

# Model Curriculum

## Irrigation Service Technician

**SECTOR: AGRICULTURE & ALLIED**  
**SUB-SECTOR: AGRICULTURE CROP PRODUCTION**  
**OCCUPATION: FARM MACHINERY, EQUIPMENT OPERATION AND MAINTENANCE**  
**REF ID: AGR/Q1104, V1.0**  
**NSQF LEVEL: 4**



## Certificate

### CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

**AGRICULTURE SKILL COUNCIL OF INDIA**

for the


**MODEL CURRICULUM**

Complying to National Occupational Standards of  
Job Role/Qualification Pack: **'Irrigation Service Technician'** QP No. **'AGR/Q1104 NSQF Level 4'**

Date of Issuance: April 24<sup>th</sup>, 2017

Valid up to: March 31<sup>st</sup>, 2020

\* Valid up to the next review date of the Qualification Pack



Authorised Signatory  
(Agriculture Skill Council of India)

## TABLE OF CONTENTS

1. Curriculum	04
2. Trainer Prerequisites	09
3. Annexure: Assessment Criteria	10

# Irrigation Service Technician

## CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Irrigation Service Technician” in the “Agriculture & Allied” Sector/Industry and aims at building the following key competencies amongst the learner

<b>Program Name</b>	<b>Irrigation Service Technician</b>		
<b>Qualification Pack Name &amp; Reference ID.</b>	AGR/Q1104, v1.0		
<b>Version No.</b>	1.0	<b>Version Update Date</b>	
<b>Pre-requisites to Training</b>	Class 8, preferably		
<b>Training Outcomes</b>	<b>After completing this programme, participants will be able to:</b> <ul style="list-style-type: none"> <li>• Undertake installation, repair and maintenance of tubewell irrigation system- drainage pump sets, centrifugal, indigenous, solar, submersible pumps</li> <li>• Undertake selection of pipes and pipe fittings</li> <li>• Install and maintain micro-irrigation systems-sprinkler, drip</li> </ul>		

This course encompasses 3 out of 3 National Occupational Standards (NOS) of “Irrigation Service Technician” Qualification Pack issued by “Agriculture Skill Council of India”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<b>Introduction</b>  <b>Theory Duration</b> (hh:mm) 02:00  <b>Practical Duration</b> (hh:mm) 00:00  <b>Corresponding NOS Code</b> Bridge Module	<ul style="list-style-type: none"> <li>Understand General Discipline in the class room &amp; Workshop (Do's &amp; Don'ts)</li> <li>Scope &amp; importance of Farm Mechanization industry in India</li> <li>Get acquainted with different irrigation system manufacturers &amp; their brands/models</li> <li>Understand the role of a Irrigation Service Technician and the progression pathways</li> </ul>	Laptop, white board, marker, projector and video films & Presentations
2	<b>Carry out installation, repair and maintenance of tube well irrigation system</b>  <b>Theory Duration</b> (hh:mm) 18:00  <b>Practical Duration</b> (hh:mm) 70:00  <b>Corresponding NOS Code</b> AGR/N1113	<ul style="list-style-type: none"> <li>explain irrigation and its importance</li> <li>Identify different Sources of water – Tanks – Wells &amp; Reservoirs – Canal Network – Irrigation Scheduling – Irrigation methods – Micro irrigation - Participatory management of Irrigation Systems.</li> <li>State Irrigation requirement of crops, depth of irrigation, frequency of irrigation, irrigation efficiencies Surface methods of water application: border, check basin and furrow irrigation – adaptability, specification and design considerations.</li> <li>List types of irrigation</li> <li>Classify irrigation methods – Surface irrigation /Sub-surface irrigation/Sprinkler irrigation/Merits and demerits – Lift irrigation /Tank irrigation.</li> <li>State indigenous water lifting devices- construction and function</li> <li>List pump and its type</li> <li>Select pump for required work</li> <li>Explain Construction and functioning of centrifugal pump</li> <li>Discuss procedure for fixing of centrifugal pump</li> <li>State need of foundation, lay the foundation and set foundation bolts</li> <li>Installing of pumps and accessories such as foot valve, pipes, bends, elbow, etc.</li> </ul>	Laptop, white board, marker, projector and video films, centrifugal pump service tools, foot valve, pipes, bends, elbow, coupling

