

## Rajasthan Skill & Livelihoods Development Corporation

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| <b>1. Module Name</b>            | <b>Plumber cum Hand Pump Mechanic</b>   |
| <b>2. Sector</b>                 | Multi Skill   |
| <b>3. Entry Qualification</b>    | Minimum 8 <sup>th</sup> Pass  |
| <b>4. Minimum Age (in years)</b> | 15  |
| <b>5. Duration</b>               | <b>69 days/ 414 hrs.</b>  |
| <b>6. Provision of Tool kit</b>  | Yes   |
| <b>7. Terminal Competency</b>    | <p>After completion of the course the trainee will be able to:</p> <ul style="list-style-type: none"> <li>• Identify &amp; familiarize with the plumbing tools;</li> <li>• identify &amp; familiarize with the plumbing materials and fittings;</li> <li>• perform work by following safety procedures with suitable PPE;</li> <li>• cut in wall as per drawing using suitable tools &amp; equipments and fill the wall with same replaced material with new finish;</li> <li>• perform cutting, threading of GI pipes;</li> <li>• lay down the GI pipeline;</li> <li>• adjust locking nuts ensuring no leaks when tested;</li> <li>• perform supporting activities on wall like drilling, nailing, clipping and hammering;</li> <li>• fix Sanitary Pipeline, including gas pipe, waste pipe line horizontally and vertically;</li> <li>• fill mortar in the joints of RCC pipes (After fixing done by plumber);</li> <li>• handle sanitary bathroom fitting;</li> <li>• prepare concrete mixture according to correct proportion;</li> <li>• recall proper fitting sequence (to protect water Pressure fall);</li> <li>• undertake jointing of cast iron pipes using lead on one joint and cement or putty on others;</li> <li>• encase light weighed pipes with concrete;</li> <li>• fix sanitary wares in bathroom and toilets;</li> <li>• replace broken sanitary and bathroom fittings with new one;</li> <li>• fix PVC pipes, sanitary, Overhead tank fittings;</li> <li>• install water pumps and connect to supply lines with minimum bend;</li> <li>• assess the requirement of materials for a specific work;</li> <li>• check the rough digging done by the assistance, before fitting installation;</li> <li>• calculate the quantum of work done;</li> <li>• recall various parts of hand pump;</li> <li>• familiarize with tools used for installation and repair of hand pump;</li> <li>• dismantle and reassemble hand pump;</li> </ul> |

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|  | <ul style="list-style-type: none"> <li>• carry out installation of hand pump;</li> <li>• find out reasons for vibration of hand pump, handle and repair it;</li> <li>• undertake repairing of hand pump to restart proper discharge of water; and</li> <li>• undertake heavy repair work of installed hand pump;</li> </ul> |
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|   | <b>Approx. hrs.</b> |
| <b>8. Registration, Inauguration, introduction and objectives of the course</b> | 2                   |

