

RURAL WATER SUPPLY PLUMBER & SANITARY WORK ASSISTANT (RWSWA)

Syllabus

(Safety Practices 25 Hrs, Theory 100 Hrs, Practical 450 Hrs, Employability Skill 75 Hrs)

Details of Theory & Practical Syllabus

Sl. No	CONTENT	DETAILS	HOURS
1	Maintain safety at the work site and housekeeping (25 Hrs)		
	Theory	<ol style="list-style-type: none">1. Reading of 'Instruction Manual of tools' while using them.2. Use the appropriate tools required for the specific work or job.3. Keep the tools in working condition and ensure the required maintenance.4. Ensure that the necessary protective equipment are available.5. Follow safety methods while using electrical wires.6. Use kerosene oil for removing dust from rusty nuts.7. Do not use tools without a handle as they may not give proper grip.8. Remove burrs or stuck material from the head of the chisel and the edges of tools.9. Wear safety glasses while using power tools like a drill machine.10. Keep metal parts lightly lubricated.11. Do not apply excessive pressure or force.12. Inspect the tools regularly.13. Use or wear safety gear (helmet, gloves, goggles, safety shoes, ear plugs, etc.).	10
	Practical	<ol style="list-style-type: none">1. Demonstrate Knowledge of Safe working practices on construction sites,2. Carry out safe working practices on construction sites.3. Identify hazards and procedure to avoid accidents at work sites.4. Ensure good housekeeping concerning hand tools, portable power tools, scaffolding, excavation of pits, use of ladders, and use of chemicals at obscure the concealed erring.5. While lifting heavy items items use proper tackles, levels rollers etc. To avoid accidental injury.6. Use of protective Goggles, face shield, safety belt as and when necessary is compulsory,7. Taking undue risk during execution of a job at a construction site should be avoided.8. In any construction site where work is in progress, put up notice for outsiders to avoid the area until the work is completed.	15
2	Understand plumbing system components (30 Hrs)		
	Theory	<ol style="list-style-type: none">1. Introduction-plumbing and sanitary system, A plumber's job role.2. Role of Plumber-Plumbing cycle,3. What is Plumbing?4. What is Sanitary Work?5. Components of plumbing system.6. Regulations and rules adopted by the concerned Panchayet /municipal corporations.	8

		7. Standard plumbing and sanitary material, as per the Bureau of Indian Standards (BIS). Points to be consider before starting the work by a plumber.	
	<u>Practical</u>	1. Identify the plumbing items fitted in the school. 2. Make a list of the identified plumbing items. 3. Identify the material used in plumbing fittings and fixtures. 4. Identify the plumbing items fitted in the house. 5. Make a list of the identified plumbing items. Identify the material used in plumbing fittings and fixtures.	22
3	Interpret diagrams and drawings used for plumbing work (30 Hrs)		
	<u>Theory</u>	1. Describe the convention used in drawings of Mechanical components. 2. Explain the meaning .of basic abbreviations and symbols used in drawing. 3. Identify mechanical components and their specification from drawing. 4. Layout drawing of mechanical components. 5. Describe Conventions used in construction drawings of building structures etc. 6. Identify location of electrical components by symbols used in construction drawing. 7. Identify the stages of construction at which the installation of pipe line.	8
	<u>Practical</u>	Demonstrate the: 1. Concept of plan, elevation, side view and sectional view of civil engineering structure. 2. Draw free hand mechanical sketches of the components. 3. Identify fabrication items a. Fitting used in installation b. Sanitary Fittings and water conducting equipment. c. building materials and their property may effect during installation of pipe lines, fittings etc d. the type of pipes their origin and route from a piping schedule, e. Develop a piping schedule for a given installations. f. Develop free hand sketches g. Draw a simple bathroom installation. h. Draw a waste water outlet from the Bathroom.	22
4	Identify different tools for Plumbing (125 Hrs)		
	<u>Theory</u>	The major tools used in plumbing- 1. Holding tools- (a) Bench vice (b) Pipe vice- (i)Open side pipe vice (ii)Fixed side pipe vice 2. Fitting tools- (a) Wrenches-adjustable and non-adjustable (b) Water-pump pliers (c) Spanners - Ring spanners, Open-ended spanners, Combination spanners, Bi-hexagonal ring spanner 3. Cutting tools- (a) Pipe cutter (b) Hacksaw-Important parts of a hacksaw are—handle, frame, blade and adjusting wing nut 4. Pipe bending tools-	25

