

INDUSTRIAL TRAINING INSTITUTE (ITI)

ANNUAL INSTRUCTIONAL PLAN (42 WEEKS)

TRADE: PLUMBER (ONE YEAR DURATION)

CTS 3.0 / NSQF-2.5 COMPLIANT

Name of Institute:	
Trade Name & Duration:	Plumber — 1 Year Duration (42 Weeks)
Academic Session:	2024 - 2025
Instructor Name:	
Group Instructor (GI) Name:	
Superintendent / Principal:	

Week No.	Professional Skills (Trade Practical)	Professional Knowledge (Trade Theory)
WEEK 01	Safety Practices & Housekeeping: 1. Importance of safety Practice, List of tools & tackles & Machinery used in the workshop. 2. List out basic need for Personal Protective Equipment (PPE). 3. Practice on First Aid Methods. 4. Safe disposal of waste materials like cotton waste, metal chips/burrs etc. 5. Hazard identification and avoidance.	Safety Induction & Shop Environment: 1. Guidance for newcomers regarding ITI system and store procedures. 2. Soft Skills, their importance and scope of job after training. 3. Safety and general precautions on shop floor. 4. First aid, electrical mains operation and electrical safety. 5. Introduction of PPEs, emergency response (power/system failure, fire).
WEEK 02	Safety Signs & Fire Extinguishers: 6. Safety signs for Danger. 7. Warning, caution & personal safety message. 8. Preventive measures for industrial environment, electrical accidents & steps for such accidents. 9. Identifying different types of Fire Extinguishers, and their use in case of Fire. 10. Precautions to be followed while working, safe use of tools and equipment.	5S & Occupational Safety: 6. Importance of housekeeping & good shop floor practices. 7. Introduction to 5S concept & its application. 8. Occupational Safety & Health: Health, Safety and Environment guidelines, legislations & regulations. 9. Work permit methodology and confined space safety.
WEEK 03	Basic Bench Tools & Sawing: 11. Demonstrate use of different types of Vices. 12. Demonstrate use of assembling Hand tools: files, hammer, hacksaw, chisel. 13. Mark out lines, gripping suitably in vice jaws, hacksawing to given dimensions. 14. Filing - Flat and using deburring tool.	Plumber Hand Tools: 10. Introduction to tools: Vice, chain wrench, files, hammer, hacksaw, chisel, vice jaws, steel rule, V-block. 11. Pipe Vice, water pump pliers, pipe cutter, sink auger, internal pipe cutter.
WEEK 04	Laser Tools & Pipe Threading: 15. Demonstrate laser pen. 16. Perform laser cutting techniques. 17. Marking with laser distance meter, filing, and deburring of PVC Pipe. 18. Marking according to simple blueprints for hole positions. 19. Select drill bit and perform drilling operation. 20. Study and use of pipe vice, internal and external threading dies. 21. Fixing different Pipe fittings in different positions of Pipe.	Fittings & Modern Measurement: 12. Different Types of Pipe Fittings: Socket, Elbow, Tee, Union, Bend, Cap, Plug, etc. 13. Concept of laser pen and laser distance meter. 14. Use of drilling machines and drill bit selection. 15. Pipe threading dies and pipe vice operations.
WEEK 05	Basic Electrical Components & Wire Joints: 22. Identify different types of active electronic components. 23. Prepare terminations of cable ends. 24. Practice skinning, twisting and crimping. 25. Make simple twist, married, Tee and western union joints.	Electrical Fundamentals: 16. Fundamentals of electricity, definitions, units & effects of electric current. 17. Conductors and insulators, conducting materials comparison. 18. Joints in electrical conductors. 19. Underground cables: Description and types.