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> <li>Identify different types of coupling between pump and engine</li> <li>Joining of mechanical coupling between the prime mover/engine and pump</li> <li>Checking the alignment of the coupling</li> <li>Connecting of three phase/ single phase electrical connections to the motor</li> <li>Commissioning and testing of pump</li> <li>Identify common faults and repair or replace foot valve, suction, delivery line, pump, coupling, etc.</li> <li>repair or replace electrical connections, fuses, bearings, starters, motors, if necessary</li> <li>repair or replace copper tubing's, valves, gaskets, etc. if necessary</li> <li>discuss importance of regular servicing of centrifugal pump,</li> <li>Oiling of pump, joints, etc. as per operator manual</li> </ul>	
3	<p><b>Carry out installation, repair and maintenance of micro-irrigation system</b></p> <p><b>Theory Duration</b> (hh:mm) 20:00</p> <p><b>Practical Duration</b> (hh:mm) 70:00</p> <p><b>Corresponding Code</b> AGR/N1114</p> <p><b>NOS</b></p>	<ul style="list-style-type: none"> <li>Explain importance of micro irrigation system-sprinkler and drip</li> <li>Discuss advantages and use of micro irrigation system</li> <li>List components of micro irrigation</li> <li>Installation and commissioning of micro irrigation system</li> <li>Selection of main line, lateral lines, riser and sprinkler heads, micro tubing, dripper</li> <li>Joining of pipeline, fitting</li> <li>Layout the main and lateral line</li> <li>Use of measuring instruments for checking of pressure, water output</li> <li>select the pump to match the power output</li> <li>lay the foundation and set foundation bolts</li> <li>select the main line, lateral lines, risers and sprinkler heads, micro tubing/ drippers</li> <li>joining of main line, lateral line, micro tubing, drippers</li> <li>installing of the fitter unit to the drip irrigation system</li> <li>installing of pressure measuring instruments on the main line, lateral line and near outlets</li> <li>commissioning and testing of the</li> </ul>	<p>micro irrigation system, pipe, joint, dripper, sprinkler heads, tubings, motor , pump, pressure measuring instrument special tools for installing micro drip system</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		sprinkler and drip irrigation systems <ul style="list-style-type: none"> <li>• inspect the lateral lines, risers, sprinkler heads, micro tubings and dripper for damage</li> <li>• adjust nozzle and drips to ensure proper irrigation</li> <li>• repair or replace defective parts repair or replace electrical connections, fuses, bearings, starters, motors, if necessary</li> <li>• test and examine operations by observing meters and pressure gauges</li> <li>• test and examine centrifugal pumps and sprinkler and drip irrigation system</li> </ul>	
4	<b>Maintain health and safety at the workplace</b>  <b>Theory Duration</b> (hh:mm) 10:00  <b>Practical Duration</b> (hh:mm) 10:00  <b>Corresponding Code</b> <b>NOS</b> AGR/N9903	<ul style="list-style-type: none"> <li>• undertake basic safety checks before operation of all machinery and vehicles and report all potential hazards to the supervisor</li> <li>• identify work for which protective clothing or equipment is required and perform those duties in accordance with workplace policy</li> <li>• assess risks prior to performing manual handling jobs, and work according to currently recommended safe practices</li> <li>• use equipment and materials safely and correctly and return the same to designated storage when not in use</li> <li>• dispose off waste safely and correctly in a designated area</li> <li>• recognize risks to bystanders and take action to reduce risk associated with jobs in the workplace</li> <li>• perform work in a manner which minimizes environmental damage and ensure work instructions for controlling risks are followed closely</li> </ul>	Laptop, white board, marker, projector, , Personal protective equipment Like: Helmet / head gear, Cotton / woollen safety gloves, Safety boots, Safety Harness; First Aid Kit: Bandages, Adhesive bandages, Betadine Solution / ointment, Pain relief spray / ointment, Antiseptic liquid; Phone directory, Search lights, fire extinguisher
	<b>Total Duration:</b>  <b>Theory Duration</b> (hh:mm) <b>50:00</b>  <b>Practical Duration</b> (hh:mm) <b>150:00</b>	<b>Unique Equipment Required:</b> Laptop, white board, marker, projector and video films on irrigation, centrifugal pump, service tools, foot valve, pipes, bends, elbow, coupling, micro irrigation system, pipe, joint, dripper, sprinkler heads, tubing, motor, pump, pressure measuring instrument, special tools for installing micro irrigation system  Personal protective equipment Like: Helmet / head gear, Cotton / woollen safety gloves, Safety boots, Safety Harness; First Aid Kit: Bandages, Antiseptic liquid; Phone directory, Search lights, fire extinguisher	