		(a) Pipe bending machine (b) Threading dies 5. Other tools- (a) Chisel (b) Hammer (c) Chain wrench (d) Rover jumper (e) Trowel (f) Screw driver (g) File (h) Plier (i) Caulking tools (j) Drill machine-components, safety precautions (k) Drill bit (l) Hanger (m) Measuring tape (n) Plumb rule and bob (o) Spirit level (p) Spade (q) Shovel (r) Pickaxe (s) Mortar pan (t) Masons' square (u) Water level tube	
	<u>Practical</u>	1. Collect the plumbing tools available in your classroom. 2. Make a list of the plumbing tools available. 3. Draw figures of the plumbing tools and label them. 4. Collect the masonry tools available in your classroom. 5. Make a list of the masonry tools available. 6. Draw figures of the masonry tools and label them.	100
5	Know different Plumbing Material and Pipes (50 Hrs)		
	Theory	Sealing Material: Thread Seal Tape, Plumber's Putty, Sealing Adhesives Plumbing Pipes- Types of plumbing pipes-advantages, Precautions 1. Cast Iron (CI) pipes, 2. Ductile iron pipes, 3. Steel pipes, 4. Galvanized Iron (GI) pipes, 5. Copper pipes 6. Asbestos Cement (AC) pipes, 7. Concrete pipes 8. Stone ware pipes, 9. PVC pipes, Chlorinated PVC (CPVC) pipes, Polypropylene pipes, Unplasticised PVC (UPVC), PEX or XLPE, Unplasticised Polyvinyl pipes, High Density Polyethylene (HDPE) -Low Density Polyethylene raw material (LDPE) -Medium Density Polyethylene raw materials (MDPE) -High Density Polyethylene raw materials (HDPE) Pipe Laying-steps involved in laying of pipes, Care during work.	16
	Practical	1. Collect the plumbing material from a shop. 2. Read the content written on the packing. 3. Identify the purpose of this material. 4. Identify the plumbing pipes in a shop.	34
6	Identify measurements and Symbols used in Plumbing (30 Hrs)		
	<u>Theory</u>	Introduction, 1. Measurement of Length, 2. Measurement of Weight, 3. Length Conversion, 4. Measurement of Volume, 5. Measurement of Density, 6. Measurement of Pressure, 7. Comprehensive Conversion. Measuring Instruments- Measuring tools: Steel ruler, Calipers, Screw gauge (Micro metre), Measuring tape, Pressure gauge, Vernier caliper Plumbing Symbols- 1. Importance of plumbing symbols, 2. Identification of the symbols given in the drawings of fixtures,	8
	<u>Practical</u>	1. Measure the length, width and height of a room. 2. Measure the weight of a brick and cement bag, 3. Draw the plumbing symbols	22