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WEEK 06	Power Tools & Testing Equipment: 26. Demonstrate Wall chaser machine. 27. Demonstrate Air blower. 28. Demonstrate straight grinder machine. 29. Use pressure testing machine to test pressure at different plumbing locations. 30. Test & identify Pressure release valves.	Testing Equipment in Plumbing: 20. Introduction to Wall chaser machine. 21. Concept of air blower and straight grinder. 22. Pressure testing machines, uses and applications. 23. Pressure relief valves principles.
WEEK 07	Leak Detection & Plumbing Terminology: 31. Demonstrate and use infrared thermometer, enlist applications. 32. List out components required for water leakage testing assembly in pipe systems. 33. Enlist tools used in plumbing with applications. 34. Study types of Plumbing systems with different applications. 35. Identify & list components in plumbing systems. 36. Study schematic diagram of plumbing system showing individual components.	Leak Testing & Terminologies: 24. Infrared thermometer and advanced laser distance meter applications. 25. Water leak detection methodology, Water Leakage Testing Assembly installation. 26. Combustible and Hydrocarbon gas detectors. 27. Plumbing Terminologies: Air gap, Backflow, Back-Siphonage, Backwater valve, Cesspool, Cross connection, Fixture unit, Float Valve, Flush Cock, Interceptor, Static head, Water Hammer, Water Pressure. 28. Pneumatic and hydraulic flushing systems.
WEEK 08	Plumbing Drawings & Pipe Materials: 37. Identify basic process flow diagrams (domestic, commercial). 38. Read, study and quantify from detailed plumbing drawing. 39. Enlist pipe materials used in plumbing with applications.	Water Planning & Pipe Types: 29. Basic planning: water requirements, water sources, quality & treatment, water storage & distribution. 30. Hot water generation and distribution. 31. Types of pipes: SWR, UPVC, CPVC, GI, OPVC, SS, PPR, composite, PEX, copper, HDPE, MDPE and selection criteria. 32. Composite PVC/uPVC pipe concepts, modern laying vs old jointing methods.
WEEK 09	Water Distribution & Sprinklers: 40. Read and understand water distribution system drawings. 41. Install water meter, water storage system, incorporate applications. 42. Install water sprinkler system for water fountains and irrigation systems. 43. Measure water temperature (hot and cold) inside pipelines.	Water Distribution & Flow Dynamics: 33. Estimation of water requirements, distribution network layouts. 34. Water pressure vs water flow, dynamic pressure & static pressure. 35. Fire sprinkler system components and installation process. 36. Safety measures in water distribution systems.
WEEK 10	Hot & Cold Water Systems & Solar Water Heaters: 44. Study layout of pipeline for hot and cold-water distribution, prepare component list. 45. Install pipeline for distribution of hot & cold water (GI, CPVC, PPR, Composite, PEX). 46. Install hot water systems (geyser, Solar water heater, heat pump).	Thermal Systems & Water Meters: 37. Heat transfer principles, thermal insulation types for hot water pipes. 38. Cold and hot water distribution equipment and materials. 39. Method of ventilating pipes. 40. Solar water heater systems, components, fixing guidelines. 41. Water meter concepts, safety guidelines for installation.

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WEEK 11	Pressure Boosting Pumps: 47. Demonstrate and install water supply and pressure boosting pump. 48. Demonstrate maintenance of water supply and pressure boosting pump. 49. Study schematic drawing of water supply to overhead tank through pump by gravity and direct boosting (without OHT).	Pumping Systems & Town Supply: 42. Water supply system of a small town. 43. Pressure boosting pumps: functions, pressure head, delivery and suction pipes, applications.
WEEK 12	Waste Water Drainage & Traps: 50. Study schematic diagram and enlist components used in waste water drainage systems. 51. Study and install types of Traps and Vents in waste water systems.	Drainage Principles: 44. Soil & Waste drainage principles. 45. Drinking and wastewater treatment plant concepts. 46. Sizing of pipes, water utilization calculations. 47. Traps, vents, inspection chambers, manholes, gravity drains, sewage treatment.
WEEK 13	Pipe Cutting Tools & Techniques: 52. Study layout of drainage systems, types of materials used. 53. Cut different diameters of PVC/uPVC/C.I. pipes as per layout. 54. Demonstrate portable jig saw machine. 55. Cutting PVC pipes using telescopic pipe cutter, ratchet cutter, hexa cutter.	Pipe Bending & Cutting Equipment: 48. Pipe bends and pipe bending concepts for fluid flow. 49. Portable jig saw machines, handheld sander/polisher. 50. Pipe cutters (telescopic, ratchet, internal, hexa), pipe bending machines, threading dies, chain wrenches. 51. Safety precautions, plumbing symbols and codes for water lines.
WEEK 14	PVC/uPVC Pipe Preparation & Solvent Cementing: 56. Preparation of PVC/uPVC pipes and fittings before joining. 57. Use strainer for removal of blockage inside pipes. 58. Fixing PVC/uPVC fittings using solvent cement. 59. Demonstrate rubber ring joint of PVC pressure pipes.	Pipe Jointing & Water Treatment: 52. Pipes, pipe fittings and joint classifications. 53. Water impurities, hard and soft water testing and softening. 54. Solvents and adhesives for PVC/CPVC/uPVC pipes, precautions during fixing.
WEEK 15	Pipeline Circuit Fabrication: 60. Make pipeline circuit on PVC/uPVC pipes with socket, elbow, bend, tee, cleanout, door fittings as per drawing. 61. Pipe joints (GI, PE, PPR, Composite, Copper).	Pipe Jointing Methods: 55. Detailed methods of fixing and joining pipes of various materials. 56. Expansion and contraction allowances in plastic piping.
WEEK 16	Pumps Installation & Water Service Accessories: 62. Installation and maintenance of pumps (centrifugal, submersible, hand pump, booster pump). 63. Fix water hammer arrester, water level indicator. 64. Install water purifier. 65. Pipe bending service connection, fix Water meter.	Pumps & Service Connections: 57. Pump types and pump selection for buildings. 58. Water hammer phenomena and surge arresters. 59. Service connections, ferrule connections, domestic water meters.

