ARCHITECTURAL ASSISTANT

COMPETENCY BASED CURRICULUM

(Duration: 2 Yrs.)

APPRENTICESHIP TRAINING SCHEME (ATS)

NSQF LEVEL- 5

SECTOR – Construction

सत्यमेव जयते

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

Directorate General of Training

Skill India
कौशल भारत-कुशल भारत

ARCHITECTURAL ASSISTANT

(Revised in 2018)

APPRENTICESHIP TRAINING SCHEME (ATS)

NSQF LEVEL - 5

Developed By

Ministry of Skill Development and Entrepreneurship
Directorate General of Training
CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE
EN-81, Sector-V, Salt Lake City,
Kolkata – 700 091

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Special acknowledgement is extended by DGT to the following expert members who had contributed immensely in this curriculum.

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

Sl. No.	Name & Designation Shri/Mr./Ms.	Organization	Mentor Council Designation
Expert group on restructuring of Apprenticeship Training Modules			
1.	Ar. Avijit Banerjee	Shapoorji Pallonji & Co. Pvt. Ltd.	Architect
2.	Himanish Bhattacharya, Instructor, Architectural Assistant.	Regional Vocational Training Institute, Kolkata.	Expert
3.	Mrs. Soma Das, Training Officer.	Regional Vocational Training Institute, Kolkata.	Expert
4.	Prasoon Ghosh, Sr. Draughtsman.	Central Staff Training & Research Institute, Kolkata.	Expert
5.	Nirmalya Nath, Astt. Dir. of Trg.	Central Staff Training & Research Institute, Kolkata.	Expert
6.	R.N.Manna, Training Officer.	Central Staff Training & Research Institute, Kolkata.	Expert
7.	Himanish Bhattacharya, Instructor, Architectural Assistant.	Regional Vocational Training Institute, Kolkata	Expert
8.	Mrs. Soma Das, Training Officer.	Regional Vocational Training Institute, Kolkata.	Expert
9.	Prasoon Ghosh, Sr. Draughtsman.	Central Staff Training & Research Institute, Kolkata.	Expert
10.	Nirmalya Nath, Astt. Dir. of Trg.	Central Staff Training & Research Institute, Kolkata.	Expert

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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.
- 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.

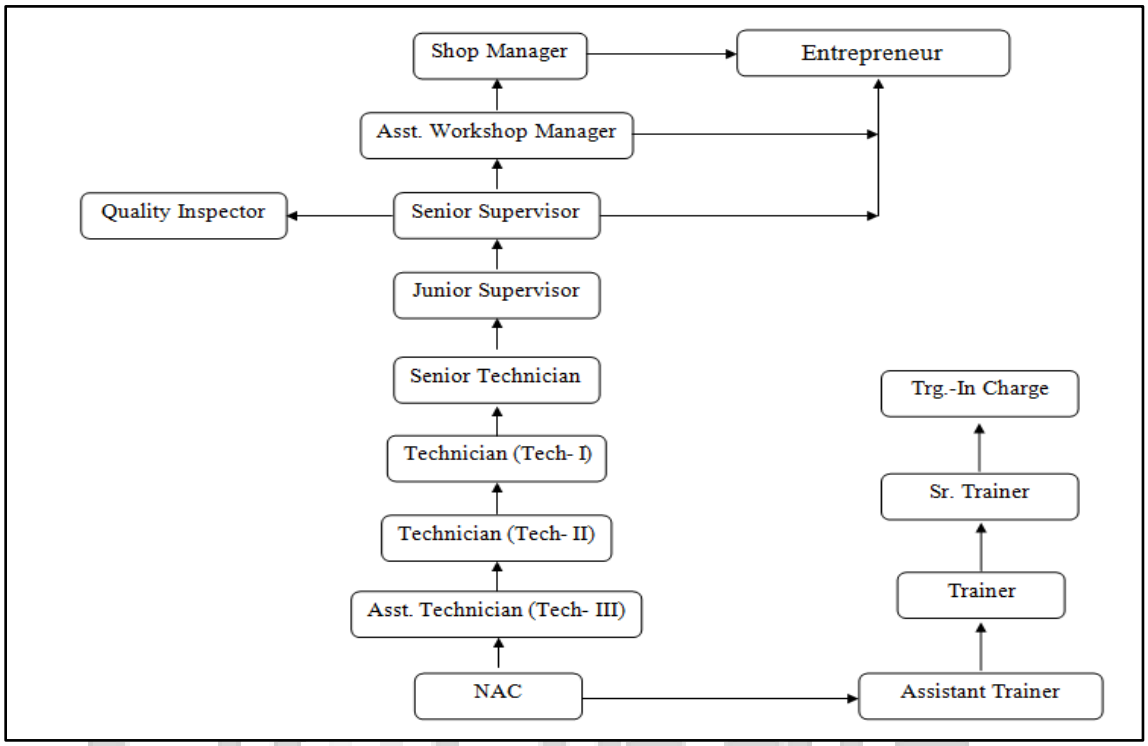
Architectural Assistant trade under ATS is one of the most popular courses delivered nationwide through different industries. The course is of two years (02 Blocks) duration. It mainly consists of Domain area and Core area. In the Domain area Trade Theory & Practical impart professional - skills and 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/finishing and assembly as per drawing for functioning, identify and rectify errors in job/assembly.
- Document the technical parameters related to the task undertaken.

