / hollow / cut sections with proper lines, lettering and dimensioning.
6. Draw component parts of a single storied residential building with suitable symbols and scales.
7. Draw different types of stone and brick masonry.
8. Draw different types of shallow and deep foundation.
9. Draw different types of shoring, scaffolding, underpinning, framework and timbering.
10. Draw different types of Damp proofing in different position.
11. Drawing of different types of arches and lintels with chajja.
12. Draw different types of Carpentry Joints in Door & Window.
13. Draw different types of Flooring.
14. Draw different types of vertical movement according to shape, location, materials in stair, lift, ramp and escalator.
15. Draw different types of roofs according to shape, construction, purpose and span.
16. Draw One Storied Residential Building Plan including all details.
17. Draw Two Storied Residential Building Plan including all details using AutoCAD.

Block – II

18. Prepare single storied RCC framed building Plan Flat Roof including all details using AutoCAD.
19. Prepare single storied RCC framed building Plan Partly tiled & partly Flat Roof including all details using CAD.
20. Prepare Two Room building Plan drawing Slope Roof of RCC structures using CAD
21. Prepare Three Bed Room double storied building Plan drawing Flat Roof of RCC structures using CAD
22. Prepare detailed drawing of RCC structures using CAD and prepare bar bending schedule.
23. Draw the details of a framed structure and portal frame of a residential building using CAD.
24. Draw the different types of steel sections, rivets and bolts using CAD.

25. Draw the details of girders, roof trusses and steel stanchions using CAD.
26. Prepare the detailed drawing showing the different types of sanitary fittings, arrangements of manholes, details of septic tank, Over Head Tank and Sanitary Plumbing System using CAD .
27. Prepare of service plan (drainage plan) for isolated building & in sewer system for Two Storied Building.
28. Draw the details flow diagram of water treatment plant (WTP) and Swerage Treatment plant (STP).
29. Draw the cross sectional view of different types of roads showing component parts using CAD.
30. Draw the details of different types of culverts including all components using CAD.
31. Prepare detailed drawing a bridge including all componentsusing CAD.
32. Draw the typical cross section of rail sections, railway tracks in cutting and embankment using CAD
33. Prepare detailed drawing of typical cross sections of Dam, barrages, weir and Cross drainage works using CAD
34. Draw the schematic diagram of different structures of Hydro electric project using CAD
35. Prepare detailed estimate and cost analysis of different types of building and other Structures using application software.
36. Prepare rate analysis of different items of work.
37. Problems on preparing preliminary/Approximate estimates for building project.
38. Perform site survey with chain / tape and prepare site plan.
39. Perform site survey with prismatic compass and prepare site plan.
40. Perform site survey with plane table and prepare site plan.
41. Make topography map / contour map with leveling instrument.
42. Perform site survey with Theodolite and prepare site plan.
43. Prepare a map using Total station.
44. Locate the station point using GPS and obtain a set of co-ordinates.

NOTE: Learning outcomes are reflection of total competencies of a trainee and assessment will be carried out as per assessment criteria.

7. LEARNING OUTCOME WITH ASSESSMENT CRITERIA

GENERIC LEARNING OUTCOME	
LEARNING OUTCOMES	**ASSESSMENT CRITERIA**
1. Recognize & comply safe working practices, environment regulation and housekeeping.	1. 1. Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements.
	1. 2. Recognize and report all unsafe situations according to site policy.
	1. 3. Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.
	1. 4. Identify, handle and store / dispose off dangerous/unsalvageable goods and substances according to site policy and procedures following safety regulations and requirements.
	1. 5. Identify and observe site policies and procedures in regard to illness or accident.
	1. 6. Identify safety alarms accurately.
	1. 7. Report supervisor/ Competent of authority in the event of accident or sickness of any staff and record accident details correctly according to site accident/injury procedures.
	1. 8. Identify and observe site evacuation procedures according to site policy.
	1. 9. Identify Personal Productive Equipment (PPE) and use the same as per related working environment.
	1. 10. Identify basic first aid and use them under different circumstances.
	1. 11. Identify different fire extinguisher and use the same as per requirement.
	1. 12. Identify environmental pollution & contribute to avoidance of same.
	1. 13. Take opportunities to use energy and materials in an environmentally friendly manner
	1. 14. Avoid waste and dispose waste as per procedure
	1. 15. Recognize different components of 5S and apply the same in the working environment.