| <b>9. Course content</b>   |                     |   |                     |
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| <b>Practical competencies</b>  | <b>Approx. hrs.</b> | <b>Underpinning Knowledge (Theory)</b>  | <b>Approx. hrs.</b> |
| <ul style="list-style-type: none"> <li>• Identification of tools and equipments used in plumbing work</li> <li>• Use of protective clothing, boots, goggles and equipment as applicable to a task</li> <li>• Good housekeeping practices, proper handling of materials and waste disposal.</li> <li>• Safety precautions and safety belts while working at site</li> <li>• Store/ lay materials at work in safe manner</li> <li>• Use and store of tools and equipments in a safe manner</li> <li>• Measurement of length &amp; dia in MKS &amp; FPS system</li> </ul> | 12                  | <ul style="list-style-type: none"> <li>• Role of Plumber.</li> <li>• Description of trade</li> <li>• Different types of tools and equipments used in plumbing work.</li> <li>• Safety precautions               <ul style="list-style-type: none"> <li>✓ While using different hand tools</li> <li>✓ While using raw materials</li> <li>✓ On the machines &amp; equipments</li> </ul> </li> <li>• Study of various types of plumbing materials used in plumbing work.</li> <li>• Knowledge of measurements and its conversion to other system.</li> </ul> | 6                   |
| <b>Taps &amp; Valves</b> <ul style="list-style-type: none"> <li>• Given a selection of taps and valves and following demonstration by instructor the trainee will dismantle taps &amp; Valves, inspect packing glands and washers, replace packing gland and washers, adjust locking nuts ensuring no leaks when tested.</li> </ul>  | 24                  | <ul style="list-style-type: none"> <li>• Working principles and methods of testing.</li> <li>• Use of basic tools and bench vice.</li> <li>• Safe handling of tools and fittings.</li> <li>• Types of gland packing.</li> </ul>   | 6                   |
| <b>Cutting/ Threading/ Bending G.I. Pipes</b> <ul style="list-style-type: none"> <li>• From a given sketch, calculate and measure length of G.I. pipe required.</li> <li>• Mark out and cut to size.</li> <li>• Thread and Bend G.I. Pipes to within given tolerances:-Marking out &amp; Cutting to <math>\pm 1\text{mm}</math> Bending/ off Setting to the following Quality &amp; Tolerances:- Free from throating, rippling and</li> </ul>  | 24                  | <ul style="list-style-type: none"> <li>• Use of Hand tools, Measuring &amp; Mark out tools, Cutting Tools, Bending Machine,</li> <li>• Stock &amp; Dies, Pipe Vice, Lubrication, Interpreting basic sketches &amp; drawings.</li> </ul>   | 6                   |

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| abnormal marks. Pipe diameter to be maintained, no distortion. Angle of bends and off sets, accurate to $\pm 1^{\circ}$  |    |  |   |
| <b>Joining/ Assembling G.I. Pipes</b> <ul style="list-style-type: none"> <li>Using completed items of above activity and from given drawing, assemble G.I. Pipe with fittings supplied:-Final assembly to be within a dimensional tolerance of <math>\pm 2\text{mm}</math>. Excess traces of jointing material to be removed. Not more than three threads to be variable after tightening of fittings. All fittings to be assembled square. Surface of pipe &amp; fittings must not be damaged.</li> </ul> | 24 | <ul style="list-style-type: none"> <li>Knowledge of various types of pipes with colour code and selection of pipe as per work, specific uses</li> <li>Pipe fittings, methods of joint. Types of pipe and fittings. Chain Wrench.</li> </ul>  | 6 |
| <b>P.V.C. Pipe Bending</b> <ul style="list-style-type: none"> <li>From a given sketch, calculate and measure length of pipe required, mark out and cut to size.</li> <li>Bend P.V.C. pipe to 5 times diameter of pipe:- Pipe diameter to be maintained, no distortion, Free from abnormal marks.</li> </ul>  | 18 | <ul style="list-style-type: none"> <li>Knowledge of operations with G I Pipes, selection of Die, method of cutting, Threading.</li> <li>Use of blow lamp and flame control. Uniform heating. Avoidance of burning. Bending on former.</li> </ul>   | 6 |
| <b>P.V.C. Jointing</b> <ul style="list-style-type: none"> <li>From a given sketch and with necessary tools join p.v.c. pipe with socket joints so that joint length is not less 1.5 time pipe diameter. Assemble exercise and secure with solvent cement to tolerance of <math>\pm 2\text{mm}</math> &amp; square to <math>\pm 1^{\circ}</math>.</li> </ul>  | 18 | <ul style="list-style-type: none"> <li>Use of hand tools, beveling reamer, applying heat with blow lamp. Preparation of Socket, Cleanliness. Application of solvent cement assembly methods. How pressure of liquid increases or decreases.</li> </ul>   | 4 |
| <b>S.W. Pipe Laying / Jointing</b> <ul style="list-style-type: none"> <li>Working with another trainee in his group, from a given sketch and with necessary tools, lay and join S.W. Pipes to correct fall and alignment. Remove surplus materials and test to meet local custom &amp; practice.</li> </ul>  | 18 | <ul style="list-style-type: none"> <li>Leveling and joining methods. Drain gradients use of sight rails.</li> <li>Testing methods, smoke / ball/ air/ water tests.</li> </ul>  | 4 |
| <b>Cast Iron Cutting &amp; Joining</b> <ul style="list-style-type: none"> <li>Working with another trainee in his group and from a given sketch cut and Join Cast Iron pipe, Set up and secure to correct alignment. Seal using lead on one joint and cement or putty on others.</li> </ul>  | 18 | <ul style="list-style-type: none"> <li>Safety in handling lead.</li> <li>Methods of jointing cast iron pipes.</li> <li>Reasons for joining methods, when and where to use.</li> <li>Use of chain wheel, melting pots, ladle, splash stick, caulking chisel. Introduction to gasket.</li> </ul> | 4 |
| <b>Fixing Sanitary Fixtures</b> <ul style="list-style-type: none"> <li>Fix low level water closet and</li> </ul>   | 18 | <ul style="list-style-type: none"> <li>Handling and lifting sanitary fixtures. Care in fitting &amp; leveling. By-laws in</li> </ul>   | 3 |