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

A. Basic Training

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

S No.	Course Element	Total Notional Training Hours	
		For 02 Yrs. course	**For 01 Yr. course**
1.	Professional Skill (Trade Practical)	550	275
2.	Professional Knowledge (Trade Theory)	240	120
3.	Workshop Calculation & Science	40	20
4.	Engineering Drawing	60	30
5.	Employability Skills	110	55
	Total (Including internal assessment)	**1000**	**500**

B. On-Job Training:-

For 02 yrs. Course (Engg): (**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 (Engg): (**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 (Engg)	1000 hrs.	3120 hrs.	4120 hrs.
For 01 yr. course (Engg)	500 hrs.	2080 hrs.	2580 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:

At the end of course the trainee will be able to**:**

- Work in architectural farm as draughtsman.
- Work in interior office as interior designer.
- Work as site supervisor and surveyor.
- Work in showroom dealing in architectural materials.
- Work in offices dealing in civil work like making of structure drawings.
- Work in manufacturing units of architectural materials like tiles, modular kitchen, and readymade doors etc.
- Work in structural farm as draughtsman.
- Undertake measured surveys of buildings and produce CAD plans, ensuring that accurate and up to date records and attribute information (asset data, condition) are electronically updated onto the Council's Asset Information Systems.
- Determine client's requirements and ensure client's expectations are met and that their participation in the design process is facilitated.

Reference NCO - 2015: 3118.0100 - Draughts person, Architectural

4. NSQF LEVEL COMPLIANCE

NSQF level for Architectural Assistant trade under ATS is **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
e. Responsibility

The Broad Learning outcome of Architectural Assistant 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	ARCHITECTURAL ASSISTANT
NCO CODE	3118.0100
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 of 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 Architectural Assistant Apprenticeship	Architectural Assistant.

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 Architectural Assistant 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. Identify and use different type of Scales.
2. Identify and use printout drawings of all types of sizes.
3. Identify and use Brick and stone masonry.
4. Draw sketches of landscape, monuments etc.
5. Define Theories of colors for various color scheme.
6. Design and Draw different types of Arches and Lintels.

7. Identify and use different types of materials used in buildings i.e. flooring, walls, ceiling, DPC etc.
8. Operate Computer and able to draw various drawing using Autocad.
9. Design and draw different types of doors and windows.
10. Plan and draw Schematic plan preparation.
11. Identify and use by Law's as per drawing.

