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

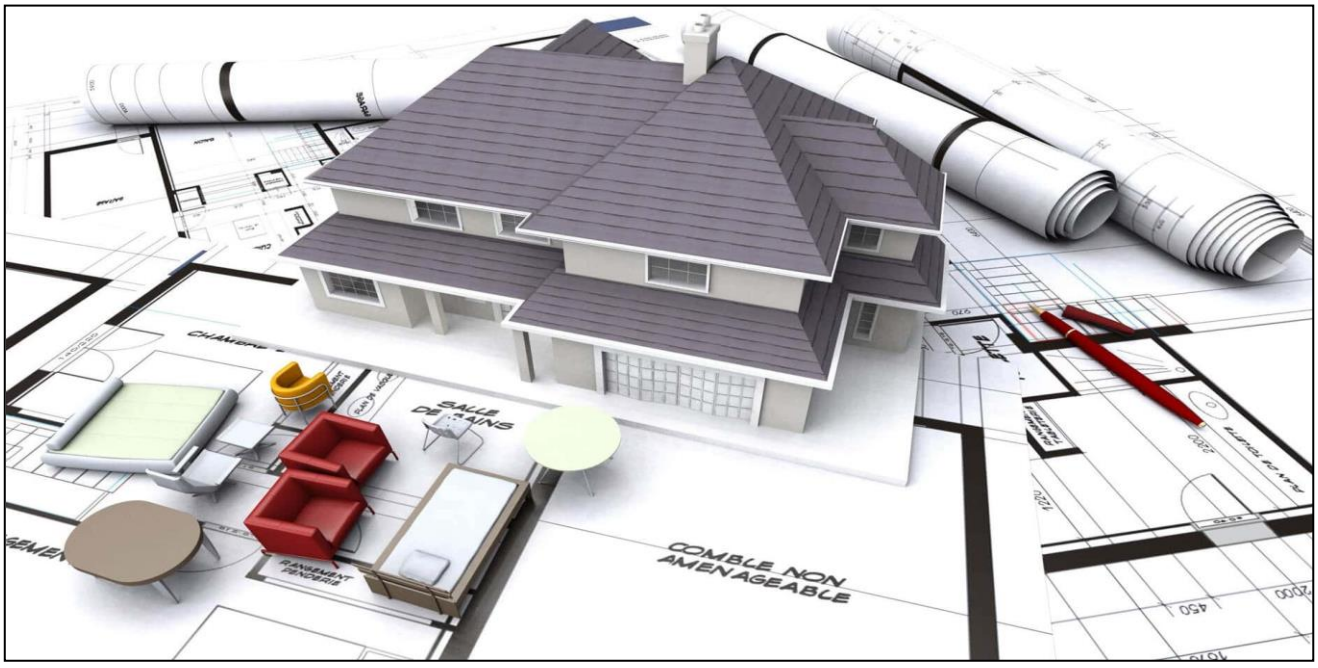
COMPETENCY BASED CURRICULUM

ARCHITECTURAL DRAUGHTSMAN

(Duration: Two Years)

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL - 4



SECTOR – CONSTRUCTION

Directorate General of Training

ARCHITECTURAL DRAUGHTSMAN

(Engineering Trade)

(Revised in March 2023)

Version: 2.0

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL - 4

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

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1. COURSE INFORMATION

During the two years duration a candidate is trained on subjects viz. Professional Skill, Professional Knowledge and Employability Skills related to job role. In addition to this a candidate is entrusted to make/do project work and Extra Curricular Activities to build up confidence. The practical skills are imparted in simple to complex manner & simultaneously theory subject is taught in the same fashion to apply cognitive knowledge while executing task. The practical part starts with Architectural symbols, simple geometrical drawing and finally ends with designing Doors, Windows, Stairs, designing of Residential / office building in CAD, 3D in sketch-up software, Working drawing, Rendering in Photoshop, Preparation of 3D model and BOQ using BIM software like Revit, etc. The broad components covered under Professional Skill subject are as below:

FIRST YEAR: The first year starts with Importance of trade training and professional prospects, Importance of safety and general precautions. The practical training starts with Free hand sketching, Lettering, basic drawing (consisting geometrical figure, Architectural symbols & representations). Later the drawing skills imparted on drawing of projections, drawing of stone and brick masonry, foundation, Carpentry Joints, Doors, Windows, Lintels, Arches. Trainees are introduced with CAD and then they are entrusted to practice drawings with CAD. Drawing of Damp proof Course (DPC), Projection of Solids in inclined positions, Section of solids, Residential building Design, Stairs, Floors and flooring, Surface Development, Final site plan with landscape are being taught in the practical. From this year trainees make drawings in CAD. Apart from practical components the trainees are being taught of History of architecture - Egyptian architecture, Greek architecture, Roman architecture and Indian architecture and related theory to practical in theory class.

SECOND YEAR: Design of single/ double storied Residential building /Post office/ farm house, project in 3D sketch up, drawing of Special doors & windows, Roof and roof coverings, final design of plans rendered with furniture layout, Final site plan with landscape elements rendered, working drawing showing all dimensions of rooms and column grids with door window schedule and details, all four elevations with floor heights, lintel heights, sill heights and details, Section through staircase or toilet with complete details in the practical and related theory to practical in theory class are being taught in this year. Project like small scale residential apartment/primary school/small office design, Joints in structure using CAD, Preparation of 3D model and BOQ using BIM software like Revit, etc. , Rendering in Photoshop, Compilation and final submission of Project work in the practical and related theory to practical, Climatic responsive design, Energy conservation, Green Architecture / sustainable architecture in theory class being taught in this year.

Professional Knowledge subject is simultaneously taught in the same fashion to apply cognitive knowledge while executing task.

2. TRAINING SYSTEM

2.1 GENERAL

The Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers a range of vocational training courses catering to the need of different sectors of the economy/ labour market. The vocational training programs are delivered under the aegis of Directorate General of Training (DGT). Craftsman Training Scheme (CTS) with variants and Apprenticeship Training Scheme (ATS) are two pioneer programs of DGT for propagating vocational training.

Architectural Draughtsman trade under CTS is one of the popular courses is delivered nationwide through network of ITIs, NVTIs and RVTIs. The course is of two years duration. It mainly consists of Domain area and Core area. The Domain area (Trade Theory & Practical) imparts professional skills and knowledge, while Core area (Employability Skills) impart requisite core skill, knowledge and life skills. After passing out the training program, the trainee is awarded National Trade Certificate (NTC) by DGT which is recognized worldwide.

Broadly candidates need to demonstrate that they are able to:

- Read & interpret technical parameters/documentation, plan and organize work processes, identify necessary materials and tools;
- Perform work with due consideration to safety rules, Govt. Bye laws and environmental protection stipulations;
- Apply professional knowledge, core skills & employability skills while performing the work.
- Produce sketches as per requirements of clients.
- Document the technical parameters related to the work undertaken.

2.2 PROGRESSION PATHWAYS

- Can join industry as Technician and will progress further as Senior Technician, Supervisor and can rise to the level of Manager.
- Can become Entrepreneur in the related field.
- Can appear in 10+2 examination through National Institute of Open Schooling (NIOS) for acquiring higher secondary certificate and can go further for General/ Technical education.
- Can take admission in diploma course in notified branches of Engineering by lateral entry.
- Can join Apprenticeship programme in different types of industries leading to National Apprenticeship certificate (NAC).

- Can join Crafts Instructor Training Scheme (CITS) in the trade for becoming instructor in ITIs.
- Can join Advanced Diploma (Vocational) courses under DGT as applicable.

2.3 COURSE STRUCTURE

Table below depicts the distribution of training hours across various course elements during a period of two years: -

S No.	Course Element	Notional Training Hours	
		1st Year	2nd Year
1	Professional Skill (Trade Practical)	840	840
2	Professional Knowledge (Trade Theory)	240	300
3	Employability Skills	120	60
	Total	**1200**	**1200**

Every year 150 hours of mandatory OJT (On the Job Training) at industry, wherever not available then group project is mandatory.

4	On the Job Training (OJT)/ Group Project	150	150
5	Optional courses (10th/ 12th class certificate along with ITI certification, or, add on short term courses)	240	240

Trainees of one-year or two-year trade can also opt for optional courses of up to 240 hours in each year for 10th/ 12th class certificate along with ITI certification or add on short term courses.

2.4 ASSESSMENT & CERTIFICATION

The trainee will be tested for his skill, knowledge and attitude during the period of course through formative assessment and at the end of the training programme through summative assessment as notified by the DGT from time to time.

a) The **Continuous Assessment** (Internal) during the period of training will be done by **Formative Assessment Method** by testing for assessment criteria listed against learning outcomes. The training institute has to maintain an individual trainee portfolio as detailed in assessment guideline. The marks of internal assessment will be as per the formative assessment template provided on www.bharatskills.gov.in

b) The final assessment will be in the form of summative assessment method. The All India Trade Test for awarding NTC will be conducted by **Controller of examinations**, DGT as per the guidelines. The pattern and marking structure are being notified by DGT from time to time. **The learning outcome and assessment criteria will be the basis for setting question papers for final assessment. The examiner during final examination will also check** the individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS REGULATION

For the purposes of determining the overall result, weightage of 100% is applied for six months and one-year duration courses and 50% weightage is applied to each examination for two years courses. The minimum pass percent for Trade Practical and Formative assessment is 60% & for all other subjects is 33%.