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WEEK 17	Taps & Cocks Installation: 66. Demonstrate, identify and install taps & valves: bib cock, angle cock, stop cock, pillar cock, flush cock, concealed cock, push cock. 67. Install bottle traps, sink taps, 3-inlet taps.	Taps & Valves Classification: 60. Introduction to taps & valves, construction and application. 61. Installation guidelines for pillar cocks, angle cocks, concealed cocks, push cocks. 62. Low-flow fixtures and water aerators.
WEEK 18	Mixers, Diverters & Faucets: 68. Install 2-in-1 mixers, 3-in-1 mixers, 2-way and 3-way divertors, overhead shower, hand shower, health faucet. 69. Install thermostatic valves, flush valves. 70. Demonstrate and install touchless sensor faucets.	Mixers & Sensor Faucets: 63. Valve types: Gate, Globe, Check, Ball, Butterfly valves. 64. Telephonic wall mixer with slide rail and telephone shower installation guidelines. 65. Sensor-operated faucets: infrared/capacitive sensors, solenoid valves.
WEEK 19	Water Closets (WC) Installation: 71. Demonstrate, identify and install floor-mounted WCs (P-trap and S-trap). 72. Install wall-hung closet with flushing cistern (open and concealed). 73. Install Indian pans (23-inch Orissa pan and Asian pan).	Water Closet Principles: 66. Water closet selection, hydraulic flushing requirements. 67. Trap seals, P-trap vs S-trap, anti-siphonage considerations. 68. Flushing cisterns: low-level, high-level, dual-flush and concealed cisterns.
WEEK 20	Urinals, Bidets & Sensor Systems: 74. Demonstrate, identify and install urinals (flat back, stall, squatting) and bidets. 75. Install push cock and sensor flushing systems for urinals.	Urinals & Automatic Flushing: 69. Types of urinals and installation standards. 70. Automatic sensor flushing and flush valve mechanisms for urinals.
WEEK 21	Hydraulic Pressure Testing: 76. Setup manual and hydraulic pressure testing machine. 77. Conduct water pressure test on installed plumbing pipelines, observe holding pressure, record drop.	Fluid Statics & Pressure Testing: 71. Static water pressure, working pressure, test pressure and bursting pressure. 72. Expansion of water on freezing/heating, Bernoulli's theorem, Pascal's law. 73. Testing guidelines as per Indian Standards (IS code).
WEEK 22	Sanitary Ware Drawings & Cisterns: 78. Study technical drawings of sanitary ware installations. 79. List applications of sanitary ware fittings. 80. Install open PVC/uPVC/CI cisterns. 81. Install concealed flush cisterns with mounting frames.	Sanitary Ware Standards: 74. Retrofitting of plumbing systems. 75. Reading sanitary plumbing drawings and layouts. 76. General guidelines for sanitary fittings installation. 77. Open and concealed cistern mechanics.
WEEK 23	Orissa Pan & Wall Mounting Urinals: 82. Fixing, installing and setting 23-inch Orissa pan (Indian pan) with P-trap. 83. Install wall-mounting urinal with waste coupling, spreader, and trap. 84. Perform cleaning of drainage pipelines using flexible cleaning rods.	Sanitary Layouts & Noise Reduction: 78. Setting out Orissa pans, floor gradients, waterproofing around pans. 79. Sanitary symbols and plumbing codes for tools and materials. 80. Noise-reducing drainage systems (e.g. Silencio), foam-core pipes.