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2. Understand, explain different mathematical calculation & science in the field of study including basic electrical and	2.1 Explain concept of basic science related to the field such as Material science, Mass, weight, density, speed, velocity, heat & temperature, force, motion, pressure, heat treatment, centre of gravity, friction.
apply in day to day work.*[Different mathematical calculation & science -Work, Power & Energy, Algebra, Geometry & Mensuration, Trigonometry, Heat & Temperature, Levers & Simple machine, graph, Statistics, Centre of gravity, Power transmission, Pressure]*	2.2 Measure dimensions as per drawing
	2.3 Use scale/ tapes to measure for fitting to specification.
	2.4 Comply given tolerance.
	2.5 Prepare list of appropriate materials by interpreting detail drawings and determine quantities of such materials.
	2.6 Ensure dimensional accuracy of assembly by using different instruments/gauges.
	2.7 Explain basic electricity, insulation &earthing.
3. Interpret specifications, different engineering drawing and apply for different application in the field of work. *[Different engineering drawing-Geometrical construction, Dimensioning, Layout, Method of representation, Symbol, scales, Different Projections, Machined components & different thread forms, Assembly drawing, Sectional views, Estimation of material, Electrical & electronic symbol]*	3. 1. Read & interpret the information on drawings and apply in executing practical work.
	3. 2. Read & analyse the specification to ascertain the material requirement, tools, and machining /assembly /maintenance parameters.
	3. 3. Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.
4. Select and ascertain measuring instrument and measure dimension of components and record data.	4.1 Select appropriate measuring instruments such as micrometers, verniercalipers, dial gauge, bevel protector and height gauge (as per tool list).
	4.2 Ascertain the functionality & correctness of the instrument.
	4.3 Measure dimension of the components & record data to analyse the with given drawing/measurement.
5. Explain the concept in productivity, quality tools, and labour welfare legislation and apply such in day to day work to improve productivity & quality.	5.1 Explain the concept of productivity and quality tools and apply during execution of job.
	5.2 Understand the basic concept of labour welfare legislation and adhere to responsibilities and remain sensitive towards such laws.
	5.3 Knows benefits guaranteed under various acts

6. Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using	6.1 Explain the concept of energy conservation, global warming, pollution and utilize the available recourses optimally & remain sensitive to avoid environment pollution.
available resources.	6.2 Dispose waste following standard procedure.
7. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.	7. 1. Explain personnel finance and entrepreneurship.
	7. 2. Explain 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.
	7. 3. Prepare Project report to become an entrepreneur for submission to financial institutions.
8. Plan and organize the work related to the occupation.	8. 1. Use documents, drawings and recognize hazards in the work site.
	8. 2. Plan workplace/ assembly location with due consideration to operational stipulation
	8. 3. Communicate effectively with others and plan project tasks
	8. 4. Assign roles and responsibilities of the co-trainees for execution of the task effectively and monitor the same.
SPECIFIC OUTCOME	
Block-I & II (Section:10)	
*Assessment Criteria i.e. the standard of performance, for each specific learning outcome mentioned under **block – I & block – II**(section: 10) must ensure that the trainee achieves well developed skill with clear choice of procedure in familiar context. Assessment criteria should broadly cover the aspect of **Planning** (Identify, ascertain, estimate etc.); **Execution** (perform, illustration, demonstration etc. by applying 1) a range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information 2) Knowledge of facts, principles, processes, and general concepts, in a field of work or study 3)Desired Mathematical Skills and some skill of collecting and organizing information, communication) and **Checking/ Testing** to ensure functionality during the assessment of each outcome.The assessments parameters must also ascertain that the candidate is responsible for own work and learning and some responsibility for other's work and learning.*	

BASIC TRAINING (Block – I)