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 the assessment. Due consideration should be given while assessing for teamwork, avoidance/reduction of scrap/wastage and disposal of scrap/waste as per procedure, behavioral attitude, sensitivity to the 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 some of 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
- Computer based multiple choice question examination
- Practical Examination

Evidences and records of internal (Formative) assessments are to be preserved until forthcoming examination for audit and verification by examining body. The following marking pattern to be adopted for formative assessment:

Performance Level	Evidence
(a) Marks in the range of 60%-75% to be allotted during assessment	

For performance in this grade, the candidate should produce work which demonstrates attainment of an acceptable standard of craftsmanship with occasional guidance, and due regard for safety procedures and practices	• Demonstration of good skill in the use of hand tools, machine tools and workshop equipment. • 60-70% accuracy achieved while undertaking different work with those demanded by the component/job. • A fairly good level of neatness and consistency in the finish. • Occasional support in completing the project/job.
(b) Marks in the range of 75%-90% to be allotted during assessment	
For this grade, a candidate should produce work which demonstrates attainment of a reasonable standard of craftsmanship, with little guidance, and regard for safety procedures and practices	• Good skill levels in the use of hand tools, machine tools and workshop equipment. • 70-80% accuracy achieved while undertaking different work with those demanded by the component/job. • A good level of neatness and consistency in the finish. • Little support in completing the project/job.
(c) Marks in the range of more than 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% accuracy achieved while undertaking different work with those demanded by the component/job. • A high level of neatness and consistency in the finish. • Minimal or no support in completing the project.

3. JOB ROLE

Architectural Draughtsman; Prepares drawings of buildings, parks, gardens, monuments etc. from sketches, designs or data for construction. Studies notes, sketches and other engineering data of buildings, parks, gardens, monuments, etc. to be constructed. Draws sketches of required construction according to directions of Architect to suit purpose and environment; alters them if directed and get them approved by him. Draws to scale drawings according to approved sketches showing plan, elevations, settings, arrangements etc. as necessary. May trace drawing and make blueprints. May prepare architectural designs, may prepare estimate schedules for material and labour. May prepare perspectives designs and render them in colour of monochrome. May prepare model of constructions work. May work as Draughtsman Civil.

Reference NCO Code-2015: 3118.0100 - Architectural Draughtsman

Reference NOS: --

i) HCS/N0802
ii) HCS/N5202
iii) CON/N9415
iv) HCS/N9402
v) CON/N9416
vi) HCS/N9421
vii) HCS/N9422
viii) HCS/N9423
ix) HCS/N9424
x) HCS/N9425
xi) HCS/N9426
xii) CON/N9417
xiii) CON/N9426
xiv) CON/N9418
xv) CON/N9419
xvi) CON/N9420
xvii) CON/N9421
xviii) CON/N9422
xix) CON/N9423
xx) CON/N9424
xxi) CON/N9425
xxii) CSC/N9402

4. GENERAL INFORMATION

Name of the Trade	**ARCHITECTURAL DRAUGHTSMAN**
Trade Code	DGT/1071
NCO - 2015	3118.0100
NOS Covered	HCS/N0802, HCS/N5202, CON/N9415, HCS/N9402, CON/N9416, HCS/N9421, HCS/N9422, HCS/N9423, HCS/N9424, HCS/N9425, HCS/N9426, CON/N9417, CON/N9426, CON/N9418, CON/N9419, CON/N9420, CON/N9421, CON/N9422, CON/N9423, CON/N9424, CON/N9425, CSC/N9402
NSQF Level	Level-4
Duration of Craftsmen Training	Two Years (2400 hours + 300 hours OJT/Group Project)
Entry Qualification	Passed 10th class examination with Science and Mathematics or with vocational subject in same sector or its equivalent.
Minimum Age	14 years as on first day of academic session.
Eligibility for PwD	LD, CP, LC, DW, AA, LV, DEAF, AUTISM, SLD, MD
Unit Strength	24 (There is no separate provision of supernumerary seats)
Space Norms	80 sq. m
Power Norms	6 KW
Instructors Qualification for	
1. Architectural Draughtsman Trade	B.Voc/Degree in Architecture from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevant field. **OR** 03 years Diploma in Architecture from AICTE/ recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant field. **OR** NTC/NAC passed in the trade of "Architectural Draughtsman" with three years' experience in the relevant field. **<u>Essential Qualification:</u>** Relevant Regular/ RPL variants of National Craft Instructor Certificate (NCIC) under DGT. ***NOTE: - Out of two Instructors required for the unit of 2(1+1), one***

	must have Degree/Diploma and other must have NTC/NAC qualifications. However, both of them must possess NCIC in any of its variants.
2. Workshop Calculation & Science	B.Voc/Degree in Engineering from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevant field. **OR** 03 years Diploma in Engineering from AICTE / recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant field. **OR** NTC/ NAC in any one of the engineering trades with three years' experience. **Essential Qualification:** Regular / RPL variants of National Craft Instructor Certificate (NCIC) in relevant trade **OR** Regular / RPL variants NCIC in RoDA or any of its variants under DGT
3. Employability Skill	MBA/ BBA / Any Graduate/ Diploma in any discipline with Two years' experience with short term ToT Course in Employability Skills. (Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above) **OR** Existing Social Studies Instructors in ITIs with short term ToT Course in Employability.
4. Minimum Age for Instructor	21 Years
Tools and Equipment	As per Annexure-I

Note: *Institutes having centralized computer Lab may utilize the same infrastructure for computer related training. However, for institutes where such facility is not available a separate computer Lab is required.*

5. LEARNING OUTCOME

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

5.1 LEARNING OUTCOMES

FIRST YEAR

1. Draw different types of architectural symbols following safety precautions. (NOS: HCS/N0802)
2. Draw different types free hand sketches and different type of letterings. (NOS: HCS/N0802)
3. Draw different types of plane geometry. (NOS: HCS/N0802)
4. Draw orthographic projections. (NOS: HCS/N0802)
5. Draw different sizes of Bricks and Brick Masonry. (NOS: HCS/N0802)
6. Draw different types of Stone Masonry. (NOS: HCS/N0802)
7. Draw different types of Foundation. (NOS: HCS/N0802)
8. Draw different Carpentry Joints. (NOS: HCS/N0802)
9. Draw different types of Wooden Doors and Windows. (NOS: HCS/N0802)
10. Draw different types of Lintels. (NOS: HCS/N0802)
11. Draw different types of Arches. (NOS: HCS/N0802)
12. Draft in CAD. (NOS: HCS/N5202)
13. Draw details of Damp proof Course (DPC) and Water Proofing Treatment at different locations. (NOS: CON/N9415)
14. Draw plan, elevation and side view of Solids in inclined positions and Section of Solids. (NOS: HCS/N9402)
15. Illustrate design procedure of Residential Building. (NOS: CON/N9416)
16. Draw plan, elevation and section through toilet of the residential building and the site plan with landscape. (NOS: HCS/N9421)
17. Draw typical vertical section of an external wall of two storied load bearing structure and RCC framed structure. (NOS: HCS/N9422)
18. Draw Plan, elevation and Construction Details of different types of stairs. (NOS: HCS/N9423)
19. Draw different types of flooring details. (NOS: HCS/N9424)
20. Produce final project work applying advance CAD commands and File management. (NOS: HCS/N9425)
21. Surface Development of geometrical solids. (NOS: HCS/N9426)
22. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: CSC/N9402)

SECOND YEAR

23. Illustrate Design-Concept and visualization of design. Topic: Residential (single/ double storied), Post office, Farmhouse. (NOS: CON/N9417)
24. Draw sanction drawing with local authority bye laws. (NOS: CON/N9426)
25. Preliminary drawing of the Design project in AUTOCAD. (NOS: HCS/N5202)
26. Read and Interpret structural drawing. (NOS: CON/N9418)
27. Draw 3 D model by sketch up software along with rendering, walkthrough, animated view. (NOS: CON/N9419)
28. Draw details of different types of doors. (NOS: HCS/N5202)
29. Draw details of different types of windows. (NOS: HCS/N5202)
30. Draw details of roofs and roof covering. (NOS: HCS/N5202)
31. Prepare final design drawings in AUTOCAD. (NOS: HCS/N5202)
32. Draw working drawing set to the site to execution. (NOS: CON/N9420)
33. Draw the Anthropometrics & ergonomics of commercial building. (NOS: CON/N9421)
34. Draw Standard sizes of outdoor movements like swimming pool, basketball court, badminton court, play area etc. (NOS: CON/N9421)
35. Prepare design and the site plan with landscape of Residential Apartment/primary school in AUTOCAD. (NOS: HCS/N5202)
36. Draw joints in structures (viz. Details of construction joints at various positions, Details of expansion joints in walls, roof). (NOS: CON/N9422)
37. Prepare 3D model and BOQ using BIM software (REVIT ARCHITECTURE). (NOS: CON/N9423)
38. Perform rendering in Photoshop (Convert the drawings in pdf and then render it in Photoshop with necessary details). (NOS: CON/N9424)
39. Prepare Working drawing – viz. Kitchen layout, Electrical layout, Plumbing Layout, DWV details. (NOS: CON/N9425)
40. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: CSC/N9402)