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| connect to solid stack, seal connections and test to meet By-laws in local authority.   |    | local authority.  |   |
| <b>Installing Water Pump, Connecting Supply Pipe</b><br><ul style="list-style-type: none"> <li>Position, level, fix and secure pump to pump base. Connect supply pipes, foot valves etc. to ensure air tight connections. Test to meet by-laws in local authority.</li> </ul> | 20 | <ul style="list-style-type: none"> <li>Working principles of water pump and foot valve.</li> <li>Methods of connection.</li> </ul>  | 3 |
| <ul style="list-style-type: none"> <li>Industry and construction site visit.</li> </ul>   | 12 |   |   |
| <ul style="list-style-type: none"> <li>Study of hand pump and its parts.</li> </ul>   | 3  | <ul style="list-style-type: none"> <li>Hand pump and its components.</li> </ul>   | 4 |
| <ul style="list-style-type: none"> <li>Visit to hand pump sites (5) to study the present status of their functioning.</li> </ul>  | 12 |   |   |
| <ul style="list-style-type: none"> <li>Familiarization with tools required for installation.</li> </ul>   | 3  | <ul style="list-style-type: none"> <li>Tools required for installation of hand pump and their uses.</li> </ul>  | 6 |
| <ul style="list-style-type: none"> <li>Dismantling of hand pump.</li> </ul>   | 6  |   |   |
| <ul style="list-style-type: none"> <li>Assembly of the hand pump.</li> </ul>  | 6  |   |   |
| <ul style="list-style-type: none"> <li>Installation of hand pump.</li> </ul>  | 18 |   |   |
| <ul style="list-style-type: none"> <li>Heavy repair work of the installed hand pump.</li> </ul>   | 24 |   |   |
| <ul style="list-style-type: none"> <li>Repairing of the vibration of the hand pump handle.</li> </ul>   | 8  | <ul style="list-style-type: none"> <li>Common hand pump troubles and their remedies.</li> </ul>   | 4 |
| <ul style="list-style-type: none"> <li>Repairing of the hand pump, when there is no water discharge.</li> </ul>   | 8  |   |   |
| <ul style="list-style-type: none"> <li>Repairing of the hand pump, when there is delayed or low water discharge.</li> </ul>   | 6  |   |   |
|   |    | <b>Entrepreneurship &amp; Soft Skills and Computer Literacy Module:</b>   | 0 |
|   |    | <ul style="list-style-type: none"> <li>Entrepreneurship – its necessity and charms of being an entrepreneur.</li> </ul>   | 1 |
|   |    | <ul style="list-style-type: none"> <li>Who is an entrepreneur and characteristics of a successful Entrepreneur?</li> </ul>  | 2 |
|   |    | <ul style="list-style-type: none"> <li>How to identify Business opportunities?</li> </ul>   | 2 |
|   |    | <ul style="list-style-type: none"> <li>Steps for setting up a small scale venture.</li> </ul>   | 1 |
|   |    | <ul style="list-style-type: none"> <li>Institutional support for entrepreneurship (whom to contact for what)</li> </ul>   | 2 |
|   |    | <ul style="list-style-type: none"> <li>Government (Central/ State) Schemes and assistance from Banks/ other financial institutions<br/> - Procedures and formalities for getting loan.</li> </ul> | 2 |