Block – II

12. Identify and use Aesthetic components of design.
13. Design and draw stairs, flooring.
14. Design and draw roof and roof covering.
15. Identify and use fire protection.
16. Plan and draw Sanction drawing preparation.
17. Design and draw Working Drawing of building.
18. Plan and draw sanitation and drainage.
19. Draw buildings Plumbing layout and rain water harvesting.
20. Design and Draw buildings Electrical layout.
21. Identify and use Local rates & availability of materials and labours.
22. Prepare Estimates of project.
23. Layout development plan as per local municipal by laws SUDA, PWD/CPWD.

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.
2. Understand, explain different mathematical calculation & science in the	2.1 Explain concept of basic science related to the field such as Material science, Mass, weight, density, speed, velocity, heat & temperature, force,

field of study including basic electrical and		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, vernier calipers, 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	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

to improve productivity & quality.		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 available resources.	6.1	Explain the concept of energy conservation, global warming, pollution and utilize the available recourses optimally & remain sensitive to avoid environment pollution.
	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 in the competency based curriculum)		
*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	**Safety: -** its importance, classification, personal, general, workshop and job safety. Occupational health and safety. Basic injury prevention, Basic first aid, Hazard identification and avoidance, safety signs for Danger, Warning, caution & personal safety message. Preventive measures for electrical accidents & steps to be taken in such accidents. Importance of housekeeping & good shop floor practices. Disposal procedure of waste materials like cotton waste, metal chips/burrs etc. **Fire& safety**: Use of Fire extinguishers.	**Importance of safety and general precautions observed in the in the industry/shop floor**. All necessary guidance to be provided to the new comers to become familiar with the working of Institute system including stores procedures. **Introduction of First aid**. Safety attitude development of the trainee by educating him to use Personal Protective Equipment (PPE). Response to emergencies eg; power failure, fire, and system failure. **Accidents**- Definition types and causes. First-Aid, nature and causes of injury and utilization of first-aid. Introduction to 5S concept & its application. **Fire: -** Types, causes and prevention methods. Fire Extinguisher, its types. Define environment, environment Pollution, Pollutants, type of Pollution (Air pollution, water pollution, soil pollution noise pollution, thermal pollution, radiation. Global warming its causes and remedies. Industrial Waste its types, sources and waste Management.
2	**Brick Masonry** • Sizes of brick and brick tiles • English and Flemish bond- for half brick thick wall and one brick thick wall	**Bricks** • Definition, classification, properties and uses of brick. • Characteristics of good brick.
3	**Stone masonry**	**Stones**

	• Coarsed rubble, uncoarsed rubble masonry. • Ashlar - chamfered masonry.	• Uses of stones. • Classification of rocks. • Characteristics of good building stones.
4	Sketches of landscape/ monuments with water colors, pencil colors, crayons.	**Lime-** Definition, classification, properties and uses of lime. **Surkhi** - Definition and uses. **Sand -**Definition, uses and classification.
5	**Color schemes** - monochromatic, tones and shades in any creative pattern.	**Foundation –**Definition, Types of foundation (pile, raft, spread mat, column, retaining wall).
6	Detail sketches of various types of concrete masonry. Detail sketches of various types of carpentry joints. Composition of pattern using different textures using different grade of pencils (H, HB, B, 2B etc).	**Concrete Masonry-** Openings, Reinforced And Mortar-Openings, Reinforced & Motor for Concrete Masonry. **Carpentry Joints**- Technical terms & Classification of joints.
7	Detail at plinth level, on terrace and basement floor.	**Damp proof Course**: Damp proof treatments in building
8	Detail of Wooden lintel, stone lintel, brick lintel, steel lintel, RCC lintel, chajjas.	**Lintels -** Purpose and types Arches**:** Classification of arches and Materials used for construction.
9	Details of Paneled door, flush door, batten and ledged door, Glazed door, sliding door, revolving door.	**Doors** -Size of doors, Door frame, Types of doors.
10	Casement window, louvered window, ventilator and its details.	**Windows** - Size of window & Classification of windows
11	Creating detailed Auto-CAD drawing of building components, rooms with fully dimensioned and specifications.	
12	Project on Total station survey, use, method of plotting, checks and adjustment of errors, setting out of building, centre line of building.	**Byelaws -** General terminology used in buildings.
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.*