7.	Able to use pipe fittings, joints, bends, different pipe joining tools for distribution of water supply (70 Hrs)		
	<u>Theory</u>	<p>Introduction,</p> <p>Pipe Fittings: Type of Pipe Fittings-1. Collar 2. Elbow-Long Radius (LR) Elbows, Short Radius (LR) Elbows, 90° Elbow, 45° Elbow 3. Gasket 4. Union 5. Reducer 6. Tee -Single tee socket, Double tee socket 7. Nipple 8. Trap-P, U, S or J-shaped type 9. Cross, 10. Offset 11)</p> <p>Pipe Joints-Types of pipe joints: 1. Threaded joint 2. Welded joint (butt welded, socket welded) 3. Brazed joint 4. Soldered joint 5. Grooved joint 6. Flanged joint 7. Compression joint</p> <p>Valves-Sluice valve, Scour valve, Air valve reflux valve, pressure relief valve, Gate valve-Split taper non rising gate valve, Rising spindle split wedge gate valve, Parallel slide valve, Globe valve, Angle valve, Check valve or non-return valve, Ferrule, Foot valve, Float valve.</p> <p>Domestic supply distribution system - Free system, grid iron and radial system.</p> <p>Install and maintain different Electric pumps.</p>	16
	<u>Practical</u>	<ol style="list-style-type: none"> 1. Survey the local market. 2. Visit the plumbing hardware shop. 3. Identify the fittings available in the shop. 4. Prepare a list of the identified fitting items seen in the market. 5. Note down the cost of the fitting items and their manufacturing company's name. 6. Draw figures of the various types of bends. 7. Collect the pipe joints, pipes and tools. 8. Identify the components. 9. Collect the joints. 10. Join the pipe with the help of proper pipe joining tools. 11. Collect the figures or joints of threaded joints, grooved and compression joints. 12. Draw the figure of the joints. 	54
8	Identify different items and in house drainage, sanitary installation. (50 Hrs)		
	<u>Theory</u>	<p>House drainage, domestic sanitary installations and conveniences-General:</p> <p>house drainage arrangements above and below the ground, various important terms used in sanitary work: Sewer, outfall, invert, inspection chamber, house drainage pipes- waste pipe, soil pipe, vent pipe, ventilating pipe, anti-siphonage pipe,</p> <p>House sewer connection of –</p> <p>i)waste water drain ii)surface/rain water drain iii)sewer from a building with a public sewer/cesspool/ soakaway; catch pit, anti-siphonage, cleaning eye, soakaway, soil waste, drainage system-i)combined system, ii) separate system, iii) partially separate system, , plumbing system-i) two-pipe system ii)one pipe system iii) single stack system, iv) partially ventilated single stack system, inspection chambers and manholes, flushing devices-flushing cisterns for i) water closets and urinals, traps used in drainage system-P,Q and S traps, intercepting trap, gulley traps, floor traps, grease traps, sanitary appliances- baths Bath tubs, drinking fountains/taps/ cock -Types of taps and its uses (bib cock, pillar cock, stop cock), wash basin, showers, sinks, urinals, water closets,</p>	16

		towel rail	
	<u>Practical</u>	1. Identify the drainage, sanitary installations and conveniences items fitted in the school. 2. Make a list of the identified sanitary items. 3. Identify the material used in sanitary fittings and fixtures. 4. Identify the sanitary fittings and fixtures items fitted in the house. 5. Make a list of the identified sanitary fittings and fixtures items. 6. Identify the material used in plumbing fittings and fixtures. 7. Survey the local market. 8. Visit the plumbing hardware shop. 9. Identify the sanitary items available in the shop. 10. Prepare a list of the identified sanitary items seen in the market. 11. Note down the cost of the sanitary items and their manufacturing company's name. 12. Draw figures of the various types of sanitary items.	34
9	Trouble shoot problems in plumbing system (15 Hrs)		
	<u>Theory</u>	Provide Customer relations and estimate a job: a. Importance of customer care and customer services. b. Significance of the good customer and good service to an organization. c. Methods of rectification and modification and costing should be done and communicated. d. Complete written estimate specifying quality should be given to customer.	3
	<u>Practical</u>	Obtain the requirement of a customer. a. Identify causes for and damage in plumbing system b. Reconditioning of water supply and sanitary fittings. Cleaning of sanitary fittings leakage and repairs. Testing for correct functioning.	12
10	Exposure to Field work (150 Hrs)		
	<u>Theory</u>	Exposure to Field Work	
	<u>Practical</u>	Visit cum study at four various work places to take practical knowledge with the modern plumbing works. Prepare a report on such visit.	150

Detail of Employability Skills Syllabus

Sl. No.	Content	Details
1.	English Literacy & Communication Skills	Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech) Transformation of sentences, Voice change, Change of tense, Spellings. Reading and understanding simple sentences about self, work and environment. Construction of simple sentences, Writing simple English. Speaking with preparation on self, on family, on friends, classmates, on know, picture reading gain confidence through role-playing . Taking messages, passing messages on and filling in message forms Greeting and introductions office hospitality, Resumes or curriculum vita essential parts, letters of application reference to previous communication. Communication and its importance, Principles of Effective communication, Types of communication – verbal, non verbal, written, email, talking on phone. Non verbal communication –characteristics, components-Para-language, Body – language, Barriers to communication and dealing with barriers. Handling nervousness/ discomfort.