6. ASSESSMENT CRITERIA

LEARNING OUTCOMES	ASSESSMENT CRITERIA
FIRST YEAR	
1. Draw different types of architectural symbols following safety precautions. (NOS: HCS/N0802)	Set and fix drawing paper on the drawing board (a) prepare Layout of drawing sheet, (b) prepare a Title block, (c) mark and fold on the designated drawing Sheet
	Draw architectural symbols for materials, doors and windows
	Draw architectural symbols for trees, plants, shrubs.
	Draw architectural symbols for plumbing fittings
	Draw architectural symbols for electrical fittings and fixtures
2. Draw different types free hand sketches and different type of letterings. (NOS: HCS/N0802)	Sketch any types of trees, plants and shrubs
	Sketch any one structure of monument.
	Draw any landscape drawing with pencil rendering.
	Sketch any objects like cube, cone, sphere, cylinder, prism, pyramid
	Perform any one structure of different composition of patterns
	Read and interpret different types of lettering commonly used in drawings.
	Draw Gothic Lettering in Freehand. (a) Sketch Roman Lettering in Freehand. (b) Draw Architectural Lettering in Freehand.
3. Draw different types of plane geometry. (NOS: HCS/N0802)	Draw a line parallel to any given point
	Perform different methods to divide a line into any equal parts
	Draw different methods of bisecting an angle, line or arc.
	Draw geometrical constructions using different methods for triangle, rectangle, square, circle, pentagon, hexagon, heptagon, octagon, ellipse.
4. Draw orthographic projection. (NOS: HCS/N0802)	Draw projections of lines in simple positions
	Draw projections of lamina in simple positions
	Draw projections of solids like cube, pyramid, prism, cone, cylinder in first angle position
	Draw projections of solids like cube, pyramid, prism, cone, cylinder in third angle position
5. Draw different sizes of	Draw isometric view of traditional brick showing frog.

Bricks and Brick Masonry. (NOS: HCS/N0802)	Drew different types of bats and closers in isometric view
	Perform drawing of English bond for one brick thick and one and half brick thick with plan, elevation and isometric view (a) Perform drawing of Flemish bond for one brick thick and one and half brick thick with plan, elevation and isometric view
	Prepare drawing for different types of bonds like zig zag bond, diagonal bond, stretcher bond, header bond, monk wall bond, herring bone bond, Dutch bond, garden all bond. Perform brick masonry with the help of tools.
6. Draw different types of Stone Masonry. (NOS: HCS/N0802)	Draw Stone & tile masonry - coursed and uncoursed rubble masonry.
	Draw random Rubble Masonry.
	Draw different types of ashlar masonry.
	Draw composite masonry with stone facing with brick, stone facing with concrete.
7. Draw different types of Foundation. (NOS: HCS/N0802)	Analyze data for creating foundation drawing of specific project.
	Sketch different types of Pile Foundation.
	Draw details of Raft Foundation.
	Perform sketch of Spread Foundation.
	Sketch grillage foundation.
8. Draw different Carpentry Joints. (NOS: HCS/N0802)	Sketch Lengthening Spliced or longitudinal Joints.
	Draw types of Bearing joint commonly used.
	Draw various types of widening or side joints.
	Draw types of Corner Joints.
	Sketch types of oblique- shouldered joints
9. Draw different types of Wooden Doors and Windows. (NOS: HCS/N0802)	Interpret the purpose and utility of doors.
	Draw details of a door frame.
	Draw details of Flush Door.
	Sketch details of Battened and ledged Door.
	Draw parts of wooden paneled door.
	Determine scope of windows in building.
	Draw details of Casement windows.
	Sketch of Louvered or Venetian Window.
	Draw details of ventilator
10. Draw different types of Lintels. (NOS: HCS/N0802)	Understand purpose of Lintels, Chajja & slabs
	Draw Wooden Lintel in place.
	Draw Brick lintel in position.

	(a) Draw Reinforced Lintel
	Draw Stone lintel.
	Draw RCC lintel in position.
11. Draw different types of Arches. (NOS: HCS/N0802)	Determine utility of Arches.
	Draw various parts of Arch with technical leveling.
	Draw a Flat Arch.
	Draw Semi-circular arch.
	Draw Segmental Arch.
	Drawing of pointed Arch.
	Draw two Centre Arch.
12. Draft in CAD. (NOS: HCS/N5202)	Understanding the basic starting procedures in CAD
	Analyzing the basic CAD commands
	Draft a plan and elevation sofa set, bed, chair, table dining, TV unit etc.
	Draft elevation of door/ window , ventilators & their sections.
	Drafting plan of interiors of bedroom/living room with all furniture layout
13. Draw details of Damp proof Course (DPC) and Water Proofing Treatment at different locations. (NOS: CON/N9415)	Identify sources of dampness in different locations.
	Identify effects of dampness. (i)Draw Damp Proof Treatment in Basement. (ii)Draw Damp Proof Treatment in Plinth Level / Ground Floors. (iii)Draw Damp Proof Treatment in Upper Floors. (iv)Draw Damp Proof Treatment in cavity wall.
	Discover sources of water seepage in roof.
	Identify effects of water seepage.
	Draw detail of water proofing treatment at roof using PCC.
	Draw detail of water proofing treatment at roof using bitumen.
14. Draw plan, elevation and side view of Solids in inclined positions and Section of Solids. (NOS: HCS/N9402)	Draw plan, elevation and side elevation of inclined solids cube.
	Draw plan, elevation and side elevation of inclined solids pyramid.
	Draw plan, elevation and side elevation of inclined solids prism.
	Draw plan, elevation and side elevation of inclined solids cone.
	Draw plan, elevation and side elevation of inclined solids cylinder.
	Check the drawings to confirm their correctness.
	Draw sectional plan, elevation and side elevation of solids/ inclined solids cutting by a horizontal section plane.
	Draw sectional plan, elevation and side elevation of solids/ inclined

	solids cutting by a vertical section plane.
	Draw sectional plan, elevation and side elevation of solids/inclined solids cutting by a section plane inclined to HP
	Draw sectional plan, elevation and side elevation of solids/ inclined solids cutting by a section plane inclined to VP.
	Draw the true shape of the cutting surface.
15. Illustrate design procedure of Residential Building. (NOS: CON/N9416)	Illustrate Client's requirements.
	Analyze the physical condition of proposed site.
	Analyze the environmental condition of proposed site.
	Follow the Building Byelaws according to local administration.
	Analyze design Principles of a residential Building.
	Determine Circulation space in building.
	Identify the Entry and Exit requirements of Residential Building.
	Analyze requirement of Car Parking.
	Check the drawings to confirm their correctness.
	Calculate estimated cost.
16. Draw plan, elevation and section through toilet of the residential building and the site plan with landscape. (NOS: HCS/N9421)	Analyze the requirement of no. of bedroom of the Residential Buildings.
	Analyze the requirement of area/ type of drawing and dining hall.
	Analyze the requirement of no. and area of toilet.
	Analyze the requirement of area and type of kitchen.
	Analyze the requirement of area and location of verandah.
	Draw ground Floor Plan of a single storied Residential Building.
	Draw roof Plan of the Residential Building.
	Draw front and side elevation of the Residential Building.
	Draw section through entrance, balcony, toilet, doors and windows of the Residential Building.
	Check the drawings to confirm their correctness.
17. Draw typical vertical section of an external wall of two storied load bearing structure and RCC framed structure. (NOS: HCS/N9422)	Draw typical vertical section of an external wall of two storied load bearing structure.
	Draw typical vertical section of an external wall of two storied RCC framed structure.
	Check the drawings to confirm their correctness.
18. Draw Plan, elevation and Construction	Draw plan and section of a straight stair.
	Draw plan and section of an open well stair.

Details of different types of stairs. (NOS: HCS/N9423)	Draw plan and section of a quarter turn stair.
	Draw plan and section of a bifurcated stair
	Draw plan and section of a circular stair.
	Draw detailed part section of a stair showing its various components.
	Draw detailed part section of a wooden stair.
	Draw detailed plan and section of a dog legged RCC stair.
	Draw plan and section MS. spiral stair.
	Check the drawings to confirm their correctness.
19. Draw different types of flooring details. (NOS: HCS/N9424)	Draw Flooring details of Ground Floor over PCC floor slab using different floor finish material.
	Draw Flooring details of Basement Floor over RCC Basement Slab using different floor finish material.
	Draw flooring details of RCC Upper Floor using different floor finish material.
	Draw flooring details of wooden suspended Floor using different floor suitable finish material.
	Draw flooring details of wooden double Floor using different floor suitable finish material.
20. Produce final project work applying advance CAD commands and File management. (NOS: HCS/N9425)	Application of advance CAD commands e.g. layers, block, insert, group, divide, measure, design center, text gradient, dimension style, leader, layouts, model space view ports.
	Determine the location of the drawing files to be saved.
	Draft all Final Floor Plans of the Residential Building in AUTO CAD.
	Draft Front Elevation and one side elevation of building.
	Draw two numbers of Through Sections showing Staircase, Toilet, Kitchen Balcony, Habitable room and Car Parking in AUTO CAD.
	Site Plan with rendering.
	Draw Key/ Location Plan.
	Check the drawings to confirm their correctness.
21. Surface Development of geometrical solids. (NOS: HCS/N9426)	Develop surface of different prisms and pyramids in simple position cutting by horizontal plane.
	Develop surface of different prisms and pyramids in simple position cutting by vertical plane.
	Develop surface of different prisms and pyramids in simple position cutting by plane inclined to HP.
	Develop surface of different prisms and pyramids in simple position cutting by a plane inclined to VP.
	Develop surface of different prisms and pyramids inclined to VP