BASIC TRAINING (Block – II)

Duration: (03) Three Months

Week No.	Professional Skills (Trade Practical)	Professional Knowledge (Trade Theory)
1	**Introduction to Design** • Design topic – Residential. • Concept and visualization of design - able to understand the process of designing. • Case study of similar project to be done.	**Aesthetic Components of Design** - Texture, color, direction, tone, proportion, scale, balance, symmetry.
2	**Drawing Of Stairs:** Plan and elevation construction details of different types of stairs, railings.	**Stairs -** Technical terms used • Materials used for different types of stairs • Planning and design of a stair • Details of construction of various stairs • Factors considered in Architectural design.
3	**Drawing of Floors and flooring** Sub floor and floor finish details, types of brick floors, timber floors. Construction details of mosaic, terrazzo, PVC, rubber, brick, granite or marble, wooden flooring.	**Floors** • Components of floor • Suspended floor • Floor coverings • Ground and basement floor **Flooring** • Types and its laying process (terrazzo, concrete, granite, marble, tiles, rubber, wooden).
4	**Drawing Of Roof And Roof Coverings** • Pitched roof details. • Flat roof details. • Lean to roof details.	**Roof and Roof Coverings -** Technical terms - Pitched roof , flat roof, lean to roof, Materials used for roofing like asbestos sheet, terracotta tiles, AC sheets, corrugated sheets etc.
5 - 7	**Working Drawing:** • All floor plans showing all dimensions and column grids with door window	**Rate Analysis And Specifications** •Specifications - importance, objectives •Rate analysis of items (concrete, brick

	schedule. • All four Elevations with floor heights, lintel heights, sill heights and details if any. • Section through staircase with complete details. • Kitchen details with complete detailed plans with above and below counter, elevations with details of cupboard heights and design. • Toilet details with complete detailed plan, all four elevations with fixture and fitting details.	work, wood work, plastering, flooring) including rates of Labour and materials, sundries, contractors profit etc as per standards.
8	**Electrical Layout Drawing** All floors Electrical plan with complete wiring and all fittings and switch board connections indicated in the drawing.	**Fire Protection** •Definitions. •Fire resisting properties of materials. •Fire resistant construction. •Fire fighting equipments and detection (alarm, sprinklers systems etc). •Means of escape, staircase, lifts etc.
9	**Sanitation And Drainage** • System of sewerage - one pipe system, two pipe system, single stack system, anti synphonage pipe. • Types of traps. • Sanitary fitting - wash basin, urinals, sinks, WCs etc.	**Rain Water Harvesting** • Purpose, advantages, system set up and various process. • Today's need for rain water harvesting and its implications.
10 - 11	**Final Design** • All floor plans rendered with furniture layout. • Front elevation and one side elevation rendered. • Section through toilet / staircase rendered. • Site plan with all landscape elements.	Knowledge of Local Labour Rate and Labour Availability.

