

Model Curriculum

QP Name: Bio Gas Plant & Bio Slurry Technician,V2

QP Code: STC - SGJ/NSQF-2022/1402,V2

QP Version: 2.0

NSQF Level: 3

Model Curriculum Version: 2.0

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Training Parameters

Sector	Green Jobs
Sub-Sector	Waste Management
Occupation	Bio Gas Plant & Bio Slurry Technician
Country	India
NSQF Level	3
Aligned to NCO/ISCO/ISIC Code	Not Available
Minimum Educational Qualification and Experience	1. Grade 10 OR 2. Grade 8 pass and pursuing continuous schooling in regular school with vocational subject OR 3. Grade 8 Pass with 2 year experience OR 4. 5th Grade Pass with 5 yrs experience
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 years
Last Reviewed On	3.5.2023
Next Review Date	3.5.2026
Version	2.0
NSQC Approval Date	3.5.2023
Model Curriculum Creation Date	3.5.2023
Model Curriculum Valid Up to Date	3.5.2026
Model Curriculum Version	2.0
Minimum Duration of the Course	450 hours
Maximum Duration of the Course	450 hours

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the participants will be able to:

- Identify Biomass resource and Bio-energy potential
- Illustrate mechanism of Biogas Systems
- Explain the process of Biomass Gasifiers
- Identify appropriate site for installing the BGP
- Construct a Bio Gas Plant with proper care and safety
- Install Cooking Apparatus
- Carry out post BGP construction activities
- Demonstrate the procedure of Bio slurry manure making and Marketing of Organically grown crops
- Work in real job situation with special emphasis on basic safety and hazards in this domain.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
SGJ/1402/OC1 Identify Biomass resource and Bio-energy potential NOS Version No.: 2.0 NSQF Level: 3	06:00 Hours	24:00 Hours	00:00Hours	00:00Hours	30:00 Hours
Module1: Biomass resource and Bio-energy potential assessment	06:00 Hours	24:00 Hours	00:00Hours	00:00Hours	30:00 Hours
SGJ/1402/OC2 Illustrate mechanism of Biogas Systems NOS Version No. :2.0 NSQF Level:3	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
Module2: Overview of Biogas Systems	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
SGJ/1402/OC3 Explain the process of Biomass Gasifiers NOS Version No.:2.0 NSQF Level: 3	12:00 Hours	18:00 Hours	00:00Hours	00:00Hours	30:00 Hours
Module3: Explain the process of Biomass Gasifiers	12:00 Hours	18:00 Hours	00:00Hours	00:00Hours	30:00 Hours
SGJ/1402/OC4 Identify appropriate site for installing the BGP NOS Version No.:2.0 NSQF Level:3	12:00 Hours	18:00 Hours	00:00Hours	00:00Hours	30:00 Hours

Module 4: Identify appropriate site for installing the BGP	12:00 Hours	18:00 Hours	00:00Hours	00:00Hours	30:00 Hours
SGJ/1402/OC5 Construct a Bio Gas Plant with proper care and safety NOS Version No.:2.0 NSQF Level: 3	15:00 Hours	75:00 Hours	00:00Hours	00:00Hours	90:00 Hours
Module 5: Construct a Bio Gas Plant with proper care and safety	15:00 Hours	75:00 Hours	00:00Hours	00:00Hours	90:00 Hours
SGJ/1402/OC6 Install Cooking Apparatus NOS Version No.: 2.0 NSQF Level: 3	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
Module 6: Install Cooking Apparatus	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
SGJ/1402/OC7 Carry out post BGP construction activities NOS Version No.:2.0 NSQF Level: 3	15:00 Hours	45:00 Hours	00:00Hours	00:00Hours	60:00 Hours
Module 7: Carry out post BGP construction activities	15:00 Hours	45:00 Hours	00:00Hours	00:00Hours	60:00 Hours
SGJ/1402/OC8 Demonstrate the procedure of Bio slurry manure making and Marketing of Organically grown crops NOS Version No.: 2.0 NSQF Level: 3	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
Module 8: Demonstrate the procedure of Bio slurry manure making and Marketing of Organically grown crops	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
SGJ/1402/OC9 Work in real job situation with special emphasis on basic safety and hazards in this domain. NOS Version No.: 2.0 NSQF Level: 3	-	-	60:00 Hours	00:00Hours	60:00 Hours
Module 9: Work in real job situation with special emphasis on basic safety and hazards in this domain.	-	-	60:00 Hours	00:00Hours	60:00 Hours
DGT/VSQ/N0102 Employability Skill NOS Version No.: 1.0 NSQF Level: 3	60:00 Hours	00:00Hours	00:00Hours	00:00Hours	60:00 Hours
Module 10: Employability Skill (including 60 hours of Apprenticeship training at work sites)	60:00 Hours	00:00Hour	00:00Hours	00:00Hours	60:00 Hours
Total Duration	150:00 Hours	240:00 Hours	60:00Hours	00:00Hours	450:00 Hours