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|   |   | • How to prepare Business plan?  | 2 |
|   |   | • Financial literacy-Costing, Pricing, Profitability and Break Even Analysis.  | 2 |
|   |   | • Cash management in small enterprises.  | 2 |
|   |   | • Accounting and Book Keeping  | 2 |
|   |   | • Introduction to Taxation   | 1 |
|   |   | • Shop and Establishment Act and its provisions.   | 1 |
|   |   | • Creativity, Problem solving & decision making.   | 1 |
|   |   | • Common mistakes generally made by entrepreneurs.   | 1 |
|   |   | • Interaction with successful entrepreneur and success stories.  | 2 |
|   |   | • Communication and Negotiation skills.  | 1 |
|   |   | • Interpersonal skills   | 1 |
|   |   | • How to Deal with customer attitude – Effective selling.  | 1 |
|   |   | • Marketing – Basic concepts/ Skills and effective mode of advertising.  | 1 |
|   |   | • Introduction to e-commerce.  | 2 |
| <b>Computer Fundamentals</b><br><b>Customize the Desktop Environment e.g.</b><br>Desktop, Start Menu, and Taskbar etc. Configuring & Migrating Files, Folders & Settings - Folder Views, Accessibility Settings | 2 | <b>Computer Fundamentals, MS-Office &amp; Internet</b><br>introduction to Computers<br>History of Computers<br>Components of Hardware Peripherals  | 1 |
| <b>MS Word</b><br>Creating, Organizing & Formatting Content<br>Collaborating – Merge, Insert, View, Edit, Track Mode etc.<br>Formatting & Managing Documents  | 4 | <b>Concept of Operating System –</b><br>Windows XP, Exploring & Configuring the Windows XP Desktop Environment-Customize the Desktop, Start Menu, and Taskbar etc.<br>Configuring & Migrating Files, Folders                       | 1 |
| <b>MS Excel</b><br>Creating, Analyzing & Formatting Data & Content<br>Collaborating - Insert, View, Edit etc.<br>Managing Workbooks   | 3 | <b>Settings - Folder Views, Accessibility Settings</b><br>Features of Windows XP<br>Understanding concepts of Word processing using MS-Word<br>Understanding concepts of Electronic spreadsheet and various types of entries in it | 1 |
| <b>MS PowerPoint</b><br>Creating & Formatting Content<br>Collaborating - Track, Edit, Add, Delete<br>Comments, Merge<br>Managing & Delivering Presentations   | 3 |  |   |

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| <b>Internet Concepts</b><br>Opening websites and downloading data<br>Writing, reading and sending emails | 4          | <b>Understanding concepts of URL</b><br>Creating and Opening an E-mail account.<br>Receiving and sending emails<br>Searching information on Internet. | 1         |
| <b>Approx. Total Practical hours</b>   | <b>316</b> | <b>Approx. Total Theory hours</b>   | <b>96</b> |
| <b>Grand Total (2+316+96)</b>  |            | <b>414</b>  |           |