	Drawing Sheet should be provided with Title Block: Subject of drawing, scale, date, job no, address, north indication, sheet no., Revision note to be mentioned in all the sheets. Drawing produced should be well readable and self explanatory.	
12	Creating & submission of drawing and layout development plan as per local municipal bye laws or State Urban Development Authority. Preparation of detailed Estimate as per PWD/ CPWD Schedule.	
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 and Science (Duration: - 20 hrs.)**	**Engineering Drawing (Duration: - 30 hrs.)**
1.	**Units & Measurements-** FPS, CGS, MKS/SI unit, unit of length, Mass and time. Fundamentals and derived units Conversion of units and applied problems.	**Engineering Drawing:** Introduction and its importance. Different types of standards used in engineering drawing. Drawing Instruments: their uses. Drawing board, T-Square, Drafter (Drafting M/c), Set Squares, Protractor, Drawing Instrument Box (Compass, Dividers, Scale, Diagonal - Scales etc.), Pencils of different Grades, Drawing pins / Clips.
2.	**Material Science** : properties -Physical & Mechanical, Types -Ferrous & Non-Ferrous, difference between Ferrous and Non-Ferrous metals.	**Lines :** types and applications in Drawing as per BIS SP:46-2003. Drawing geometrical object using all types of lines. **Drawing of Geometrical Figures:** Angle, Triangle, Square, Rectangle and Circle. **Letters: -** Lettering styles, Single stroke letters and numbers as per IS standard. Lettering practice.
3.	**Mass .Weight and Density** : Mass, Unit of Mass, Weight, difference between mass and weight, Density, unit of density.	**Dimensioning**- Types of dimension, elements of dimensions, Methods of indicating Values, Arrangement, Alignment and indication of dimensions. **Scales**:-Types use and construction. Representative factor of scale.
4.	**Speed and Velocity:** Rest and motion, speed, velocity, difference between speed and velocity, acceleration, retardation. Average Velocity, Acceleration & Retardation. Related problems. Circular Motion: Relation between circular motion and Linear motion,	**Methods of presentation of Engineering Drawing** - Pictorial View - Orthogonal View - Isometric view Circle and its elements.

	Centrifugal force, Centripetal force.	
5.	**Ratio & Proportion** : Simple calculation on related problems. **Percentage:** Introduction, Simple calculation.	**Constructions: -** Draw proportionate free hand sketches of plane figures. Sketch horizontal, vertical and inclined line by free hand, Draw circles by free hand using square and radial line method, Draw arcs and ellipse by free hand.
6.	**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. Meaning of H.P., I.H.P., B.H.P., and F.H.P. and CC and Torque.	**Projections:** Concept of axes plane and quadrant. Orthographic projections. Method of first angle and third angle projections (definition and difference). Symbol of 1st angle and 3rd angle projection as per IS specification. - Free hand Drawing of Orthographic projection from isometric/3D view of geometrical blocks.

Block – II		
Sl. No.	**Workshop Calculation and Science (Duration: - 20 hrs.)**	**Engineering Drawing (Duration: - 30 hrs.)**
1.	**Algebra:** Addition, Subtraction, Multiplication, Division, Algebraic formula, Linear equations (with two variables).	**Screw :-** Its Types and Sizes, Screw thread, their standard forms as per BIS, external and internal thread.
2.	**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.	**Rivets and Joints:-** Prepare a drawing sheet on rivets nomenclature and Joints.
3.	**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. Volume of cut-out solids: hollow cylinders, frustum of cone, block section. Volume of	**Free hand Sketches for simple pipe line with general fittings.**

	simple solid blocks.	
4.	**Basic Electricity:** Introduction, use of electricity, how electricity is produced, 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. Concept of earthling.	**Reading of drawing. Simple exercises related to missing lines, dimensions. How to make queries.**
5.	**Simple machines Transmission of power:** - Transmission of power by belt, pulleys & gear drive. **Heat treatment process: -** Heat treatment and advantages. Annealing, Normalizing, Hardening, Tempering.	**Simple exercises related to trade related symbols.** **Basic electrical and electronic symbols.**
6.	**Trigonometry:** Trigonometrical ratios, measurement of angles. Trigonometric tables. Finding the value of unknown sides and angles of a triangle by Trigonometrical method. Finding height and distance by trigonometry. Application of trigonometry in shop problems. (viz. taper angle calculation). Calculate the area of triangle by using trigonometry and application of Pythagoras theorem.	**Free hand sketch of trade related components / parts /cutting tool indicating angles.**
7.	**Concept of pressure** - **Definition**:-Force, Pressure, and their units, atmospheric pressure, gauges used for measuring pressure, problems. Introduction to pneumatics & hydraulics systems.	
8.	**Simple exercises related to trade related Test Papers. Solution of NCVT test papers.**	

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
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.
4. 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	Basic Hazards, Chemical Hazards, Vibroacoustic Hazards, Mechanical

Hazards	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-JOB-TRAINING)

BROAD LEARNING TO BE COVERED IN INDUSTRY FOR ARCHITECTURE ASSITANT TRADE:

1. Safety and best practices /Basic Industrial Culture (5S, KAIZEN, etc.)
2. Record keeping and documentation.
3. Design and draw different types of building drawings as per laws. Identify and use different types of materials.
4. Make all drawings on Auto Cad software.
5. Deal the customers effectively.