Module Details

Module1: Identify Biomass resource and Bio-energy potential

Mapped to SGJ/1402/OC1,v2.0

Terminal Outcomes:

- Classify biomass
- Identify Bio Energy Resources, World Bio Energy Potential, India's Bio Energy Potential.
- Identify properties and characteristics of biomass
- Identify different energy conversion methods.
- Identify Biomass Combustion methods
- Utilize bioenergy in Biomass based power generation and domestic cooking.

Duration: 06:00	Duration: 24:00
Theory–Key Learning Outcomes	Practical–Key Learning Outcomes
<ul style="list-style-type: none"> • Reading of source biomass and bioenergy. • Use the appropriate biomass for the generation of bioenergy. • Identify Physio-chemical characteristics of biomass. • Illustrate different energy conversion methods. • Illustrate Biomass Combustion methods. • Use of bioenergy in Biomass based power generation and domestic cooking 	<ul style="list-style-type: none"> • Identify Bio Energy Resources • Select suitable biomass for generation of bio energy. • Check the availability of biomass. • Demonstrate Physio-chemical characteristics of biomass. • Verify Biomass Combustion potential and Loose biomass densification capacity. • Find Biomass based power generation and domestic cooking process.
Classroom Aids:	
Computer, Projection Equipment, Power Point Presentation and software, Facilitator's Guide, Participant's Handbook.	
Tools, Equipment and Other Requirements:	
Different biomass, Steel rod, Spade Lid, Container, Bucket, Iron hook, Thread, Wooden block, Karnik.	

Module2: Illustrate mechanism of Biogas Systems

Mapped to SGJ/1402/OC2,V2.0

Terminal Outcomes:

- Describe the Technology of Biogas production, and Digester types.
- Exhibit Bio methanation process and Chemical reaction of bio methanation process.
- Demonstrate design of Digester, Biogas plant design, operation, fault checking, maintenance.
- Explain the use of about Dung, Vegetable Waste and Municipal Waste based Biogas plants.
- Demonstrate the procedure of Biogas Bottling Plant Technology.
- Utilize Biogas as fuel for transportation, Lighting, Running Dual Fuel Engines, Electricity generation..