Grand Total Course Duration: **200 Hours, 0 Minutes**

*(This syllabus/ curriculum has been approved by Agriculture Skill Council of India)*



## Trainer Prerequisites for Job role: "Irrigation Service Technician" mapped to Qualification Pack: "AGR/Q1104, v1.0"

Sr. No.	Area	Details
1	<b>Description</b>	Trainer is responsible for educating the trainees – do installation, repair and maintenance of irrigation pumps- centrifugal pumps, submersible pump, sprinkler systems etc and installation of drip irrigation systems on a regular basis
2	<b>Personal Attributes</b>	Trainer should be Subject Matter Expert. He/ she should have good communication, leadership, observation and practical oriented skills.
3	<b>Minimum Educational Qualifications</b>	Diploma in Agriculture Engineering
4a	<b>Domain Certification</b>	Certified for Job Role: " <u>Irrigation Service Technician</u> " mapped to QP: " <u>AGR/Q1104, v1.0</u> ". Minimum accepted score is 80%.
4b	<b>Platform Certification</b>	Recommended that the Trainer is certified for the Job Role: "Trainer", mapped to the Qualification Pack: "MEP/Q0102". Minimum accepted % as per respective SSC guidelines is 80%.
5	<b>Experience</b>	<ul style="list-style-type: none"> <li>• B.Tech (Ag. Engg) with 1 Year relevant experience</li> <li>• Diploma (Ag. Engg) with 3 Years relevant experience</li> <li>• ITI/ Vocational pass out farm machinery with 5+ years experience in relevant field</li> </ul>

## Annexure: Assessment Criteria

<b>Assessment Criteria</b>	
<b>Job Role</b>	<b>Irrigation Service Technician</b>
<b>Qualification Pack</b>	<b>AGR/Q1104, v1.0</b>
<b>Sector Skill Council</b>	<b>Agriculture</b>

Sr. No.	Guidelines for Assessment
1	Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2	The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre(as per assessment criteria below)
4	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on this criteria
5	To pass the Qualification Pack, every trainee should score a minimum of 70% in aggregate
6	In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

Assessment outcomes	Assessment criteria for outcomes	Marks Allocation			
		Total Marks	Out Of	Theory	Skills Practical
1. AGR/N1113 Carry out installation, repair and maintenance of tubewell irrigation system	PC1. select the pump to match the power output		7	2	5
	PC2. lay the foundation and set bolts		7	2	5
	PC3. mount pumps and accessories like foot valve, pipes, bends, elbow, etc.		7	2	5
	PC4. ensure mechanical coupling between the prime mover and pump		7	2	5
	PC5. check the alignment of the coupling		7	2	5
	PC6. provide three phase/ single phase electrical connections to the motor		7	3	4
	PC7. fit starter and other electrical accessories		7	2	5
	PC8. inspect the foot valve suction, delivery line, pump, coupling, etc. for damage		7	2	5
	PC9. repair or replace defective parts in units and equipments like foot valve, delivery line, coupling, etc.		8	2	6
	PC10. check the alignment of coupling		7	2	5
	PC11. repair or replace electrical connections, fuses, bearings, starters, motors, if necessary		8	2	6
	PC12. repair or replace copper tubings, valves, gaskets, etc. if necessary		7	2	5
	PC13. carry out lubrication of pump, joints, etc. as per operator manual		7	2	5
	PC14. test and examine operations by observing meters and pressure gauges		7	3	4
			<b>100</b>	<b>30</b>	<b>70</b>
2. AGR/N1114 Carry out installation, repair and maintenance of micro-irrigation system	PC1. select the pump to match the power output		5	1.5	3.5
	PC2. lay the foundation and set foundation bolts		5	1.5	3.5
	PC3. mount pumps and accessories like foot valve, pipes, bends, elbow, etc.		5	1.5	3.5
	PC4. ensure mechanical coupling between the prime mover and pump		5	1.5	3.5
	PC5. check the alignment of the coupling		5	1.5	3.5
	PC6. provide three phase/ single phase electrical connections to the motor		5	1.5	3.5
	PC7. fit starter and other electrical accessories		5	1.5	3.5
	PC8. select the main line, lateral lines, risers and sprinkler heads, micro tubings/ drippers		5	1.5	3.5