| S.No. | Item  | Unit | Quantity | S.No.                | Item  | Unit | Quantity |
|-------|---|------|----------|----------------------|---|------|----------|
| 1     | Traditional & ratchet type Pipe Die Set - 1/2" to 1" & 1 1/4" to 2" | Set  | 4 Each   | 38                   | Cotton Hand Gloves                          | Nos. | 30       |
| 2     | Pipe Wrench (Size No.8) & (Size No.12)                              | Set  | 9 Each   | 39                   | GI Pipe 1/2", 3/4", 1", 1 1/4", 1 1/2", 2"  | M    | 75 Each  |
| 3     | Chain wrench 1"---4"  | Set  | 3 Each   | 40                   | PVC Pipe 1/2", 3/4", 1", 1 1/4", 1 1/2", 2" | M    | 75 Each  |
| 4     | Pipe Vice (Size No.2) & (Size No.3)                                 | Nos. | 6 Each   | 41                   | CI Pipes 4", 6" 2 M length                  | Nos. | 15       |
| 5     | Wooden Bench (3' x 6' height - 4')                                  | Nos. | 5        | 42                   | Lead and lead wool                          | Kg   | 37       |
| 6     | Hammer Sledge (2 pound) & (1 pound)                                 | Nos. | 6 Each   | 43                   | Stone Ware Pipe 4"                          | Nos. | 30       |
| 7     | Flat Chisel (1') & Point Chisel (1')                                | Nos. | 7 Each   | 44                   | White Wash Basin                            | Nos. | 3        |
| 8     | Flat Punch (1/2') & Point Punch (1/2')                              | Nos. | 7 Each   | 45                   | White I.W.C Cistern                         | Nos. | 3        |
| 9     | Rawel Jumper Bit set (6 mm) & (8 mm)                                | Nos. | 7 Each   | 46                   | White E.W.C (Normal)                        | Nos. | 3        |
| 10    | Pipe Wheel Cutter (upto 2" cutting)                                 | Nos. | 7        | 47                   | White 'p' Trap 4"                           | Nos. | 3        |
| 11    | Spanner Set (Double End)  | Set  | 3        | 48                   | White 's' Trap 4'                           | Nos. | 3        |
| 12    | Spirit Level (length 2 feet)  | Nos. | 7        | 49                   | White kitchen Sink                          | Nos. | 1        |
| 13    | Tube Level (1/4" Hose White)  | Mtr  | 45       | 50                   | White Urinal (Flat)                         | Nos. | 1        |
| 14    | Screw Spanner (Size No.12)  | Nos. | 7        | 51                   | White Urinal (magnon)                       | Nos. | 1        |
| 15    | Screw Driver (1 1/2 feet) & (1 feet)                                | Nos. | 7 Each   | 52                   | 1/2" Bibcock (l) & (s)                      | Nos. | 7 Each   |
| 16    | Grip Plier (266 - 10)   | Nos. | 7        | 53                   | 1/2" Pillar cock & Angle Cock               | Nos. | 7 Each   |
| 17    | Pocker (Tapuria 871)  | Nos. | 7        | 54                   | 1/2" Ball Valve                             | Nos. | 7        |
| 18    | Cutting Pliers - Taparia  | Nos. | 7        | 55                   | 1" Gate Valve, Globe Valve & Check Valve    | Nos. | 7 Each   |
| 19    | Hacksaw Frame with Blade  | Nos. | 15       | 56                   | 1" NRV                                      | Nos. | 7        |
| 20    | Try Square (small)  | Nos. | 7        | 57                   | 1" Foot Valve & 2" Foot Valve               | Nos. | 4 Each   |
| 21    | Plum Bob (Small)  | Nos. | 7        | <b>Pipe Fittings</b> |   |      |          |
| 22    | Cocking Chisel (1 1/4")   | Nos. | 6        | 58                   | 1/2" G.I. Elbow                             | Nos. | 15       |
| 23    | Blow lamp   | Nos. | 6        | 59                   | 3/4" G.I Elbow                              | Nos. | 15       |