Duration: 10:00	Duration: 20:00
Theory–Key Learning Outcomes	Practical–Key Learning Outcomes
<p>The candidate will be able to describe the following:-</p> <ul style="list-style-type: none"> • Introduction to bio gas. Difference between Biogas and LPG/CNG. Advantages of Biogas. • Understand Bio methanation process and Chemical reaction of bio methanation process • Criteria for design of Biogas plant. • Understand Dung, Vegetable Waste and Municipal Waste based Biogas plants. • Verify that water is available in the vicinity for making a water solution of dung to be given in the input inlet, • Procedure of bottling of Biogas. • Methods of use of Biogas as fuel for transportation, Lighting, Running Dual Fuel Engines, Electricity generation. 	<p>The candidate will be able to demonstrate the following:-</p> <ul style="list-style-type: none"> • Demonstration of Biogas generation process with the chart/videos. • Demonstrate Biogas plant design and Digester design. • Demonstrate various Chemical reaction involve in bio methanation process. • Demonstrate construction of Dung, Vegetable Waste and Municipal Waste based Biogas plants. • Demonstrate Biogas Bottling system and procedure.
Classroom Aids:	
Computer, Projection Equipment, Power Point Presentation and software, Facilitator’s Guide, Participant’s Handbook	
Tools, Equipment and Other Requirements	
<p>Good quality bricks, Sand, Cement, Stone chips, Extrusion pipe, Steel rod, Spade Lid, Container, Bucket, Iron hook, Thread, Woolen thread, Wooden block, Karnik Tram karnik, Rusho, Level pipe, Matam, Tape, Nail, Compressor,</p> <p>1 1/2 GI pipe, 1/2” - 1 1/2” Thread dye machine, 1/2” + 3/4”+1” Knives set, Pipe spanner Gastonia, Spanner adjustable, Plier, Common Screw driver set, Spanner set, Measuring tape Hacksaw frame and blade, Bench vice, Oven single and double, Cube cork Ball valve, Gate valve, 3/8” GI Pipe, 1/2 “ GI Pipe, 1/2” HD PVC Pipe, 1/2” Push pipe 1/2” union, 3/4” - 1/2” GI Elbow, 1/2”-3” GI Nipple, 1/2” T, 1/2” Elbow, 1/2” Push elbow 1/2” Push socket, 3/4” - 1/2” Push elbow, 1/2’ Pushunion, Sealing materials Hubbox</p>	

Module 3: Explain the process of Biomass Gasifiers

Mapped to SGJ/1402/OC3,V2.0

Terminal Outcomes:

- Understand the Principle of Bio mass Gasifiers.
- Interpret Design of Bio mass Gasifiers, updraft gasifier, down draft gasifier.
- Demonstrate Zero carbon biomass gasification plants
- Demonstrate Gasification of plastic-rich waste.
- Understand Biomass integrated gasification/combined cycles systems, gasification, pyrolysis, liquefaction process.
- Demonstrate Biomass pre- treatment and processing.
- Demonstrate Electricity generation from biomass gasifier, bio-gasoline, bio-diesel and duel fuel engine.

Duration:12:00	Duration:18:00
Theory–Key Learning Outcomes	Practical–Key Learning Outcomes
<p>The candidate will be able to describe the followings:-</p> <ul style="list-style-type: none"> • Make the Design of Bio mass Gasifiers, updraft gasifier, down draft gasifier • Construct Zero carbon biomass gasification plants • Carry out the Gasification of plastic-rich waste. • Find the Biomass integrated gasification, pyrolysis, liquification process. • Know about Biomass pre-treatment and processing • Know about Electricity generation from biomass gasifier, bio-gasoline, bio-diesel and duel fuel engine. 	<p>The candidate will be able to</p> <ul style="list-style-type: none"> • Demonstrate Design of Bio mass Gasifiers , updraft gasifier, down draft gasifier. • Demonstrate construction of Zero carbon biomass gasification plants. • Construct gasifier for Gasification of plastic-rich waste. • Demonstrate Biomass integrated gasification cycles systems, gasification, pyrolysis, liquification cycles. • Demonstrate Biomass pre- treatment and processing • Demonstrate biodiesel, improved biomass cookstove, biohydrogen generation procedure with the chart/videos. • Demonstrate Electricity generation process from biomass gasifier, engine systems, bio-gasoline, bio-diesel and duel fuel engine with the chart/videos.
Classroom Aids:	
Computer, Projection Equipment, Power Point Presentation and software, Facilitator’s Guide, Participant’s Handbook	
Tools, Equipment and Other Requirements	
Good quality bricks, Sand, Cement, Stone chips, Extrusion pipe, Steel rod, Spade Lid, Container, Bucket , Iron hook, Thread , Woolen thread , Wooden block, Karnik Tram karnik, Rusho, Level pipe, Matam, Tape, Nail , Compressor, 1 1/2 GI pipe, 1/2” - 1 1/2” Thread dye machine, 1/2” + 3/4”+1” Knives set, Pipe spanner Gastonia, Spanner adjustable, Plier, Common Screw driver set, Spanner set, Measuring tape, Hacksaw frame and blade, Bench vice, Oven single and double, Cube cork, Ball valve, Gate valve, 3/8” GI Pipe, 1/2 “ GI Pipe , 1/2” HD PVC Pipe, 1/2” Push pipe, 1/2” union, 3/4” - 1/2” GI Elbow, 1/2”-3” GI Nipple, 1/2” T, 1/2” Elbow, 1/2” Push elbow, 1/2” Push socket, 3/4” - 1/2” Push elbow, 1/2’ Push union, Sealing materials, Hubbox	