	cutting by horizontal plane.
	Develop surface of different prisms and pyramids inclined to VP simple position cutting by vertical plane.
22. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: CSC/N9402)	Solve different mathematical problems
	Explain concept of basic science related to the field of study
SECOND YEAR	
23. Illustrate Design-Concept and visualization of design. Topic: Residential (single/double storied) Post office, Farmhouse. (NOS: CON/N9417)	Make Bubble diagram showing the through circulated areas one way, two way.
	Elements of schematic drawing. Its standard sizes and area required around for movement
	Follow the Building Byelaws according to local administration.
	Analyze requirement of Car Parking.
	Presentation drawing show the details of furniture layout, entrance exit, north point, split levels, built-up area, carpet area, common area.
24. Draw sanction drawing with local authority bye laws. (NOS: CON/N9426)	Draw sanction drawing showing floor plans site plan, location plan, plumbing details, rainwater harvest, schedule of areas, schedule of openings, architects' signature, client signature, north point.
	Check the drawings to confirm their correctness.
25. Preliminary drawing of the Design project in AUTOCAD. (NOS: HCS/N5202)	Draw ground Floor Plan of a single storied Residential Building.
	Draw typical floor plan with staircase
	Draw roof Plan of the Residential Building.
	Draw front and side elevation of the Residential Building.
	Draw section through entrance, balcony, toilet, doors and windows of the Residential Building.
	Draw enlarged details at roof terrace.
	Draw rendered site plan with landscape.
	Check the drawings to confirm their correctness.
26. Read and Interpret structural drawing.	Draw R.C.C roof one-way slab in plan.
	Draw one-way slab section

(NOS: CON/N9418)	Draw two-way slab, section.
	Draw single reinforced beam
	Draw double reinforced beam.
	Illustrate column foundation plan, section detail.
	Prepare stairs waist slab reinforcement details.
27. Draw 3 D model by sketch up software along with rendering, walkthrough animated view. (NOS: CON/N9419)	Draw 3D animated view with help of sketch up software
	Project submission with sky, trees presentation. (a) Import drawing from Auto CAD. (b) Tools. click drag-release (c) Extrude (push/pull), grouping, layers, arc-2 point, shapes – rectangle, move, orbit, zoom, pan (d) Auto fold, offset, make component, copy array (e) Solid tools, paint bucket, follow me. mirror scale, rotate (f) Sand box—terrain, smoove, drape, add detail, from contour, from scratch, shadow, fog, f lip edge, explode. (g) Camera, walkthrough, animated view by setting time. (h) View, axes, text light effects—omni, spot, sphere, less light, print option, hide/unhide classifier, intersect faces.
28. Draw details of different types of doors. (NOS: HCS/N5202)	Discover special doors as per special requirement,
	Draw details of revolving door.
	Draw details of sliding door.
	Draw details of louvered door/puja door.
	Identify the metal doors as per design.
	Draw details of rolling steel shutter.
	Draw details of aluminium swing door.
	Draw collapsible door, M.S door,
29. Draw details of different types of windows. (NOS: HCS/N5202)	Discover special windows
	Draw bay window.
	Draw details of dormer window, sky light.
	Draw aluminium sliding windows.
	Draw UPVC windows.
	Draw CRCA sheets/pressed steel windows.
30. Draw details of roofs and roof covering. (NOS: HCS/N5202)	Draw details of lean-to roof.
	Draw couple roof.
	Draw king post truss with details and technical terms.
	Draw queen post truss.
	Determine roof covering materials.

	Method of fixing AC/GI sheets to different types of purlins
	Method of fixing mangalore tiles.
31. Prepare final design drawings in AUTOCAD. (NOS: HCS/N5202)	Draft all Final Floor Plans of the Residential Building in AUTO CAD.
	Draft Front Elevation and one side elevation of building.
	Draw two numbers of through Sections showing Staircase, Toilet, Kitchen Balcony, Habitable room and Car Parking in AUTO CAD.
	Check the drawings to confirm their correctness.
32. Draw working drawing set to the site to execution. (NOS: CON/N9420)	After friezing /finalizing scheme drawing with column position Centerline drawing with beam c/c dimensions.
	Draw detailed column footing with dimension.
	Draw Ground Floor Plan with Door Window schedule, l split levels with dimension.
	Draw First Floor Plan with Staircase design.
	Draw elevations in 1:50 scale.
	Draw detailed section through staircase, floor heights, lintel, sill heights.
	Draw enlarged stair design along with railing, balcony railing
	Draw compound wall detail.
33. Draw the Anthropometrics & ergonomics of commercial building. (NOS: CON/N9421)	Draw the Furniture design, its standard sizes and area required around for movement and height of Office Layout
	sketch the office lay out for 50 number staff
	Draw the office cabin for Managing Director.
	Draw the reception lay out.
	Draw the working area lay out.
	Check the drawings to confirm their correctness.
34. Draw Standard sizes of outdoor movements like swimming pool, basketball court, badminton court, play area etc. (NOS: CON/N9421)	Analyze data for creating swimming pool and draw the layout of swimming pool along with safety measurements.
	Draw the basketball court / badminton court.
	Sketch the layout, the play area of primary school.
	Check the drawings to confirm their correctness.
35. Prepare design and site plan with landscape of	Read and interpret design data after analyzing the requirement and area analysis.
	Illustrate Client's requirements. sketch the bubble diagram.

Residential Apartment/ primary school in AUTOCAD. (NOS: HCS/N5202)	Identify the Entry and Exit requirements of Residential Building.
	Analyze requirement of Car Parking. Draw stilt /basement/car parking detailed drawing along with drainage, plumbing, water purification tanks. Determine Circulation space and draw detailed drawing of floor plans of building.
	Check the drawings to confirm their correctness.
	Sketch the four side elevations.
	Draw section through staircase and toilet.
	Draw site plan with landscape layout.
36. Draw joints in structures (viz. Details of construction joints at various positions, Details of expansion joints in walls, roof). (NOS: CON/N9422)	Location of construction joints for different members. (a)Draw construction joint installation at slabs, columns beams and walls after the day work.
	Illustrate with neat sketches of provision of joints in the following components of reservoir. (a) Draw details at junction between wall and floor. (b) Draw details of construction joint in the floor of reservoir.
	Draw details of different types of joints in structure. (a) Isolation joint in detail (b)Contraction joint, Dummy joint. (C) Sliding joint,
	Draw plan showing location of contraction, expansion and isolation joints.
	Illustrate Expansion joints in walls and roofs, spacing of expansion joints, materials used in expansion joints brick masonry (a) Draw plan showing location of expansion joint between two building blocks. (b)section 'x-x' detail and enlarged detail at walls, roof, foundation of brick masonry walls (c) Draw plan showing expansion joint in verandah slab with blown up details
	Draw detailed layout of provision of expansion joint in framed structure at (a) Roof level (b) First floor level (c) Foundation level
	Check the drawings to confirm their correctness.
37. Prepare 3D model and BOQ using BIM	Create 3D model from 2D plan.
	Interpret the basic starting procedure like installation, Unit

software (REVIT ARCHITECTURE). (NOS: CON/N9423)	conversion etc.
	Explore the User Interface: Menu Bar and Toolbars, Options Bar, Type Selector, Properties Button, Design Bar, Project Browser, Status Bar, View Control Bar, Drawing Area etc.
	Place and modify walls
	Complex walls
	Draw scheme in revit architecture (Creating 3D model from 2D plane) (a) Place Door window and components with dimension and constraints. (b) Create floors and Roof & ceilings (C) Curtain walls (d) Stairs Structural elements (f) Massing and site (Splitting, merging, topo surface etc.), and conceptual models (g) Family creation (Doors & Windows, staircase, furniture etc.)
	Creating and Documenting the Project: Create and name a project in which you will create the building model. (a) Add tags to the project and schedule doors and rooms. (b) Create a colour scheme of the drawings with colours fill & Color Scheme Legend (C) Import and Export (Auto CAD files) (d) Manage Views (Plan region, plan view, ceiling plan, area plan & structural plan, Callout views) (e) Sections (f) Design options
	Generate surfaces and apply material to the model: Generate 3D model from 2D plan and apply material Decals
	Create Lighting, Camera view and rendering: (a) Render drawing. (b) place Camera & Lightings (C) Solar study and Walkthrough
	Prepare bill of Quantity : (a) Calculate Quantity of materials Prepare Schedule (Bill of materials, Quantities etc.)
38. Perform rendering in Photoshop (Convert the drawings in pdf and then render it in photoshop with	Convert the floor plans in pdf and then render the drawing in photoshop with necessary details.
	Identify the basic features of Photoshop: Getting Started, Interface Layout, Palettes, Toolbox, Selection Tools, Alteration Tools, Drawing and Selection Tools, Assisting Tools, Color Boxes and Modes, Basic

necessary details). (NOS: CON/N9424)	Image Editing and Saving.
	Import PDF Floor plans and render it with colours, textures and necessary details.
	Import an architectural elevation, section drawings and render in Photoshop.
	Complete the 3D view of a building with graphical representations (Sky, Trees, Human, Automobiles etc.)
39. Prepare Working drawing: Kitchen layout, Electrical layout, Plumbing Layout, DWV details. (NOS: CON/N9425)	Draw kitchen layout details: include plan, section and all side elevations with proper dimensions and material specification.
	Draw the electrical layout of a working drawing floor plan with the proper symbols, dimensions, and notations.
	Draw Plumbing Layout drawing, shows the system of piping for fresh water going into the building and waste going out, water supply system, drainage system, Legends, Notes. Fixture units also should be marked along with the pipe. Pipes with different purposes will be displayed with different colors for ease of understanding. Drainage pipes should be shown with slope, manhole schedule which consist of each manhole name, Depth etc.
	Draw the plan and elevation of DWV details with the specification, location and schedules of the openings.
40. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: CSC/N9402)	Solve different mathematical problems
	Explain concept of basic science related to the field of study