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: -

Block – I

1. Identify and use different type of Scales.
2. Identify and use printout drawings of all types of sizes .
3. Identify and use Brick and stone masonry.
4. Draw sketches of landscape, monuments etc.
5. Define Theories of colors for various color scheme.
6. Design and Draw different types of Arches and Lintels.
7. Identify and use different types of materials used in buildings i.e. flooring, walls, ceiling, DPC etc.
8. Operate Computer and able to draw various drawing using Autocad.
9. Design and draw different types of doors and windows.
10. Plan and draw Schematic plan prepration.
11. Identify and use by Law's as per drawing.

Block– II

12. Identify and use Aesthetic components of design
13. Design and draw stairs, flooring.
14. Design and draw roof and roof covering.
15. Identify and use fire protection.
16. Plan and draw Sanction drawing preparation.
17. Design and draw Working Drawing of building.
18. Plan and draw sanitation and drainage.

19. Draw buildings Plumbing layout and rain water harvesting.
20. Design and Draw buildings Electrical layout.
21. Identify and use Local rates & availability of materials and labours.
22. Prepare Estimates of project.
23. Layout development plan as per local municipal by laws SUDA, PWD/CPWD.

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

TRADE: ARCHITECTURAL ASSISTANT

LIST OF TOOLS & EQUIPMENTS FOR -20 APPRENTICES

A: TRAINEES TOOL KIT:-

Sl. No.	Name of the items	Quantity (indicative)
1.	Adjustable set square with beveled edge – 30 cm	20 + 1 sets
2.	Compass with Long arm & pen holder	20 + 1 Nos.
3.	Protractor – 15 cm	20 + 1 Nos.
4.	Graphic Pens	As per requirement
5.	Triangular Scale 30 cm (feet/inch, metric)	20 + 1 Nos.
6.	Clutch pencil – 0.5mm , 0.2 mm , 2mm.	20 + 1 Nos.
7.	Parallel Bar / T scale – 1250 mm long	20 +1 Nos.
8.	Plastic French curve with ink edge – set of 12	3sets
9.	Flexi curve- 80cm	4Nos.
10.	Furniture template 1:50, 1:100,1:200	20+1Nos.
11.	Circular and oval template	20+1Nos.
12.	Metric Tape-5M	20+1Nos.
13.	Calculator	05Nos.
14.	Beam Compass with pen holder (rotring/steadler made)	02Nos.
15.	Pen Drive	As per requirement

Note:

1. *All the hand tools mentioned under Sl. No. 1 to 11 would be issued to Trainees once during their course and to be treated as consumables.*
2. *The quantities of hand Tools may be increased accordingly based on the No. of Trainees on*

roll (including the Strength of Additional Unit, if any).

3. *In addition to the list, small measuring tapes, Drawing Sheet, Tracing Paper, Butter Sheet, Color Pencils, Pencil (of various grades), Pencil Leads, Cello tape, Eraser and any other Raw Materials would be issued as per the requirement and will be considered as consumable items.*
4. *For faculty members Raw Materials like Pen Drive, Pocket Hard Disk, Memory Card, Re-writable CDs & DVD etc., may be provided.*