Module 4: Identify appropriate site for installing the BGP

Mapped to SGJ/1402/OC4,V2.0

Terminal Outcomes:

- Select suitable location based on factors such as avoidance of water inundation/marshy land/tall tree, availability of cow dung in nearby areas, maximum 200 ft. distance from kitchen point and a minimum 40 ft. distance from pond/river/ tube well etc.
- Verify that water is available in the vicinity for making a water solution of dung to be given in the input inlet,
- Confirm the availability of labour for giving daily input
- Mix sufficient water to prepare input and also collect bio slurry output at regular interval,
- Construct plastic/straw shed over bio slurry collection chamber and keep sufficient space to uplift & dry the collected bio slurry.

Duration: 12:00	Duration: 18:00
Theory–Key Learning Outcomes	Practical–Key Learning Outcomes
<p>The candidate will be able to describe the following:-</p> <ul style="list-style-type: none"> • Introduction to bio gas. Difference between Biogas and LPG/CNG. Advantages of Biogas. • Criteria for selection of site or suitable location. • Based on factors such as avoidance of water inundation/marshy land/tall tree, availability of cow dung in nearby areas, maximum 200 ft. distance from kitchen point and a minimum 40 ft. distance from pond/river/ tube well etc. • Verify that water is available in the vicinity for making a water solution of dung to be given in the input inlet, • Confirm the availability of labour for giving daily input • Procedure to mixing sufficient water to prepare input • Procedure for collection of bio slurry output at regular interval, • Methods of construction of shed over bio slurry collection chamber 	<p>The candidate will be able to demonstrate the following:-</p> <ul style="list-style-type: none"> • Demonstration of Biogas generation process with the chart/videos. • Select suitable location based on factors such as avoidance of water inundation/marshy land/tall tree. • Check the availability of cow dung in nearby areas, maximum 200 ft. distance from kitchen point and a minimum 40 ft. distance from pond/river/ tube well etc. • Verify that water is available in the vicinity for making a water solution of dung to be given in the input inlet, • Confirm the availability of labour for giving daily input • Mix sufficient water to prepare input and also collect bio slurry output at regular interval, • Construct plastic/straw shed over bio slurry collection chamber and keep sufficient space to uplift & dry the collected bio slurry.

Classroom Aids:

Computer, Projection Equipment, Power Point Presentation and software

Tools, Equipment and Other Requirements

Good quality bricks, Sand, Cement, Stone chips, Extrusion pipe, Steel rod, Spade Lid, Container, Bucket, Iron hook, Thread, Woolen thread, Wooden block, Karnik : Tram karnik, Rusho, Level pipe, Matam, Tape, Nail, Compressor, 1 1/2 GI pipe, 1/2" - 1 1/2" Thread dye machine, 1/2" + 3/4" + 1" Knives set, Pipe spanner, Gastone, Spanner adjustable, Plier, Common Screw driver set, Spanner set, Measuring tape, Hacksaw frame and blade, Bench vice, Oven single and double, Cube cork, Ball valve, Gate valve, 3/8" GI Pipe, 1/2 " GI Pipe, 1/2" HD PVC Pipe, 1/2" Push pipe, 1/2" union, 3/4" - 1/2" GI Elbow, 1/2"-3" GI Nipple, 1/2" T, 1/2" Elbow, 1/2" Push elbow, 1/2" Push socket, 3/4" - 1/2" Push elbow, 1/2' Pushunion, Sealing materials, Hubbox