Duration: (03) Three Months

Week No.	Professional Skills (Trade Practical)	Professional Knowledge (Trade Theory)
1.	1. Orientation of the Trade and Institute. 2. Techniques of use of Instruments, 3. Equipments, their care and maintenance. 4. Method of fixing of drawing sheet on the drawing board drawing a layout of different size of sheets. 5. Safety precautions to be observed in the Computer Lab Drawing of:- 6. Lines, lettering and Dimensioning. 7. Construction of plain geometrical figures. 8. Construction of solid geometrical figures	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. • Importance of B.I.S. introduction of Code of Practice for Architectural andBuilding Drawings (IS: 962- 1989). • Layout of drawing. Lines, Lettering, Dimensioning, Scales and Projection
2.	**Drawing of :-** 9. Projections – Orthographic (Line, plane, Solid in Isometric, oblique) and Perspective. 10. Symbols & conventional representation for materials in sections as per IS 962-1989 for building drawings. 11. Components of a building.	Building materials:- • Rocks– classification, types, uses • Stones – classification, types, uses • Bricks –. Manufacturing classification, types, and 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.
3.	**Drawing of different forms of :-** 12. Stone masonry 13. Brick Masonry 14. Elements, Classification, types of bonds. 15. Hollow blocks 16. 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
4.	**Foundation:-** 17. Construction details of Shallow & Deep Foundation. 18. Types of foundations, 19. Well foundation, 20. Special foundations , 21. Pile foundations 22. Foundation on black cotton soils. etc	**Foundation:-** • Construction details of Shallow & Deep Foundation. • Types of foundations, • Well foundation, • Special foundations , • Pile foundations • Foundation on black cotton soils, etc
5.	**Temporary structures – sub structure:-** 23. Scaffolding, shoring, underpinning. 24. Partition- aluminium frame with glass sheet, timber, straw board. 25. Details of supporting structures for construction 26. 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
6.	**Showing details of treatments in building:-** 27. Methods of Damp proofing. 28. Anti-termites 29. 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
7.	**Draw different forms of :-** 30. arches, 31. lintels 32. sunshades 33. Centring & Shuttering.	• Arches - Technical terms-.types, centring • 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 • Doors –Parts, Location, Standard sizes, types. • Windows-types, • Ventilators-purpose-types,
9.	Detailed drawings of wooden flooring.	• Floors – Ground floor & upper floor-Types. • Flooring- materials used, types
10.	**Drawing different forms Of vertical movements:-** 34. As per shape-Drawing of straight, open-newel, Dog-legged, Geometrical and Bifurcated, circular, spiral stairs, etc. 35. AS per material-Brick, stone, wooden, steel, R.C.C. stairs.	• Stairs-Terms, requirements • Planning and designing of stair and details of construction. • Basic concept of Lift and Escalator.
11.	**Drawing of different forms of:-** 36. Slopped/Pitched Roof Truss – 37. King Post and Queen Post roof trusses showing detailed connections. 38. Steel roof trusses showing detailed connections. 39. Wooden roof trusses showing detailed connections.	• Roofs & Covering of Roofs-Purposes- Elements, Types-Flat, Pitched • Truss-King Post, queen post, Mansard, Bel-fast, steel, composite. • Shell- Types-North-light & double curved. • Dome- Component parts. • Roofs & Coverings- Objectives, Types & uses.
12.	**Drawing details of:-** 40. Line diagram of single storied residential Building with attached Bath of both pitched & flat roof. 41. Making Plan, Elevation & Section with the aid of Line diagram of the Building Plan. 42. Layout and detailing of Residential Building. 43. Creating a Drawing of Building Plan-Showing setbacks. 44. Showing Layout Plan & Key Plan.	**Building:-** • Principle of Planning. • Objective and importance. • Functions and responsibility. • Orientation. • Local Building Bye- Laws as per ISI Code. • Layout Plan & Key Plan. • Submitted in composition of Drawing. • Provision for safety. Requirement of green belt and land.

13.	45. Preparation of Plan drawing, Section of two storied residential building	**Computer Aided Drafting:-** • Operating system ,Hardware &software • Introduction of CAD • Its Graphical User Interface. • Method of Installation • Basic commands of CAD. • Exposure to latest version of Architectural Desktop and training.
	Internal Assessment/Examination 03days	

NOTE: -

More emphasis to be given on video/real-life pictures during theoretical classes. Some real-life pictures/videos of related industry operations may be shown to the trainees to give a feel of Industry and their future assignment.

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BASIC TRAINING (Block – II)