B: TOOLS INSTRUMENTS AND GENERAL SHOP OUTFITS

Sl. No.	Name of the items	Quantity (indicative)
1.	Dual Desk	As per requirement
2.	Drawing Boards measuring 1250mm x900mm fixed over adjustable stand	**20+1Sets.
3.	Draughtsman stool with back (revolving type)	**24 Nos.
4.	Students Lockers – with 8 compartments	3 Nos.
5.	Wooden Chest of Drawers	4 Nos.
6.	Steel book case (with lockable glass shutters)	1 No.
7.	Instructor's table with glass top	2 Nos.
8.	Revolving Chair for Class room	2 Nos.
9.	Instructor's revolving with arm chair	2 Nos.
10.	Visitor's revolving chair	2 Nos.
11.	Steel Almirah	
12.	Magnetic White Board	
13.	Pin-up board (with or without stand)	6 Nos.
14.	Working table size 1250x950	2Nos.
15.	Tracing Table with Plain glass 1250x900	1 No.
16.	Air conditioner 2.0 tons (split unit) for theory and practical room	4 Nos.

**Numbers may be increased depending on on-roll trainee's strength and additional Unit (if any)

C: GENERAL MACHINERY INSTALLATIONS:-

Sl. No.	Name & Description of Machines	Quantity (indicative)
1.	Personal Computer with LCD monitor & DVD re-writer along with Latest compatible OS	**20 Nos.
2.	Notebook PC	2 Nos.
3.	Drafting Software like AutoCAD, or equiv.	**20 Nos.
4.	3D modeling software like Max, Revit etc.	**20 Nos.
5.	Plotter (A0 size)	1 No.
6.	Laser Jet color printer (A4 size)	1 No.
7.	Inkjet/ Laser Jet Printer (A3 size)	1 No.
8.	Color Scanner/printer with Latest Configuration	1 No.
9.	700VA or higher Offline UPS	**20 Nos.
10.	Computer work station (module type)	**20 Nos.
11.	Printer Table (module type)	1 No.
12.	Operator's revolving chair	22 Nos.
13.	Instructor 's Lab table	1 No.
14.	Instructor's revolving chair with arm	3 Nos.
15.	Book shelf with glass shutters	1 No.
16.	Air conditioner 2.0 tons (split type) for CAD lab	4 Nos.
17.	LAN connectivity	As per requirement
18.	Internet connection	1 No.
19.	Visualizer	1 No.
20.	Vacuum Cleaner	1 No.
21.	Computer work station (module type)	**20 Nos.
22.	LCD Projector	1 No.
23.	Interactive Board	1 No.

**it may be as per requirement i.e. equal to number of trainees.

Mouse & Keyboard should be treated as Raw Material.

<u>Note:</u> 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: Architectural Assistant (ATS)

LIST OF TOOLS & EQUIPMENTS FOR TWENTY APPRENTICES

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

A: TRAINEES TOOL KIT

Sl. No.	Name of the items	Quantity (indicative)
1.	Draughtsman drawing instrument box	20 Nos.
2.	Set square celluloid 45^o (250 X 1.5 mm)	20 Nos.
3.	Set square celluloid 30^o-60^o (250 X 1.5 mm)	20 Nos.
4.	Mini drafter	05 Nos.
5.	Drawing board (700mm x500 mm) IS: 1444	20 Nos.

B: FURNITURE REQUIRED

Sl. No.	Name of the items	Quantity (indicative)
1.	Drawing Board	20 Nos.
2.	Models : Solid & cut section	As Required
3.	Drawing Table for trainees	As Required
4.	Stool for trainees	As Required
5.	Cupboard (big)	01 No.
6.	White Board (size: 8ft. x 4ft.)	01 No.
7.	Trainer's Table	01 No.
8.	Trainer's Chair	01 No.

ANNEXURE-II

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	**Candidate Name**	**Father's/Mother's Name**	Safety consciousness	Workplace hygiene	Attendance/ Punctuality	Ability to follow Manuals/ Written instructions	Application of Knowledge	Skills to handle tools & equipment	Economical use of materials	Speed in doing work	Quality in workmanship	VIVA	**Total internal assessment Marks**	**Result (Y/N)**
Maximum Marks (Total 100 Marks)			**15**	**5**	**10**	**5**	**10**	**10**	**5**	**10**	**15**	**15**		
1														
2														