7. TRADE SYLLABUS

SYLLABUS FOR ARCHITECTURAL DRAUGHTSMAN TRADE			
FIRST YEAR			
Duration	**Reference Learning Outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
Professional Skill 26 Hrs.; Professional Knowledge 06 Hrs.	Draw different types of architectural symbols following safety precautions.	**Familiarization** 1. Importance of safety and general precautions observed in the institute and in the section. 2. Importance of the trade in the development of the country's infrastructure. 3. Recreational, medical facilities and other extracurricular activities of the institute. 4. All necessary guidance to be provided to the new comers to become familiar, with the working of training institute.	**Orientation** Familiarization with the institute Importance of trade training Introduction to the trade and professional prospects Orientation of subjects Familiarization with engineering drawing, tools and equipment.
		Architectural symbols 5. Architectural symbol for materials, doors, windows. 6. Architectural symbols for trees, plants, shrubs. 7. Architectural symbols for plumbing and electrical fittings and fixtures.	**Architectural Symbols** Architectural signs and symbols and their uses in the drawings
Professional Skill 28 Hrs.; Professional Knowledge 06 Hrs.	Draw different types free hand sketches and different type of letterings.	**Sketching** 8. Free hand sketching of trees, plants and shrubs. 9. Free hand sketching of landscape and monuments. 10. Free hand sketching of objects. 11. Lettering – types of	**Sketching techniques** Elements of drafting, readability, clarity, accuracy and neatness Pencil grades Method of pencil uses Uses of different brush strokes

		lettering, legibility, uniformity. 12. Purpose and uses of lines, curves, line weight, types of lines.	Various types of lines used for sketching
Professional Skill 17 Hrs.; Professional Knowledge 02 Hrs.	Draw different types of plane geometry.	**Plane geometry** 13. Draw a line parallel to any given point. 14. Divide a line into any number of equal parts different methods. 15. Bisect a line, arc or angle. 16. Geometrical constructions using different method – square, pentagon, triangle, hexagon, heptagon, octagon, ellipse. **Dimensioning** 17. Basic system of measurement, dimensional control, location, dimensioning of different objects like lines, circle, curves and angles Scale and proportion.	**Solids** Definition of solids – cube, square prism, hexagonal prism, triangular prism, square prism, triangular pyramid, hexagonal pyramid, pentagonal pyramid, cylinder, sphere, cone.
Professional Skill 92 Hrs.; Professional Knowledge 10 Hrs.	Draw orthographic projections.	**Introduction to orthographic projections** 18. Types of projections. 19. Projection planes. 20. First angle projection. 21. Third angle projection. 22. Method of drawing orthographic projections. Projections of lines and lamina 23. Projections of lines in simple position. 24. Projection of lamina in simple position. Projection of solids in simple positions 25. Drawing plan, elevation and side elevation of simple	**Types of projections** Types of projections Projection planes First angle projection Third angle projection **Isometric view** Isometric view of geometrical solids

		solids like cube, pyramid, prism, cone, cylinder in first angle projection. 26. Drawing projection of solids in third angle projection in simple positions.	
Professional Skill 50 Hrs.; Professional Knowledge 12 Hrs.	Draw different sizes of Bricks and Brick Masonry.	**Brick masonry** 27. Sizes of brick and brick bats. 28. English and Flemish bond for one brick thick and one and half brick thick wall. 29. Different types of bonds (zig zag bond, diagonal bond, stretcher bond, header bond, monk wall bond, herring bone bond, Dutch bond, garden wall bond). Brick laying with the help of tools /infrastructure. Setting out & measurement, cutting & construction, joint finishing & presentation.	**Brick masonry** Technical terms, Sizes of brick and brick tiles, Principle of brick masonry construction, English and Flemish bond for one brick thick and one and half brick thick wall, Different types of bonds and their uses in construction, Hollow brick masonry, AAC Block, Fly-ash brick, brick laying, understanding brick laying, pattern designs. Interpretation of drawings, setting out and measurement, construction, joint finishing & presentation.
Professional Skill 22 Hrs.; Professional Knowledge 06 Hrs.	Draw different types of Stone Masonry.	**Stone masonry, tile masonry** 30. Setting and measurement Cutting, preparations, fix, cleaning 31. Coursed and uncoursed rubble masonry. 32. Random rubble masonry. 33. Ashlar masonry. 34. Composite masonry (stone facing with brick backing, stone facing with concrete backing, stone facing with rubble backing).	**Stone masonry, tile masonry** Wall & floor filing Produce and interpret drawing, setting out & measurement, preparations, fix Technical terms Principles of stone masonry Rubble masonry Ashlar masonry Composite masonry
Professional Skill 22 Hrs.; Professional	Draw different types of Foundation.	**Foundation with column** 35. Types of foundation – spread foundation, grillage foundation, pile foundation,	**Foundation with column** Purpose of foundation Causes of failure of foundation Types of

Knowledge 10 Hrs.		raft or mat foundation.	foundation – spread foundation, grillage foundation, pile foundation, raft or mat foundation
Professional Skill 22 Hrs.; Professional Knowledge 06 Hrs.	Draw different Carpentry Joints.	**Carpentry Joints** 36. Lengthening spliced or longitudinal joints. 37. Bearing joints. 38. Framing joints. 39. Angle or corner joints. 40. Widening or side joints. 41. Oblique-shouldered joints.	**Carpentry Joints** Technical terms Lengthening joints and their uses Bearing joints and their uses Framing joints and their uses Angle or corner joints and their uses Widening or side joints and their uses Oblique-shouldered joints and their uses
Professional Skill 48 Hrs.; Professional Knowledge 12 Hrs.	Draw different types of Wooden Doors and Windows.	**Doors** 42. Details of paneled door, flush door, batten and ledged door. **Windows** 43. Details of casement window, louvered window, ventilator.	**Doors** Standard Sizes of doors Types of doors - paneled door, flush door, batten and ledged door **Windows** Standard Sizes of windows Details of casement window, louvered window, ventilator Fixtures and fasteners Types of joints (used in doors and windows)
Professional Skill 10 Hrs.; Professional Knowledge 02 Hrs.	Draw different types of Lintels.	**Lintels/slab lintels** 44. Details of Wooden lintel, stone lintel, brick lintel, steel lintel, RCC lintel, Chajjas.	**Lintels/ slab lintels** Purpose of lintel Types and uses of lintels – wooden lintel, stone lintel, brick lintel, steel lintel, RCC lintel, Chajjas
Professional Skill 17 Hrs.; Professional Knowledge 06 Hrs.	Draw different types of Arches.	**Arches** 45. Details of semicircular arch, flat arch, segmental arch, pointed arch, two centered arch.	**Arches** Technical terms Materials used for construction of arches Types of arches and their uses – flat arch, semicircular arch, segmental arch, semi elliptical arch, two centered

			arch, three centered arch.
Professional Skill 84 Hrs.; Professional Knowledge 21 Hrs.	Draft in CAD.	**CAD** 46. Introduction to CAD. 47. Starting procedures of CAD – screen appearance, tool bar, menu bar, quick access tool bar, command tool bar, units, settings, dimensioning. 48. Basic CAD drafting commands - 1 – line, circle, arc, ellipse, copy, move, rotate, erase, undo, mirror, offset, fillet, polygon, trim, extend, explode. 49. Basic CAD commands 2 – rectangle, array, scale, stretch, break, join, chamfer, spline, colors, line type, line weight, properties, match properties, hatch. 50. Draft a plan and elevation of a sofa set, bed, chair, table, dining, TV unit etc using basic CAD Commands 51. Draft door/windows and ventilators in detailed section (frame panel fixing etc.) 52. Draft interiors of bed room/living room using basic CAD commands.	**Commands. (22hrs Factors considered in architectural design)** **Introduction to CAD** Understanding the basic elements of design like point, line, plane, figure, form and space, light and color, texture.
Professional Skill 46 Hrs.; Professional Knowledge 08 Hrs.	Draw plan, elevation and side view of Solids in inclined positions and Section of Solids.	**Projection of Solids in inclined positions in AutoCAD** 53. Drawing plan, elevation and side elevation of inclined solids like cube, pyramid, prism, cone, cylinder in first angle projections. **Section of solids**	Introduction to model space view port in auto CAD