Duration: (03) Three Months

Week No.	Professional Skills (Trade Practical)	Professional Knowledge (Trade Theory)
1	**Drawing of residential Building prepare :-** 46. Plan, elevation & section of building with specification for the given line diagram to suitable scale. 47. A reading room with R C C flat roof slab. 48. A House of single storied residential building with single bed room and attached toilet with R. C. C. flat roof slab.	**Building planning:-** • Economy and orientation • Provision for lighting and ventilation. • Provision for drainage and sanitation. • Types of building. • Planning and designing of residential, public and commercial building.
2.	49. A residential building with double bedroom with R.C.C. flat roof slab. 50. House with single bed and hall with partly tiled and partly R C C flat roof slab. 51. Two roomed house with R.C.C. slope roof with gable ends. 52. A house with fully tiled roof with hips and valleys. 53. Design and create a double storied residential building with triple bed room and its accessories.	**Prefabricated structure:-** • Preparation. • Method of construction and assembling. • Advantages and disadvantages.
3.	**Drawing details of R C C members with reinforcement.** 54. Rectangular beams (single reinforced & double reinforced). 55. Lintels, chajjas, slabs. 56. Stair- details of step. 57. Columns with footings. 58. Continuous columns showing disposition of reinforcement. 59. Preparing bar bending schedules. 60. Details of one way slab and two way slab. 61. T-beam, inverted T-beam, cantilever, retaining wall. 62. R C C detailing - framed structure, portal frame, ductile detailing, B.I.S code-456-2000 & its application.	**R C C structure:-** • Introduction to R C C uses. • Materials – proportions. • Form work. • Bar bending details as per I. S. Code. • Reinforced brick work. **Materials used for R C C:-** • Construction. • Selection of materials- course aggregate, fine aggregate, cement, water and reinforcement, • Characteristics. • Method of mixing concrete- machine mixing and hand mixing. • Slump test. • Structure- columns, beams, slabs- one way and two way slab. • Innovative construction. • Safety against earthquake. • Grade of cement, steel behaviour and test.

		• Retaining wall. • R C C framed structure.
4.	**Drawing different types of :-** 63. Steel sections, rivet, bolts etc. 64. Section and elevation of girders. 65. Structural joints. 66. Plate girders, roof trushes, stanchion etc.	**Steel structures:-** • Common forms of steel sections. • Structural fasteners, joints. • Tension and compression member. • Classification fabrication. Construction details.
5	**Public health and sanitation:-** 67. Drawings of showing various pipe joints for underground drainage. 68. Types of sanitary fittings in multi-storied building. 69. Water supply system. 70. Plumbing system of new technology. Public health & sanitation. 71. R C C square overhead tank supported by four columns. 72. Rapid sand filter. 73. Preparation of service plan (drainage plan) for isolated building & in sewer system. 74. Drawing of toilet fixtures.	**House drainage of building:-** • Introduction. • Terms used in PHE. • Systems of sanitation. • System of house drainage. • System of house Plumbing, sanitary fittings etc. • Purification of water. • Types of sewer appurtenance. • Manholes & septic tank. • New technology of plumbing System.
6.	**Roads:-** 75. Drawing& showing of road structure and component parts. 76. Preparing a drawing of Cross-sections showing the different types of of roads- according to location and materials 77. Preparing a drawing of road curves and gradient.	**Roads:-** • Introduction. • History of highway development. • General principles of alignment. • Classification and construction of different types of roads. • Components parts. • Road curves and gradient. • Curves-types, designation of curves. • Setting out simple curve by successive bisecting from long chords. • Simple curve by offsets from long chords. • Road drainage system.
7.	**Bridge:-** preparing drawing of 78. Different types of culvert. 79. Preparing drawing of an arched bridge. 80. Steel connection detailing and generation of fabrication drawing 81. Preparation of construction / Fabrication drawings	**Bridges & Tunnels:-** • Introduction to bridges. • Components parts of bridge. • Classification of culverts. • IRC loading. • Selection of type and location. • Factors governing the ideal site. • Alignment of bridge-

	Draw plan and sectional views of the following:- 82. R C C slab culvert with splayed wing walls. 83. Steel foot over bridge across a highway. 84. Two span Tee Beam Bridge with square returns.	• Foundation-selection-caisson. • Coffer dam- types. • Types of super structure. • Substructure-piers, abutments, wing walls- • Classification of bridge. • Tunnels- rules used for the sizes of different members.
8.	**Railways:-** 85. Draw typical cross section of rail sections 86. Railway tracks -embankment layout plans of railway platform. 87. Typical cross section of railway track cutting and embankment (single track and double track). 88. Layout of signalling points and crossings.	**Railways:-** • Permanent way. • 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 and materials of 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 way. • Railway station and yard.
9.	**Drawing different types of irrigation structures:-** 89. Dams, Barrages, weir, etc, 90. Longitudinal section of distributaries- with the help of given sketch and data. 91. Head Regulators 92. Types of cross drainage work.	**Irrigation Engineering :-** • Terms used in irrigation. • Hydrology like duty, delta, base period, intensity of irrigation. • Hydrograph, peak flow, run off, catchment area, CCA, Rabi crop, Kharif crop, etc. • Storage/Diversion head work-characteristics, Types. • Reservoir-types of Reservoirs, i.e., single purpose and multi-purpose, area, and capacity and curves of Reservoir. • Dams, Barrages & weir-types, purposes. • Hydro-electric project like Forebay, Penstock, Turbines, Power house, etc. • Canals:-classification and distribution system, canal structures. • Types of cross drainage works like Aqua duct, Super passage, Siphon, Level