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WEEK 24	Wash Basins & Kitchen Sinks Installation: 85. Install wash basins (wall-hung, pedestal, countertop, under-counter, corner type). 86. Install Kitchen sinks (single bowl, double bowl with drain board). 87. Clear kitchen sink chock-ups using sink auger (drain gun).	Basins, Sinks & Traps: 81. Design criteria and accessibility for washrooms. 82. Wash basin brackets, fisher bolts, waste coupling, bottle trap connections. 83. Kitchen sink installation, grease build-up causes and clearance methods.
WEEK 25	Bathtubs & Bathroom Accessories: 88. Demonstrate installation of bathtub, frame support, waste coupling, overflow set. 89. Install bottle traps (regular & PVC/uPVC P-type traps). 90. Fix bathroom accessories: towel rod, towel ring, soap dish, toilet paper holder, grab bars.	Bathtubs & Fixtures: 84. Fitting considerations for bathtubs, whirlpools, showers, grab bars. 85. Trap seals maintenance, evaporation prevention. 86. Troubleshooting chock-ups in bath and shower drains.
WEEK 26	European Water Closets (EWC): 91. Install floor-mounted European Water Closet (EWC) with wax seal and floor bolts. 92. Install wall-hung EWC with concealed chair bracket frame and dual-flush actuator plate.	EWC Fixtures & Installation: 87. Types of floor-mounted and wall-mounted EWCs. 88. Mounting frames, weight-bearing requirements, gasket seals.
WEEK 27	Rainwater Gutter & Downpipe Installation: 93. Install PVC/uPVC/CI rainwater gutter outlets and connections to vertical downpipes. 94. Fix gutter brackets, drop outlets, running outlets, shoe bends.	Water Conservation & Rainwater Dynamics: 89. Introduction to water conservation, rainwater harvesting concepts. 90. Rainfall intensity, roof catchment calculations. 91. Drainage systems and types, layout reading.
WEEK 28	Rainwater Harvesting & Ground Recharge: 95. Install rainwater harvesting and piping system as per site layout. 96. Prepare inspection report of recharge chambers and soak pits. 97. Study demonstrative gray water harvesting system.	Recharge Structures & Siphonic Drainage: 92. Siphonic rainwater drainage systems. 93. First flush diverters, leaf screens, filtration media. 94. Storage tanks, recharge wells, borewell recharge pits, soak pits. 95. Gray water treatment and reuse for flushing/gardening.
WEEK 29	Plumbing Maintenance & Valve Servicing: 98. Assemble and disassemble different types of taps and cocks. 99. Assemble and disassemble flush cistern mechanisms (ball valve, siphon, flush valve). 100. Repair and replace defective washers, O-rings, spindle assemblies in taps and valves.	Maintenance Protocols: 96. Periodic inspection, testing and maintenance routines. 97. Storage tank cleaning, water quality testing (pH, TDS, turbidity). 98. Pump and valve leakage causes and rectifying techniques.
WEEK 30	Leakage Tracing & Sensor System Maintenance: 101. Perform testing to identify water leakage in concealed pipelines, provide solutions. 102. Check working of sensor systems for wash basins and urinals. 103. Regular maintenance of push cock systems for urinals.	Pipeline Inspection & Corrosion Control: 99. Water pressure system inspection, water level indicators and sensors. 100. Pipe clamping positions, bracket spacing guidelines. 101. Non-return valve (NRV) operation and effectiveness. 102. Corrosion causes, galvanic action remedies, effects of frost.