		54. Drawing projection of solids in different section plane.	
Professional Skill 84 Hrs.; Professional Knowledge 18 Hrs.	Draw Plan, elevation and Construction Details of different types of stairs.	**Stairs** 55. Plan and elevation of different types of stairs – straight stairs, quarter turn stairs, open well stairs, bifurcated stairs, circular stairs. 56. Construction Details of dog-legged stairs, baluster details, railing, nosing, tread and riser calculation. 57. Details of wooden stairs. 58. Details of MS spiral stairs.	**Stairs** Technical terms General dimensions and arrangements Requirements of good stairs Ashlar masonry Classification of stairs – straight flight stairs, dog legged stairs, newel stairs, open well stairs, geometrical stairs, circular stairs, bifurcated stairs, spiral stairs, stairs of different materials – wooden stairs, stone stairs, metal stairs, reinforced concrete stairs
Professional Skill 25 Hrs.; Professional Knowledge 08Hrs.	Draw different types of flooring details.	**Floors and flooring** 59. Components of ground floor. 60. Details of cement flooring. 61. Details of stone / tile flooring. 62. Details of wooden suspended flooring. 63. Details of wooden double floor.	**Floors and flooring** Components of floor – sub floor, floor covering, construction of ground floor, selection of floorings Suspended floors Floor coverings Ground and basement floor
Professional Skill (44 Hrs) Professional Knowledge	Illustrate design procedure of Residential Building.	**Introduction to design** 64. Design topic – Residential. 65. Concept and visualization of design. (Students should be able to understand the process of designing and the design project will go throughout the year) Initial sketches/preliminary drawings manually. Sketches of the plan.	Design principles – balance, proportion, perspective, movement, rhythm, harmony, unity, symmetry and contrast

Professional Skill 40 Hrs.; Professional Knowledge 12 Hrs.	Draw plan, elevation and section through toilet of the residential building and the site plan with landscape.	**Preliminary drawing** 66. Drawing to be prepared by trainees in AUTOCAD based on single floor residential building after analyzing the requirement and area analysis. 67. Front elevation and one side elevation. 68. Section through staircase or toilet. 69. Site plan with landscaping.	Conceptual design ideas – site analysis, site planning, requirements, space designation, proportionately defined rooms, single line diagram, floor plan analysis, functional planning.
Professional Skill 34 Hrs.; Professional Knowledge 18 Hrs	Draw details of Damp proof Course (DPC) and Water Proofing Treatment at different locations.	**Damp proof Course (DPC)** 70. Details at plinth level. 71. Details at terrace level (Water Proofing Treatment). 72. Details at basement level. 73. Details of cavity wall.	**Damp proof Course (DPC)** Definition Sources of dampness Prevention methods of dampness – integral treatment, surface treatment, membrane damp proofing, cavity wall construction Materials used in DPC – mastic asphalt, hot laid bitumen, metal sheets, PCC etc. **Anti-termite treatment** Types of Anti termite treatment a)Treatment to basement in ordinary soil b)Treatment to basement in damp soil
Professional Skill 08 Hrs.; Professional Knowledge 02 Hrs.	Draw typical vertical section of an external wall of two storied load bearing structure and RCC framed structure.	Draft in AutoCAD 74. Load bearing wall. 75. RCC framed structure.	Pre-fabricated panels RCC, GI Powder coated steel panels.
Professional Skill 111	Produce final project work	**CAD** 76. Advance CAD commands –	**Indian architecture** Stupas and its characteristic

Hrs.; Professional Knowledge 15 Hrs.	applying advance CAD commands and File management.	layers, block, insert, group, divide, measure, design center, text gradient, dimension style, leader, layouts, model space view ports, File management. **Final design** 77. Final floor plans showing living room, kitchen, bedrooms, toilet, logical order from the main entrance, basic area with furniture, garage and driveway, pedestrian ways, levels, north line, section line, scale, dwv schedule, statement of area etc. 78. Front elevation with all heights and levels mentioned. 79. One side elevation with all heights and levels mentioned 80. Detailed section through staircase/ toilet with all heights and levels mentioned. (All presentation drawing to be submitted as project spiral binding). 81. Final site plan with landscape elements. **Note**: design elements to keep in consideration while designing the elevations	features and typical examples Typical Buddhist column or order Northern Indian style elements and characteristic features (lingaraja temple at Orissa, sun temple at konark, temple of khajuraho **History of architecture (HOA)** **Egyptian architecture** Characteristic features of Egyptian architecture Tombs mastaba pyramid – the great pyramid at cheops at giza the great sphinx of chephren **Greek architecture** Greek columns like doric order, ionic order, corianthan order Characteristic features of the temple of Parthenon at Athens, Olympia stadium at athens.
Professional Skill 10 Hrs.; Professional Knowledge 14 Hrs.	Surface Development of geometrical solids.	**Surface Development** 82. Developing surface Development of solids.	**Roman architecture** Characteristic features of the temples of Saturn at rome, the pantheon at Athens, basilica of Trajan at rome.

		(**Note**: subject of drawing, scale, date, job no, address, ph.no, north – south direction, sheet no. to be mentioned in all the sheets. Drawing produced should be well readable and self-explanatory.)	**Indian architecture** Stupas and its characteristic features and typical examples Typical Buddhist column or order Northern Indian style elements and characteristic features (Lingaraja temple at Orissa, sun temple at Konark, temple of Khajuraho) Central Hindu style elements and characteristic features (rock cut temples at Badami and Humpi, Hoysaleswar temple at halebid) South Hindu or Dravidian style elements and characteristic features (shore temple at Mahabalipuram, Brihadesvar temple at Tanjavur, temple of Madurai)
WORKSHOP CALCULATION & SCIENCE: (40 Hrs)			
Professional Knowledge WCS- 40 Hrs.	Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study.	**<u>WORKSHOP CALCULATION & SCIENCE:</u>** **Unit, Fractions** Classification of unit system Fundamental and Derived units F.P.S, C.G.S, M.K.S and SI units Measurement units and conversion Factors, HCF, LCM and problems Fractions - Addition, substraction, multiplication & division Decimal fractions - Addition, subtraction, multiplication & division Solving problems by using calculator **Square root, Ratio and Proportions, Percentage** Square and square root Simple problems using calculator Applications of Pythagoras theorem and related problems Ratio and proportion Ratio and proportion - Direct and indirect proportions Percentage Percentage - Changing percentage to decimal and fraction **Material Science** Types metals, types of ferrous and non-ferrous metals	

		Physical and mechanical properties of metals Introduction of iron and cast iron Difference between iron & steel, alloy steel and carbon steel Properties and timber **Mass, Weight, Volume and Density** Mass, volume, density, weight and specific gravity **Heat & Temperature and Pressure** Concept of heat and temperature, effects of heat, difference between heat and temperature, boiling point & melting point of different metals and non-metals Scales of temperature, Celsius, Fahrenheit, kelvin and conversion between scales of temperature Heat &Temperature - Temperature measuring instruments, types of thermometer, pyrometer and transmission of heat - Conduction, convection and radiation Co-efficient of linear expansion and related problems with assignments **Mensuration** Area and perimeter of square, rectangle and parallelogram Area and perimeter of Triangles Area and perimeter of circle, semi-circle, circular ring, sector of circle, hexagon and ellipse Surface area and volume of solids - cube, cuboid, cylinder, sphere and hollow cylinder Finding the lateral surface area, total surface area and capacity in liters of hexagonal, conical and cylindrical shaped vessels **Trigonometry** Measurement of angles Trigonometrical ratios Trigonometrical tables Application in calculating height and distance (Simple applications)
Project work / site visit • Project work on a single floor residence with furniture layout – plan, elevation and section (single line diagram to be made available) • Site visit to any of the construction site / study tour to historical monuments to observe the details		

SYLLABUS FOR ARCHITECTURAL DRAUGHTSMAN TRADE			
SECOND YEAR			
Duration	**Reference Learning Outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
Professional Skill 40 Hrs.; Professional Knowledge 12 Hrs.	Illustrate Design-Concept and visualization of design. Topic: Residential (single/double storied), Post office, Farmhouse.	**Introduction to design** 83. Design topic Residential nursing home/Post office/ farm house. Case study of similar project to be done. A complete project report also to be submitted. 84. Concept and visualization of design. (Students should be able to understand the process of designing and the design project will go throughout the year.)	**Factors considered in architectural design** Approaches to planning Open planning Closed planning
Professional Skill 46 Hrs.; Professional Knowledge 12 Hrs.	Preliminary drawing of the Design project in AUTOCAD.	**Preliminary drawing** 85. Drawing to be prepared by trainees in AUTOCAD based on design project after analyzing the requirement and area analysis. 86. Initial sketches/preliminary drawings manually. 87. Sketches of the plan. 88. Front elevation and one side elevation. 89. Section through staircase or toilet. 90. Site plan with landscaping.	**Environmental factors considered in architectural design** Orientation of building Effects of wind Window positioning Space designation Proportionately defined rooms.
Professional Skill 40 Hrs.;	Draw sanction drawing with local	**Case study** 91. Draft sanction drawing of	**Factors considered in architectural design**