		crossing, inlet and outlet, etc.
10	**Estimating & Costing:-** 93. General principle of estimating & costing. 94. Methods of measurement techniques. 95. Preparation of detailed estimate;- Calculation of quantities of items of single storied and double storied building. 96. Preparation of abstract of estimate by prevailing rates. 97. Rate analysis:- 98. Preparation of rate analysis of major items-R C C, P C C, works, brick works & stone masonry & plastering. 99. Problems on preparation of preliminary or approximate estimates for building projects.	**Estimating and costing:-** • Introduction. • Purpose of common techniques. • Drawing of construction. • Measurement techniques. • Estimate-necessity, importance, types-approximate and detailed estimate-main and sub estimates, revised, supplementary, maintenance/repair estimates-taking off quantities-method. • Rate analysis of typical items and their specifications. • Labour and materials. • Schedule of rates. Estimating of irregular boundaries by trapezoidal and Simpson's formulae.
11	**Surveying:-** 100. Equipment and instrument used to perform surveying. 101. Distance measuring with chain and tape. 102. Entering Field book and plotting. 103. Calculating the area of site. 104. **Plane Table** 105. Surveying of a Building site with Plane Table. 106. **Compass survey:-** 107. Field work of prismatic compass survey. 108. Plotting of prismatic compass survey. 109. Testing and adjusting the compass. 110. Observation of bearings. 111. Bearing a line. 112. F.B.,B.B., R.B.,W.C.B. of a Line, Traverse and also check the close traversing.	**Surveying:-** • Introduction, history and principals of chain survey. • Instrument employed. • Use care maintenance and common terms. • Classification aquracy types. • Main divisions (plain and geodetic). • Chaining. • Speed in field work and office work. **Plane table survey:-** • Instrument used in plane table survey. • Care and maintenance of plane table survey. **Compass survey:-** • Instrument and its setting up. • Bearing and each included angle of close traverse. • Local attraction. • Magnetic declination and its true bearing. Precaution in using prismatic compass.
12	**Leveling:-** 113. Handling of leveling instruments and their settings. 114. Temporary adjustment of a level. 115. Simple leveling.	**Leveling:-** • Dumpy level, auto level- introduction, definitions. • Principle of leveling. • Leveling staffs, its graduation and

	116. Differential leveling (fly leveling). 117. Leveling Book for entry in data for Field work. 118. Reduction of levels-height of collimation method and rise & fall method-comparison of methods. 119. Problems on reduction of levels. 120. Missing data and how to fill it up– calculations & Arithmetical check in various problems and its solution. 121. Types of leveling.	types. • Minimum equipment required. • Types, component parts and function. • Temporary and permanent adjustment, procedure to setting of. • Level and horizontal surface. Datum, benchmark, focusing and parallax. • Deduction of levels (means reduced levels). • Types of leveling. • Application to chain and Leveling Instrument to Building construction. • Contouring:-definition-characteristic-methods. • Direct and indirect methods. Interpolation of contours-contour gradient-uses of contour plan and map.
13	**Internal Assessment/Examination 03days**	

NOTE: -

- *More emphasis to be given on video/real-life pictures during theoretical classes. Some real-life pictures/videos of related industry operations may be shown to the trainees to give a feel of Industry and their future assignment.*

9. SYLLABUS - CORE SKILLS

9.1 WORKSHOP CALCULATION SCIENCE & ENGINEERING DRAWING

Block – I		
Sl. No.	**Workshop Calculation (Duration: - 20 hrs.)**	**Workshop Science (Duration: - 20 hrs.)**
1.	Ratio & Proportion : Simple calculation on related problems.	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
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, transmission of heat, conduction, convection, radiation. -
5.	Trigonometry: Trigonometrical ratios, measurement of angles. Trigonometric tables	Basic Electricity : Types of current - AC, DC, their comparison, voltage, resistance, their units. Conductor, insulator, Types of connections – series, parallel, electric power, Horse power, energy, unit of electrical energy.
6.		Levers and Simple Machines: levers and its types.

		Simple Machines, Effort and Load, Mechanical Advantage, Velocity Ratio, Efficiency of machine, Relationship between Efficiency, velocity ratio and Mechanical Advantage.