		Self awareness, Importance of Commitment, Ethics and Values, Ways to Motivate Oneself, Personal Goal setting and Employability Planning. Manners, Etiquettes, Dress code for an interview, Do's & Don'ts for an interview, Problem Solving, Confidence Building, Attitude.
2.	I.T. Literacy	<p>Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of computer.</p> <p>Basics of Operating System, WINDOWS, The user interface of Windows OS, Create, Copy, Move and delete Files and Folders, Use of External memory like pen drive, CD, DVD etc, Use of Common applications.</p> <p>Basic operating of Word Processing, Creating, opening and closing Documents, use of shortcuts, Creating and Editing of Text, Formatting the Text, Insertion & creation of Tables. Printing document.</p> <p>Basics of Excel worksheet, understanding basic commands, creating simple worksheets, understanding sample worksheets, use of simple formulas and functions, Printing of simple excel sheets</p> <p>Internet, Concept of Internet (Network of Networks),</p> <p>Meaning of World Wide Web (WWW), Web Browser, Web Site, Web page and Search Engines. Accessing the Internet using Web Browser, Downloading and Printing Web Pages, Opening an email account and use of email. Social media sites and its implication.</p> <p>Information Security and antivirus tools, Do's and Don'ts in Information Security, Awareness of IT – ACT, types of cyber crimes.</p>
3.	Entrepreneurship Skills	<p>Entrepreneurship vs. management, Entrepreneurial motivation. Performance & Record, Role & Function of Entrepreneur, Qualities of a good Entrepreneur, SWOT and Risk Analysis. Concept & application of PLC, Sales & distribution Management. Different Between Small Scale & Large Scale Business, Market Survey, Method of marketing, Publicity and advertisement, Marketing Mix.</p> <p>Preparation of Project. Role of Various Schemes and Institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non financing support agencies to familiarizes with the Policies /Programmes & procedure & the available scheme.</p> <p>Project formation, Feasibility, Legal formalities i.e., Shop Act, Estimation & Costing, Investment procedure – Loan procurement – Banking Processes.</p>
4.	Productivity & Quality Tools	<p>Definition, Necessity, Meaning of GDP.</p> <p>Personal / Workman – Incentive, Production linked Bonus, Improvement in living standard. Industry Nation.</p> <p>Skills, Working Aids, Automation, Environment, Motivation. How improves or slows down.</p> <p>Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance.</p> <p>Meaning of quality, Quality characteristic. Definition, Advantage of small group activity, objectives of quality Circle, Roles and function of Quality Circles in Organization, Operation of Quality circle. Approaches to starting Quality Circles, Steps for continuation Quality Circles.</p> <p>Idea of ISO 9000 and BIS systems and its importance in maintaining qualities.</p> <p>Purpose of Housekeeping, Practice of good House keeping. Basic quality tools with a few examples</p>