Professional Knowledge 12 Hrs.	authority bye laws.	any chosen design of 83 in AutoCAD.	Circulation – horizontal circulation, through circulation, vertical circulation, open court circulation.
Professional Skill 15 Hrs.; Professional Knowledge 06 Hrs.	Read and Interpret structural drawing.	92. RCC slab details 93. Column foundation	Reading and interpretation of structural drawing. One way slab, two way slab. Single reinforced beam. Double reinforced beam. Column foundation. Stair case Waist slab.
Professional Skill 100 Hrs.; Professional Knowledge 14 Hrs.	Draw 3D model by sketch up software along with rendering, walkthrough, animated view.	**Introduction to 3D in sketch-up software** 94. Setup, new document, open, save and close 95. Styles colors and materials 96. Layers 97. Practice or project in sketch up 98. Walk through in AutoCAD	Introduction of sketch up software and its installation
Professional Skill 20 Hrs.; Professional Knowledge 12 Hrs.	Draw details of different types of doors.	**Special doors in AutoCAD** 99. Details of revolving doors. 100. Details of sliding doors. 101. Details of metal doors. 102. Details of rolling steel shutter doors or rolling grill doors.	**Special doors** Louvered doors, collapsible doors, rolling steel shutter door, revolving door, sliding door, metal doors
Professional Skill 20 Hrs.; Professional Knowledge 12 Hrs.	Draw details of different types of windows.	**Special windows in AutoCAD** 103. Details of sliding windows. 104. Details of metal windows. 105. Details of bay windows. 106. Details of UPVC windows. 107. CRCA sheets / Pressed steel windows.	**Special windows** Bay windows, dormer windows, sliding windows, metal windows
Professional	Draw details of	**Roof and roof coverings in**	**Roof and roof coverings**

Skill 44 Hrs.; Professional Knowledge 12 Hrs.	roofs and roof covering.	**auto CAD** 108. Details of lean-to roof. 109. Details of couple or span roof. 110. Details of king post truss. 111. Details of queen post truss. 112. Methods of laying and fixing AC sheets to different types of purlins.	Technical terms Classification of pitched roof – lean to roof, couple roof, closed couple roof, collar roof, scissor roof, king post truss, queen post truss
Professional Skill 51Hrs.; Professional Knowledge 12 Hrs.	Prepare final design drawings in AUTOCAD.	**Final design** 113. All floor plans rendered with furniture layout. 114. Front elevation and one side elevation rendered. 115. Section through stairs/toilet rendered 116. Final site plan with landscape elements rendered. (**Note**: subject of drawing, scale, date, job no, address, ph.no, north, sheet no. to be mentioned in all the sheets. Drawing produced should be well readable and self-explanatory)	Roof covering materials – wooden shingles, asbestos cement sheets, galvanized corrugated iron sheets, asphaltic roofing sheets
Professional Skill 40 Hrs.; Professional Knowledge 16 Hrs.	Draw working drawing set to the site to execution.	**Working drawing in auto cad** 117. All floor plans working drawing showing all dimensions of rooms and column grids with door window schedule and details if any. 118. All four elevations with floor heights, lintel heights, sill heights and details if any. 119. Section through staircase or toilet with complete details.	Introduction to working drawing and sample drawing study
Professional	Draw the	**Case study**	**Case study**

Skill 28 Hrs.; Professional Knowledge 24 Hrs.	Anthropometrics & ergonomics of commercial building. Draw Standard sizes of outdoor movements like swimming pool, basketball court, badminton court, play area etc.	120. Case study of project like small scale residential apartment/primary school/small office design for 50 people to be done. **Anthropometrics of commercial building** Furniture layout, its standard sizes and area required around for movement and height (office layout, reception layout, cabin layout, swimming) 121. Standard sizes of outdoor recreational activites like swimming pool, basketball court, badminton court, play area etc.	A complete project report also to be submitted with all plans and photographs and details of the given project Anthropometry study w r t Building design
Professional Skill 84 Hrs.; Professional Knowledge 24 Hrs.	Prepare design and the site plan with landscape of Residential Apartment/ primary school in AUTOCAD.	**Preliminary drawing** 122. Drawing to be prepared by trainees in AUTOCAD based on design project after analyzing the requirement and area analysis. 123. Initial sketches/preliminary drawings manually. 124. Sketches of the plan. 125. Front elevation and one side elevation. 126. Section through staircase or toilet. 127. Site plan with landscaping.	**Climatic responsive design** Study of climates in India Sun path diagram and orientation of building with respect to the climate. Positioning of windows and open spaces as per climatic need Fundamentals of climate responsive planning Passive solar design.
Professional Skill 12Hrs.; Professional Knowledge	Draw joints in structures (viz. Details of construction joints at various	**Joints in structure** 128. Details of construction joints at various positions. 129. Details of expansion	**Expansion joints and construction joints** Need for expansion joints in building Construction joints –

08 Hrs.	positions, Details of expansion joints in walls, roof).	joints in walls, roof.	Contraction joints, isolation joints, dummy joints, sliding joints. position of construction joints Expansion joints in walls and roofs, spacing of expansion joints, materials used in expansion joints
Professional Skill 196 Hrs.; Professional Knowledge 26 Hrs.	Prepare 3D model and BOQ using BIM software (REVIT ARCHITECTURE).	130. Preparation of 3D model and BOQ using BIM software like Revit, etc. 131. Creating 3D model from 2D plane. 132. Generation of surfaces. 133. Material editor. 134. Lighting and rendering. 135. Quantity calculation of materials.	Introduction to revit software And study of sample projects
Professional Skill 56 Hrs.; Professional Knowledge 30 Hrs.	Perform rendering in Photoshop (Convert the drawings in pdf and then render it in photoshop with necessary details).	**Rendering in Photoshop and presentation of project in power point** 136. Convert the floor plans, elevation, section and 3d views in pdf and then render the drawings in photoshop with necessary details.	**Green Architecture / sustainable architecture** Green building and its importance. Benefits of green building Fundamentals of green building Material and resources Water efficiency Study of IGBC rated building in India (famous 5)
Professional Skill 48 Hrs.; Professional Knowledge 32 Hrs.	Prepare Working drawing: Kitchen layout, Electrical layout, Plumbing Layout DWV details.	137. Kitchen layout. 138. Electrical layout. 139. Plumbing Layout. 140. DWV details.	Energy conservation Sustainable site selection Green building rating system – LEED/ GRIHA
WORKSHOP CALCULATION & SCIENCE: (36 Hrs.)			

Professional Knowledge WCS- 36 Hrs.	Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study.	**WORKSHOP CALCULATION & SCIENCE:** **Friction** Friction - Advantages and disadvantages, Laws of friction, co-efficient of friction, angle of friction, simple problems related to friction Friction - Lubrication Friction - Co- efficient of friction, application and effects of friction in workshop practice **Centre of Gravity** Centre of gravity - Centre of gravity and its practical application **Area of cut out regular surfaces and area of irregular surfaces** Area of cut out regular surfaces - circle, segment and sector of circle Related problems of area of cut out regular surfaces - circle, segment and sector of circle Area of irregular surfaces and application related to shop problems **Algebra** Algebra - Addition, subtraction, multiplication & division Algebra - Theory of indices, algebraic formula, related problems **Elasticity** Elasticity - Elastic, plastic materials, stress, strain and their units and young's modulus Elasticity - Ultimate stress and working stress **Profit and Loss** Profit and loss - Simple problems on profit & loss Profit and loss - Simple and compound interest **Estimation and Costing** Estimation and costing - Simple estimation of the requirement of material etc., as applicable to the trade Estimation and costing - Problems on estimation and costing
Project work / site visit **Broad Area:** a) Compiling and final submission of Project work b) Study tour to historical places to familiarize culture and heritage.		

SYLLABUS FOR CORE SKILLS
1. Employability Skills (Common for all CTS trades) (120 Hrs. + 60 Hrs.)

Learning outcomes, assessment criteria, syllabus and Tool List of Core Skills subjects which is common for a group of trades, provided separately in www.bharatskills.gov.in / dgt.gov.in

LIST OF TOOLS & EQUIPMENT			
ARCHITECTURAL DRAUGHTSMAN (for batch of 24 candidates)			
S No.	**Name of items**	**Specification**	**Quantity**
A. GENERAL OUTFIT FOR CLASSROOM			
1.	Dual Desk		12 Nos.
2.	Drawing Boards measuring 1250mm x900mm fixed over adjustable stand		24+1Sets
3.	Armless chair with back (revolving type)		24 Nos.
4.	Students Lockers	with 8 compartments	3 Nos.
5.	Chest of Drawers		4 Nos.
6.	Steel bookcase (with lockable glass shutters)		1 No.
7.	Instructor's table with glass top		3 No.
8.	Chairs for Computer lab		24 Nos.
9.	Instructor's revolving with armchair		3 Nos.
10	Steel Almirah		2 Nos.
11.	Magnetic White Board		2 Nos.
12.	Pin-up board (with or without stand)		6 Nos.
13.	Working table	size - 1250x950	3 Nos.
14.	Air conditioner	1.5ton capacity each	2 nos. for each room
15.	Desktop Computer	CPU: 32/64 Bit i3/i5/i7 or latest processor, Speed: 3 GHz or Higher. RAM: - 4 GB DDR-III or Higher, Wi-Fi Enabled. Network Card: Integrated Gigabit Ethernet, with USB Mouse, USB Keyboard and Monitor (Min. 17 Inch. Licensed Operating System and Antivirus compatible with trade related software. Graphics card 4gb	24+1Sets
17.	Multi-function Laser color printer A3 size		1 no
18.	5KVA or higher online UPS	Online UPS	2 NOS
19.	Computer workstation (module type)		24 nos.
20.	Bookshelf with glass shutter		1 no.