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WEEK 31	Masonry Materials & Mortar Preparation: 104. Preparation of Cement Mortar and Plain Cement Concrete (PCC). 105. Application of mason hand tools: trowel, plumb bob, spirit level, mason square. 106. Lay Floor Traps and Multi Floor Traps with cement mortar.	Masonry in Plumbing: 103. Construction materials: Cement, sand, aggregate grades, water-cement ratio. 104. Concrete admixtures, waterproofing compounds. 105. Brick bonds: English bond, Flemish bond for chambers.
WEEK 32	Chamber Wall Construction & Pipe Concealing: 107. Construct brick walls for plumbing chambers with various bonds. 108. Cut masonry wall, replace concealed pipes, repair leaks. 109. Plastering and damp-proofing of chambers.	Traps & Wall Chasing: 106. Traps for foul and unfoul pipelines. 107. Wall chasing methods, pipe sleeve provisions in RCC. 108. Plastering mixes, damp-proof course (DPC), Mivan shuttering concepts.
WEEK 33	Gully Chambers & Foul Inspection Chambers: 110. Construct gully chamber for unfoul pipes (wash basin, sink, bath, shower). 111. Construct Inspection Chamber for foul pipes (WC, urinal, bidet).	Wastewater Segregation: 109. Unfoul vs foul wastewater segregation. 110. Inspection chamber sizing, invert levels, self-cleansing velocity. 111. Vent pipe provisions to arrest foul sewer gases.
WEEK 34	Septic Tanks, Soak Pits & Sewer Connection: 112. Construct Soak Pit for unsewered areas. 113. Construct Septic Tank with baffles and vent pipe. 114. Construct inspection chamber with benching and channelling. 115. Connect building sewer line to street sewer manhole. 116. Install prefabricated PVC manhole chambers.	Sewage Disposal Structures: 112. Septic tank working, detention time, sludge and scum digestion, anaerobic action. 113. Soak pits and dispersion trenches design. 114. Benchng and channelling standards in manholes. 115. Drop manholes, public sewer connection rules.
WEEK 35	Documentation & Records Maintenance: 117. Make installation reports based on site case studies. 118. Prepare routine and preventive maintenance schedules. 119. Prepare Standard Operating Procedures (SOP) for repair and maintenance.	Plumbing Records & SOPs: 116. Importance of records, warranty certificates, calibration reports. 117. As-built drawings, valve identification charts. 118. Job cost estimation and material billing. 119. Indian Standard (IS) code of practice for water supply and drainage.
WEEK 36	Smart Water Meters & Leak Detectors: 120. Install smart water meter, setup and test using smartphone app. 121. Install smart leak detectors under sinks, near water heaters, basements. 122. Test sensors by simulating leaks.	IoT in Plumbing: 120. Smart water meters: ultrasonic and electromagnetic flow measurement, AMR/AMI systems. 121. IoT-based smart leak detection systems, automated shutoff valves.

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WEEK 37	Smart Irrigation & Digital Diagnostics: 123. Install smart irrigation controller, connect to water supply, program automated watering schedules via app. 124. Use digital pressure gauge and smart flow meter to analyze flow rates and pressures. 125. Troubleshoot plumbing problems using diagnostic mobile apps.	Smart Irrigation & App Diagnostics: 122. Weather-sensing automated irrigation systems, soil moisture sensors. 123. Real-time digital diagnostic tools, smartphone telemetry in plumbing.
WEEK 38	Eco-Friendly Fixtures & Smart Water Heaters: 126. Install low-flow faucets and aerator showerheads; measure water flow before and after installation. 127. Install smart water heater, connect to mobile app, configure temperature schedules.	Energy Efficiency & Modern Plumbing: 124. WaterSense labeled eco-friendly fixtures, flow restrictors, water conservation economics. 125. Wi-Fi enabled smart water heaters, energy management, remote diagnostics. 126. Small-scale modern plumbing layout design.
WEEK 39	On the Job Training (OJT)	On the Job Training (OJT)
WEEK 40	On the Job Training (OJT)	On the Job Training (OJT)
WEEK 41	On the Job Training (OJT)	On the Job Training (OJT)
WEEK 42	On the Job Training (OJT)	On the Job Training (OJT)
APPROVAL & SIGNATURES _____ Sign of Instructor _____ Sign of Group Instructor (GI) _____ Sign of Superintendent / Principal		