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Block – II		
Sl. No.	**Workshop Calculation (Duration: - 20 hrs.)**	**Workshop Science (Duration : - 20 hrs.)**
1.	Area of cut-out regular surfaces: circle and segment and sector of circle. Area of irregular surfaces. Application related to shop problems.	Temperature measuring instruments. Specific heats of solids & liquids.
2.	Volume of cut out solids: hollow cylinders, frustum of cone, block section. Volume of simple machine blocks. 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. - Compressive, tensile, shear forces and simple problems. Stress, strain, ultimate strength, factor of safety. - Basic study of stress strain curve for MS. Shear force and bending moment diagrams
4.	Finding height and distance by trigonometry.	Velocity, Acceleration & Retardation. 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

9.2 EMPLOYABILITY SKILLS

(DURATION: - 110 HRS.)

Block – I (Duration – 55 hrs.)	
1. English Literacy Duration : 20 Hrs.	Marks : 09
Pronunciation	Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech)
Functional Grammar	Transformation of sentences, Voice change, Change of tense, Spellings.
Reading	Reading and understanding simple sentences about self, work and environment
Writing	Construction of simple sentences Writing simple English
Speaking / Spoken English	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.
2. I.T. Literacy Duration : 20 Hrs.	Marks : 09
Basics of Computer	Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of computer.
Computer Operating System	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.
Word processing and Worksheet	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. Basics of Excel worksheet, understanding basic commands, creating simple worksheets, understanding sample worksheets, use of simple formulas and functions, Printing of simple excel sheets.

Computer Networking and Internet	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), 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 Information Security, Awareness of IT - ACT, types of cyber crimes.
3. Communication Skills Duration : 15 Hrs. Marks : 07	
Introduction to Communication Skills	Communication and its importance Principles of Effective communication Types of communication - verbal, non verbal, written, email, talking on phone. Non verbal communication -characteristics, components-Para-language Body language Barriers to communication and dealing with barriers. Handling nervousness/ discomfort.
Listening Skills	Listening-hearing and listening, effective listening, barriers to effective listening guidelines for effective listening. Triple- A Listening - Attitude, Attention & Adjustment. Active Listening Skills.
Motivational Training	Characteristics Essential to Achieving Success. The Power of Positive Attitude. Self awareness Importance of Commitment Ethics and Values Ways to Motivate Oneself Personal Goal setting and Employability Planning.
Facing Interviews	Manners, Etiquettes, Dress code for an interview Do's & Don'ts for an interview.
Behavioral Skills	Problem Solving Confidence Building Attitude
Block – II **Duration – 55 hrs.**	
4. Entrepreneurship Skills Duration : 15 Hrs. Marks : 06	

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Concept of Entrepreneurship	Entrepreneur - 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.
Project Preparation & Marketing analysis	Qualities of a good Entrepreneur, SWOT and Risk Analysis. Concept & application of PLC, Sales & distribution Management. Different Between Small Scale & Large Scale Business, Market Survey, Method of marketing, Publicity and advertisement, Marketing Mix.
Institutions Support	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.
Investment Procurement	Project formation, Feasibility, Legal formalities i.e., Shop Act, Estimation & Costing, Investment procedure - Loan procurement - Banking Processes.
5. Productivity Duration : 10 Hrs. Marks : 05	
Benefits	Personal / Workman - Incentive, Production linked Bonus, Improvement in living standard.
Affecting Factors	Skills, Working Aids, Automation, Environment, Motivation - How improves or slows down.
Comparison with developed countries	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.
Personal Finance Management	Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance.
6. Occupational Safety, Health and Environment Education Duration : 15 Hrs. Marks : 06	
Safety & Health	Introduction to Occupational Safety and Health importance of safety and health at workplace.
Occupational Hazards	Basic Hazards, Chemical Hazards, Vibroacoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health, Occupational hygienic, Occupational Diseases/ Disorders & its prevention.
Accident & safety	Basic principles for protective equipment. Accident Prevention techniques - control of accidents and safety

	measures.
First Aid	Care of injured & Sick at the workplaces, First-Aid & Transportation of sick person.
Basic Provisions	Idea of basic provision legislation of India. safety, health, welfare under legislative of India.
Ecosystem	Introduction to Environment. Relationship between Society and Environment, Ecosystem and Factors causing imbalance.
Pollution	Pollution and pollutants including liquid, gaseous, solid and hazardous waste.
Energy Conservation	Conservation of Energy, re-use and recycle.
Global warming	Global warming, climate change and Ozone layer depletion.
Ground Water	Hydrological cycle, ground and surface water, Conservation and Harvesting of water.
Environment	Right attitude towards environment, Maintenance of in -house environment.
7. Labour Welfare Legislation Duration : 05 Hrs. Marks : 03	
Welfare Acts	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.
8. Quality Tools Duration : 10 Hrs. Marks : 05	
Quality Consciousness	Meaning of quality, Quality characteristic.
Quality Circles	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.
Quality Management System	Idea of ISO 9000 and BIS systems and its importance in maintaining qualities.
House Keeping	Purpose of House-keeping, Practice of good Housekeeping.
Quality Tools	Basic quality tools with a few examples.