Outcomes

Outcomes to be assessed/ NOS to be assessed	Assessment criteria for the outcome
1. Maintain safety at the work site.	<p>1.1 Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements and according to site policy.</p> <p>1.2 Identify and take necessary precautions on fire and safety .</p> <p>1.3 Identify, handle and store / dispose dangerous goods and substances according to safety regulations and requirements.</p> <p>1.4 Report supervisor/ Competent of authority in the event of accident or sickness of any staff and record accident details correctly. according to site accident/injury procedures.</p> <p>1.5 Identify and observe site evacuation procedures according to site policy.</p> <p>1.6 Identify Personal Productive Equipment (PPE) and use the same as per related working environment.</p> <p>1.7 Identify basic first aid and use them under different circumstances.</p> <p>1.8 Identify different fire extinguisher and use the same as per requirement.</p>
2. Understand plumbing system components.	<p>2.1 Explain the role of plumber and its importance-Plumbing cycle-plumbing and sanitary system</p> <p>2.2 Explain- What is Plumbing? What is Sanitary Work?</p> <p>2.3. Explain Components of plumbing system.</p> <p>2.4 Name Standard plumbing and sanitary material, as per the Bureau of Indian Standards (BIS).</p> <p>2.5 Perform maintenance of all the instruments and tools related to plumbing.</p> <p>2.6 Explain Points to be consider before starting the work by a plumber</p>
3. Interpret diagrams and drawings used for plumbing work.	<p>3.1 Demonstrate the Concept of plan, elevation, side view and sectional view of civil engineering structure</p> <p>3.2 Draw free hand mechanical sketches of the major tools used in plumbing</p> <p>3.3 Identify water supply and Sanitary fitting used in installation</p> <p>3.4 Describe building materials and their property may effect during installation of pipe lines, fittings etc.</p> <p>3.5 Identify the type of pipes and their material.</p> <p>3.6 Develop free hand sketches</p> <p>i. Draw a simple bathroom installation.</p> <p>ii. Draw a waste water outlet from the Bathroom.</p>
4. Identify different tools for Plumbing	<p>4.1 Describe the major tools used in plumbing-</p> <p>4.2 Identify different types of holding tools and use the same as per requirement.</p> <p>4.3 Identify different types of fitting tools and use the same as per requirement.</p>

	4.4 Identify different types of Cutting tools and use the same as per requirement.
	4.5 Identify different types of Pipe bending tools and use the same as per requirement.
	4.6 Identify different types of other accessories besides mentioned above and use the same as per requirement.
5. Know different Plumbing Material and Pipes.	5.1 Prepare list of different Sealing materials and location where they are used in plumbing.
	5.2 Identify different types of pipes used in water supply and sanitary and drainage work and their advantages, disadvantage and Care during work.
6. Identify measurements and Symbols used in Plumbing	6.1 Identify different types of Measuring tools for length, diameter, water pressure
	6.2 Identify different types of Plumbing Symbols-, Importance of plumbing symbols, Identification of the symbols given in the drawings of fixtures
7. Able to use pipe fittings, joints, bends, different pipe joining tools for distribution of water supply.	6.1 Identify the fittings available in the workshop.
	6.2 Prepare a list of the identified fitting items seen in the workshop.
	6.3 Draw figures of the various types of bends.
	6.3 Collect the pipe joints, pipes and tools and join the pipe with the help of proper pipe joining tools.
	6.4 Draw the figure of the threaded joints, grooved and compression joints.
8. Identify different items and in house drainage, sanitary installation.	8.1 Identify the drainage, sanitary installations and conveniences items fitted in the school.
	8.2. Make a list of the identified sanitary items.
	8.3 Identify the sanitary fittings and fixtures and types material used.
	8.4. Draw figures of the various types of sanitary items.
9. Trouble shoot problems in plumbing system.	9.1 Identify causes for and damage in plumbing system
	9.2 Reconditioning of water supply and sanitary fittings. Cleaning of sanitary fittings leakage and repairs. Testing for correct functioning.
10. Able to work in real job situation with special emphasis on basic safety and hazards in this domain.	10.1 Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain.
11. Understand and practice soft skills	(11.1) Assessor will rate the trainee on his ability to practice soft skills, including clear and concise communication, in day to day work with team and with higher authority
12. Demonstrate knowledge of concept and principles of basic arithmetic and financial calculation and apply knowledge of specific area to perform practical operations.	(12.1) Apply basic arithmetic calculations for arriving dimensional parameters as per drawing. (12.2) Apply basic financial calculation to understand cost of materials & labour and basic concepts of profit/loss, (12.3) Engage in basic banking transactions as customer

13. Explain time management, entrepreneurship and manage/organize related task in day to day work for personal & social growth.	(13.1) Ascertain appropriate time for the assigned task. (13.2) Execute the assigned task within time frame. (13.3) Manage own work within specified time. (13.4) Explain importance & factors affect the development of entrepreneurship. (13.5) Identify service providers for developing entrepreneur/business establishment.
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