	PC9. join main line, lateral line, micro tubing, drippers		5	1.5	3.5
	PC10. install the filter unit to the drip irrigation system		5	1.5	3.5
	PC11.install pressure measuring instruments on the main line, lateral line and near outlets		5	1.5	3.5
	PC12.inspect the foot valve suction, delivery line, pump, coupling, etc. for damage		5	1.5	3.5
	PC13.inspect the lateral lines, risers, sprinkler heads, micro tubings and dripper for damage		5	1.5	3.5
	PC14.adjust nozzle and drips to ensure proper irrigation		5	1.5	3.5
	PC15.repair or replace defective parts in units and equipments like foot valve, delivery line, coupling, etc.		5	1.5	3.5
	PC16.check the alignment of coupling		5	1.5	3.5
	PC17.repair or replace electrical connections, fuses, bearings, starters, motors, if necessary		5	1.5	3.5
	PC18.repair or replace copper tubings, valves, gaskets, etc. if necessary		5	1.5	3.5
	PC19.carry out lubrication of pump, joints, etc. as per operator manual		5	1.5	3.5
	PC20.test and examine operations by observing meters and pressure gauges		5	1.5	3.5
			<b>100</b>	<b>30</b>	<b>70</b>
3. AGR/N9903 Maintain health and safety at the workplace	PC1. undertake basic safety checks before operation of all machinery and vehicles and report all potential hazards to the supervisor		6	2	4
	PC2. identify work for which protective clothing or equipment is required and perform those duties in accordance with workplace policy		6	2	4
	PC3. read and understand the hazards of use and contamination mentioned on the labels of pesticides/ fumigants etc		6	2	4
	PC4. assess risks prior to performing manual handling jobs, and work according to currently recommended safe practices		6	2	4
	PC5. use equipment and materials safely and correctly and return the same to designated storage when not in use		6	2	4
	PC6. dispose off waste safely and correctly in a designated area		7	2	5
	PC7. recognize risks to bystanders and take action to reduce risk associated with jobs in the workplace		7	2	5
	PC8. perform work in a manner which minimizes environmental damage all		7	2	5

	procedures and ensure work instructions for controlling risks are followed closely			
	PC9. report any accidents, incidents or problems without delay to an appropriate person and take necessary immediate action to reduce further danger	7	2	5
	PC10. follow procedures for dealing with accidents, fires and emergencies, including communicating location and directions for emergency evacuation	7	2	5
	PC11. follow emergency procedures to company standard/workplace requirements	7	2	5
	PC12. use emergency equipment in accordance with manufacturers' specifications and workplace requirements	7	2	5
	PC13. provide treatment appropriate to the patient's injuries in accordance with recognized first aid techniques	7	2	5
	PC14. recover (if practical), clean, inspect/test, refurbish, replace and store the first aid equipment as appropriate	7	2	5
	PC15. report details of first aid administered in accordance with workplace procedures.	7	2	5
		<b>100</b>	<b>30</b>	<b>70</b>
	<b>TOTAL</b>	<b>300</b>	<b>300</b>	<b>90</b>
	<b>Percentage Weightage</b>			<b>30%</b>
	<b>Minimum Pass% to qualify (aggregate):</b>			<b>70%</b>