10. DETAILS OF COMPETENCIES (ON-JOBTRAINING)

BROAD LEARNING TO BE COVERED IN INDUSTRY FOR DRAUGHTSMAN CIVIL TRADE:

1. Safety and best practices /Basic Industrial Culture (5S, KAIZEN, etc.)
2. Housekeeping, Record keeping and documentation
3. Prepare one & Two Storied Residential Building Plan in Architecture & Structure in RCC structure flat & slope roof.
4. Prepare Sanitary & Plumbing Layout including drainage System.
5. Prepare Detail Estimate of Two Storied Residential Building including BBS.
6. Prepare detail drawing of Culvert, Bridge, Road & Railway.
7. Prepare a map by using Chain, Compass, Plane Table, Theodolite and Total Station.
8. Prepare a contour map by using Levelling instrument.

Note: Actual training will depend on the existing facilities available in the establishments.

The **competencies/ specific outcomes** on completion of On-Job Training are detailed below using CAD: -

Block – I

1. Prepare drawing of CARPENTRY JOINTS: Lengthening, bearing housing, framing, panelling & moulding.
2. Prepare drawing different types of Doors & Windows and ventilators.
3. Prepare drawing different types of ground & upper floors, Various floor finishing &construction sequence
4. Prepare drawing different forms of vertical transportation – different types of Stair, Lift & Escalator
5. Prepare drawing of different types of Steel roof trusses and Wooden roof truss
6. Draw a single storied residential building plan including all details with suitable symbols and scales using CAD.
7. Draw Two Storied Residential Building Plan (3BHK) including all details Architecture & Structure using AutoCAD.
8. Draw Residential, public and commercial building including all details using AutoCAD.
9. Draw a Prefabricated Structure using CAD

10. Draw an earthquake resisting buildings including all details**.**
11. Draw the cross sectional view of different types of roads showing component parts using CAD.
12. Draw the details of different types of culverts including all components using CAD.
13. Prepare detailed drawing a bridge including all components using CAD.

Block – II

14. Draw the typical cross section of rail sections, railway tracks in cutting and embankment using CAD
15. Drawing of different types of Irrigation structures – Dam, Barrages, Weir& Hydro Electric Project
16. Prepare detailed estimate and cost analysis of different types of building and other Structures using application software.
17. Draw a system of Wiring.
18. Draw different type of RCC structure and prepare a BBS of the above.
19. Draw the details of a framed structure and portal frame of a residential building using CAD.
20. Draw the different types of steel sections, rivets and bolts using CAD.
21. Draw the details of girders, roof trusses and steel stanchions using CAD.
22. Prepare the detailed drawing showing the different types of sanitary fittings, arrangements of manholes, details of septic tank, Over Head Tank and Sanitary Plumbing System using CAD.
23. Prepare of service plan (drainage plan) for isolated building & in sewer system for Two Storied Building.
24. Draw the details flow diagram of water treatment plant (WTP) and Swerage Treatment plant (STP).
25. Prepare detailed drawing of typical cross sections of Dam, barrages, weir and Cross drainage works using CAD
26. Draw the schematic diagram of different structures of Hydro electric project using CAD
27. Prepare rate analysis of different items of work.
28. Problems on preparing preliminary/Approximate estimates for building project

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29. Perform site survey with chain / tape and prepare site plan.
30. Perform site survey with prismatic compass and prepare site plan.
31. Perform site survey with plane table and prepare site plan.
32. Make topography map / contour map with levelling instrument.
33. Perform site survey with Theodolite and prepare site plan.
34. Prepare a map using Total station.
35. Locate the station point using GPS and obtain a set of co-ordinates

Note:

1. Industry must ensure that above mentioned competencies are achieved by the trainees during their on job training.

2. In addition to above competencies/ outcomes industry may impart additional training relevant to the specific industry.