21.	LAN connectivity		As per requirement
22.	Internet connection	Minimum 50mbps speed	As per requirement
24.	Vacuum cleaner	Wet & dry,1200 suction	2 nos.
25.	LCD projector with screen / LED display with inbuilt computer with screen/Interactive Smart Board	Short length Wi-fi connection HDMI	1 no
26.	Interactive board touch screen	83 inch	1 no
27.	Graphic Pens	2mm,4mm,1mm,0.5mm	As per requirement
28.	CAD software / CAD within built BIM	Latest version education	24+1 users
29	REVIT	Latest version education	24+1 users
30	SKETCH UP	Latest version education	24+1 users
31	PHOTO SHOP	Latest version education	24+1 users
32	Hard disk(portable)	2TB	2NO
33	LAP TOP (FOR TRAINER)	I7, 32 GB RAM,4GB GRAPHICS CARD AND 2TB HDD, WINOWS10	2 NO
34	PA System	Speaker sound system	1 set
35	Wi-Fi dongle	4mbps speed	1no
36	Visitors chair	With arm, revolving	04 nos.
37	Printer Table	Wooden, movable	01 no.
Mouse & Keyboard should be treated as Raw Material.			
B. LIST OF CONSUMABLES FOR 24 TRAINEES AND ONE INSTRUCTOR			
36	Adjustable set square with beveled edge	30 cm	24 + 1 sets
37.	Compass with Long arm & pen holder	30 cm	24 + 1 Nos.
38.	Protractor	15 cm	24 + 1 Nos.
39.	Triangular Scale	30 cm (feet-inch, metric)	24 + 1 Nos.
40.	Clutch pencil	0.5mm, 0.2 mm, 2mm.	24 + 1 Nos.
41.	Parallel Bar / T scale	1250 mm long	24 +1 Nos.
42.	Plastic French curve with ink edge	set of 12	3 sets
44.	Furniture template	1:50, 1:100,1:200	24+1 Nos.
45.	Circular and oval template		24+1 Nos.
46.	Metric Tape-5M	30mts	24+1 Nos.
47.	Calculator	scientific	05 Nos
48.	Beam Compass with pen holder		02 Nos.
42.	Pen Drive	32GB/64GB	As per requirement

Note:

1. *The quantities of hand Tools may be increased according to the No. of Trainees on roll (including the Strength of Additional Unit, if any).*
2. *In addition to the list, small measuring tapes, Drawing Sheet, Tracing Paper, Butter Sheet, Color Pencils, Poster colours, painting brushes, Pencils (of various grades), Pencil Leads, Cello tape, Eraser, drafting pens, Mount boards and any other Raw Materials would be issued as per the requirement and will be considered as consumable items.*
3. *For faculty members Raw Materials like Pen Drive, Pocket Hard Disk, Memory Card, Re-writable CDs & DVD etc., may be provided.*
4. Internet facility is desired to be provided in the classroom.

The DGT sincerely acknowledges contributions of the Industries, State Directorates, Trade Experts, Domain Experts, trainers of ITIs, NSTIs, faculties from universities and all others who contributed in revising the curriculum.

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

List of Expert members participated for finalizing the course curriculum of Architectural Draughtsman trade held on 10th January' 2018 at CSTARI, Kolkata.			
S No.	**Name & Designation Sh/Mr./Ms.**	**Organization**	**Remarks**
1.	B.V.S. Sesha Chari, Director	CSTARI, Kolkata	Chairman
2.	Avijit Banerjee, DGM	Shapoorji Pallonji & co. Pvt. Ltd., Kolkata	Member
3.	Sutanu Bhattacharya, Director	SBA spectra Consultant Pvt. Ltd.	Member
4.	Nabarun Biswas, Architect Director	AB Consultants (P) Ltd.	Member
5.	Sikha Paul, Architect	ABODE Consultant	Member
6.	Raja Dey, Jt. Director (Arch)	HQ Chief Engineer, Ministry of Defrnce, MES, Shillong-711103	Member
7.	D. Brahmeswari, TO	RVTI, Bangalore	Member
8.	Arpana Singh, TO	NVTI, Noida	Member
9.	Polly Biswas, TO	RVTI, Indore	Member
10.	Suriya Kumari K. ,TO	RVTI, Kolkata	Member
11.	Soma Das (Talukdar), VI	RVTI, Kolkata	Member
12.	Himanish Bhattacharya, VI	RVTI, Kolkata	Member
13.	N. Nath, ADT	CSTARI, Kolkata	Member
14.	B.K. Nigam, TO	CSTARI, Kolkata	Member
15.	R.N. Manna, TO	CSTARI, Kolkata	Member

MEMBERS OF SECTOR MENTOR COUNCIL		
S No	**Name and Representing organization**	**Remarks**
1	Mr. G.M. Rao, Chairman GMR Infrastructure IBC Knowledge Park, Phase 2, "D" Block, 9th Floor, 4/1, Bannerghatta Road, Bangalore - 560 029, Karnataka	Nominated by Federation of Indian Chambers of Commerce and Industry (FICCI)
2	Mr. Jasmeet Singh, Head-Customer Experience Program JCB India, 23/7 Mathura Road Ballabgarh, Faridabad, Haryana 121004	Nominated by Federation of Indian Chambers of Commerce and Industry (FICCI)
3	Mr. C.S. Gupta, Secretary Indian Plumbing Association E - 117, L.G.F. Greater Kailash - 3 Masjid Moth, NEW DELHI – 110 048	
4	Mr. Ajit Gulabchand, Chairman HCC Chairman Construction SSC Hindustan Construction Co. Ltd. Hincon House, 247 Park LBS Marg, Vikhroli (W), Mumbai - 400083	
5	Mr. Satish Gottipati M/s Precca Solutions India Pvt. Ltd. Plot No 6, D. No. 2-9/5/6 Venkat Sai Gateway, Green Land Colony, Hyderabad-500032	Nominated by Federation of Indian Micro and Small & Medium Enterprises (FISME)
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9	Dr. Rajesh Deoliya, Principal Scientist CSIR-CBRI Extension Centre Zone 6, II nd Floor India Habitat Centre, Lodhi Road, New Delhi 110003	Nominated by Central Building Research Institute (CBRI), Roorkee
10	Dr. N. Dhang, Professor D/o Civil Engineering Indian Institute of Technology Kharagpur Kharagpur, India - 721302	Chairman

11	Dr. P. Sitapati Rao, Additional Director General National Academy of Construction NAC Grounds, Cyberabad, Hyderabad-500084, Andhra Pradesh, India	Nominated by National Academy of Construction, Hyderabad
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13	Shri M.C. Sharma, Jt. Director (TTC)	Mentor
14	Shri. R.N. MANNA, TO	Representative of CSTARI
15	Shri. GOPALKRISHNAN, TO	Representative of NIMI
16	Smt. ARPANA SINGH, TO, NVTI NOIDA	Champion Master Trainer
17	Shri. S. RANA, TO, ATI, Kolkata	Member
18	Shri. S.R. VHATKAR, TO, ATI, Kolkata	Member
19	Shri, T.K. BHATTACHARYA, TO, ATI, Hyd	Member
20	Shri. P.K. MADAVI, TO, CTI, Chennai	Member
21	Smt. Surya Kumari, TO, RVTI Kolkata	Member
22	Shri. C.T. SHANTILAL, VI, ATI, Calicut	Member
23	Shri Devasari Ganesh, TO, RVTI Mumbai	Member
24	Shri K.N. Babu, TO, RVTI, Bangalore	Member
25	Shri. D.K. Chattopadhyay, TO, ATI Kolkata	Member
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30	Shri. Madhusudhanan C, Sr. Instructor, ITD, Kerala	Member
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32	Shri. R Sundar, ATO, Govt. ITI, Channai	Member
33	Smt. Amrutha, VI, RVTI(W), Bangalore	Member
34	Smt. Hari Chandana Devi, VI, RVTI(W), Panipat	Member
35	Ms. Aswathy Prabhakaran, VI, RVTI(W), Bangalore	Member
36	Shri. Sugesh K, Jr. Instructor, ITD, Kerala	Member

ABBREVIATIONS

CTS	Craftsmen Training Scheme
ATS	Apprenticeship Training Scheme
CITS	Craft Instructor Training Scheme
DGT	Directorate General of Training
MSDE	Ministry of Skill Development and Entrepreneurship
NTC	National Trade Certificate
NAC	National Apprenticeship Certificate
NCIC	National Craft Instructor Certificate
LD	Loco motor Disability
CP	Cerebral Palsy
MD	Multiple Disabilities
LV	Low Vision
HH	Hard of Hearing
ID	Intellectual Disabilities
LC	Leprosy Cured
SLD	Specific Learning Disabilities
DW	Dwarfism
MI	Mental Illness
AA	Acid Attack
PwD	Person with disabilities


कौशलं बलम्