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| 24 | Trowel Mason (small) & (Big)         | Nos. | 7 Each  | 60 | 1" G.I Elbow                        | Nos.  | 15      |
| 25 | Spade with handle                    | Nos. | 7       | 61 | ½" ¾" G.I. Tee                      | Nos.  | 45      |
| 26 | Mortar Pan                           | Nos. | 7       | 62 | 1"x ¾", ¼" x ½", 1" x ½"            | Nos.  | 45      |
| 27 | Hand Drilling Machine                | Nos. | 1       | 63 | G.I Reducer Elbow 1"x ¾", 1" X ½"   | Nos.  | 15 Each |
| 28 | Cleaning Brush & Painting Brush (2") | Nos. | 7 Each  | 64 | G.I Reducer Elbow ¾"x ½"            | Nos.  | 15      |
| 29 | Oil Can (Small)                      | Nos. | 4       | 65 | G.I Coupling ½" X ¾" X 1"           | Nos.  | 45      |
| 30 | Chain Wrench (upto 3")               | Nos. | 3       | 66 | G.I Straight Reducer 1" x ¾" x 1 ½" | Nos.  | 45      |
| 31 | Hand Bending Machine (1/2" to 1")    | Nos. | 4       | 67 | G.I Bend ½", ¾", 1"                 | Nos.  | 45      |
| 32 | Ladder (10 feet height)              | Nos. | 3       | 68 | G.I union ½", ¾", 1"                | Nos.  | 45      |
| 33 | Measuring Tape (5m)                  | Nos. | 7       |    | <b>PVC Fittings</b>                 |       |         |
| 34 | Spun Yarn                            | Kg   | 75      | 69 | All types pasted thread each        | Nos.  | 15      |
| 35 | Hydraulic Pressure Test Pump         | Nos. | 1       | 70 | Solvent Cement                      | Litre | 3       |
| 36 | Safety Belt                          | Nos. | 7       | 71 | Shellac                             | Nos.  | 30      |
| 37 | Safety Shoes & Safety Helmet         | Nos. | 30 Each | 72 | Thread Ball                         | Nos.  | 75      |

| S.No. | Item   | Quantity | S.No. | Item   | Quantity |
|-------|--|----------|-------|--|----------|
|       | <b>Tools for masonry work</b>                                |          | 14    | Pipe wrench                                    | 6        |
| 1     | Scoop  | 6        | 15    | Double ended spanner                           | 6        |
| 2     | Pan  | 6        | 16    | Screw driver                                   | 6        |
| 3     | Spade  | 6        | 17    | Bush   | 6        |
| 4     | Leveling Plank   | 6        | 18    | Oil can  | 6        |
| 5     | Buckets  | 6        | 19    | Hammer   | 6        |
| 6     | Platform shuttering unit measuring tape                      | 6        | 20    | Tool box                                       | 6        |
|       | <b>Tools for installation &amp; repair work of hand pump</b> |          | 21    | Spirit level                                   | 6        |
| 7     | Pipe lifter  | 6        | 22    | Chain coupler supporting tool                  | 6        |
| 8     | Tank lifter  | 6        | 23    | Sand   | 6        |
| 9     | Crank spanner  | 6        | 24    | Rod Coupling spanner                           | 6        |
| 10    | Connecting rod vice  | 6        | 25    | Hacksaw  | 6        |
| 11    | Connecting rod lifter  | 6        | 26    | Pipe die set                                   | 6        |
| 12    | Hand axle punch  | 6        | 27    | Hand pump for familiarization and installation | 2        |
| 13    | Heavy duty vice  | 3        | 28    | Installed hand pump for repair                 | 2        |

**Note:** In case of repetition of any item in the above mentioned tool list, that particular item may be procured as per maximum number of that item, shown in the list.

| S.No. | Item              | Quantity                   | S.No. | Item   | Quantity        |
|-------|-------------------|----------------------------|-------|--|-----------------|
|       | <b>Hardware</b>   |                            |       | <b>Software:</b>   |                 |
| 1     | Computers/Laptops | 10 (one for three trainee) | 6     | Microsoft Windows 7/8/10 or UNIX/ LINUX or latest software | For all Systems |

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| 2 | Power backup                               | For all Systems    | 7 | Microsoft Office 2007/ 2010/ 2013 or latest software                                      | For all Systems |
| 3 | Inkjet/Laser Printer (Network/USB Printer) | 1                  | 8 | Antivirus Software (TVD/ Norton/ Quick Heal Total Security/ Kaspersky/ Any Popular brand) | For all Systems |
| 4 | Speaker                                    | 1                  | 9 | Internet Connection   | For all Systems |
| 5 | Spare H/W components                       | As per requirement |   |   |                 |