ANNEXURE – I

INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONAL KNOWLEDGE

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LIST OF TOOLS AND EQUIPMENT for Basic Training (For 20 Apprentices)

A. TRAINEES TOOL KIT (For each additional unit trainees tool kit Sl. 1-18 is required additionally)

Sl. no.	Name of the Tool &Equipments	Quantity
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 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 6metric 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 : INSTRUMENTS & GENERAL SHOP OUTFIT		
9	Geometrical models(wooden/plastic) as per given below; i) Cube 08 cm sides. ii)Rectangular parallel piped 8cmX15cm iii) Sphere 8 cm dia. iv) Right circular cone R cm dia base and 15 cm vertical height v) Square pyramid Mem side base and 15 cm vertical height vi)Cylinder 8 cm dia. 15 cm height. vii) Prisms triangular S cm sides triangle and 15 cm length. viii) Prism hexagonal 8 cm side's hexagon and 15 lengths	4 each
10	Templates - Circle. Ellipse, furniture, etc	4 nos.
11	French curves - transparent plastic set of 12	4 nos.
12	Flexible curves 80 cm long	4 nos.
13	Radius curve metric 3 mm to 15 mm	4 no.
14	Brass parallel rulers in a case	4 nos.

15	Calculator Scientific (Non-programmable)	4 nos.
16	Proportional dividers 15 cm	4 nos.
C : GENERAL MACHINERY INSTALLATIONS		
1	Steel tape 30 meters long.	4 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)	2 Nos.
3	Instrument for Total Station with latest model, With all accessories (Graphic LCD display on both sides. Multi function key board on both sides. 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)	2 Nos.
4	Hand held GPS (latest model) with standard specification	2 No.
5	Auto level With all accessories	2Nos.
D. LIST OF TOOLS & EQUIPMENTS FOR COMPUTER LAB		
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.
19	Document Camera / Visualizer	02 Nos.
20	Smart Board Inter Active Board	02 Nos.
21	Steel Cupboard I8O x 90 x 45 cm	02 Nos.
22	Steel Cupboard 120x60 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.

INFRASTRUCTURE FOR WORKSHOP CALCULATION & SCIENCE AND ENGINEERING DRAWING

TRADE: DRAUGHTSMAN CIVIL

LIST OF TOOLS& EQUIPMENTS FOR -20APPRENTICES

1) **Space Norms** : 45 Sq. m.(For Engineering Drawing)

2) Infrastructure:

A : TRAINEES TOOL KIT:-			
Sl. No.	**Name of the items**	**Specification**	**Quantity**
1.	Draughtsman drawing instrument box		20+1 set
2.	Set square celluloid 45^0 (250 X 1.5 mm)		20+1 set
3.	Set square celluloid 30^0-60^0 (250 X 1.5 mm)		20+1 set
4.	Mini drafter		20+1 set
5.	Drawing board (700mm x500 mm) IS: 1444		20+1 set
B : Furniture Required			
Sl. No.	**Name of the items**	**Specification**	**Quantity**
1	Drawing Board		20
2	Models : Solid & cut section		as required
3	Drawing Table for trainees		as required
4	Stool for trainees		as required
5	Cupboard (big)		01
6	White Board (size: 8ft. x 4ft.)		01
7	Trainer's Table		01
8	Trainer's Chair		01

TOOLS &EQUIPMENTS FOR EMPLOYABILITY SKILLS		
Sl. No.	**Name of the Equipment**	**Quantity**
1.	Computer (PC) with latest configurations and Internet connection with standard operating system and standard word processor and worksheet software	10 Nos.
2.	UPS - 500VA	10 Nos.
3.	Scanner cum Printer	1 No.
4.	Computer Tables	10 Nos.
5.	Computer Chairs	20 Nos.
6.	LCD Projector	1 No.
7.	White Board 1200mm x 900mm	1 No.
Note: - Above Tools &Equipments not required, if Computer LAB is available in the institute.		

FORMAT FOR INTERNAL ASSESSMENT

Name & Address of the Assessor :			**Year of Enrollment :**
Name & Address of ITI (Govt./Pvt.) :			**Date of Assessment :**
Name & Address of the Industry :			**Assessment location: Industry / ITI**
Trade Name :	**Semester:**		**Duration of the Trade/course:**
Learning Outcome:			

Sl. No	**Maximum Marks (Total 100 Marks)**		**15** Safety consciousness	**5** Workplace hygiene	**10** Attendance/ Punctuality	**5** Ability to follow Manuals/ Written instructions	**10** Application of Knowledge	**10** Skills to handle tools & equipment	**5** Economical use of materials	**10** Speed in doing work	**15** Quality in workmanship	**15** VIVA	**Total internal assessment Marks**	**Result (Y/N)**
	Candidate Name	**Father's/Mother's Name**												
1														
2														