Module 5: Construct a Bio Gas Plant with proper care and safety

Mapped to SGJ/1402/OC5,V2.0

Terminal Outcomes:

- Plan for fixed dome Dinabandhu Model family size Bio Gas Plant construction.
- Apply the construction technology and materials as per soil and climatic condition of the State
- Take the help of proper supervisory technical expert for BGP and trained masonry support which is essential
- Demonstrate soil test to find the type of construction,
- Finalized the area of minimum 150 sq. ft. is required to construct the BGP.
- Identify the construction materials which is required as per technical specification for a particular type of BGP for different agro-climatic
- Identify and take necessary precautions on fire and safety.
- Identify, handle and store / dispose dangerous goods and substances according to safety regulations and requirements.
- Confirm that there is no leakage of gas or don't work with fire in and around BGP.
- Identify and observe site evacuation procedures according to site policy.
- Identify Personal Protective Equipment (PPE) and use the same as per related working environment.
- Identify basic first aid and use them under different circumstances.
- Identify different fire extinguisher and use the same as per requirement.

Duration: 15:00	Duration: 75:00
Theory–Key Learning Outcomes	Practical–Key Learning Outcomes
<p>The candidate will be able to describe the followings:-</p> <ul style="list-style-type: none"> ● Fixed Dome Dinabandhu Model family size Bio Gas Plant construction requires construction technology and materials as per soil and climatic condition of the State. ● Identify the components required for the construction of BGP. ● Decide the size of Bio Gas plant as per availability of raw materials. ● Select the types of Indian digester as per the design. ● Check the availability of raw materials for the construction at constructions site. ● Calculate the man power required to complete the job. ● Follow the instructions from supervisor time to time for installation of gas pipeline which is required technical supervision. ● Follow the procedure for excavation work 	<p>The candidate will be able to demonstrate the followings:-</p> <ul style="list-style-type: none"> ● Fixed Dome Dinabandhu Model family size Bio Gas Plant construction requires construction technology and materials as per soil and climatic condition of the State, ● Carry out the soil test to find the type of construction with the help of supervisor. ● Mark the construction area for BGP ● Find the construction materials are required as per technical specification for a particular type of BGP for different agro-climatic condition. ● List and identify the Construction materials which include bricks, sand, stone chips, cement, pipe, iron rod, biogas oven, etc. ● Find the man days required to complete the construction, after construction, 15 days is required for curing and then loading of the

and plant construction work.

- Assess possible risk and hazards in the work environment and exercise safety precautions to minimize injury to self and others,
- Comply relevant safety practices as the work deals with inflatable gas, don't give bleaching water, soap, urea etc. in Bio gas Plant
- Confirm that there is no leakage of gas, or don't work with fire around BGP

chamber is to be done with cow dung mixed with water through inlet under loamy & sandy soil.

- Find the man days required for construction at hilly areas.
- Follow the procedure for installation of gas pipeline which needs technical supervision.
- After completion of Plant construction, the constructed structure has to be cured with water for 15 days. Then a mixture of cow dung and water 1 kg each is to be given through inlet pipeline and the pipeline fittings has to be completed. Then the valve is to be closed for seven days and it is to be seen whether watery cow dung is coming out from the outlet pipeline. If it comes out, then 50 kg each of cow dung and water has to be given.
- Checks to be made whether gas is coming out through the burner in the kitchen and if found that the gas is not flaming, the full air to be passed and after closing the valve, checks are to be made on the next day.
- Demonstrate Knowledge of Safe working practices on construction sites,
- Carry out safe working practices on construction sites.
- Identify hazards and procedure to avoid accidents at work sites.
- Comply with occupational health and safety requirements relevant to the work,
- Assess possible risk and hazards in the work environment and exercise safety precautions to minimize injury to self and others,
- Comply relevant safety practices as the work deals with inflatable gas, don't give bleaching water, soap, urea etc. in Bio gas Plant
- Confirm that there is no leakage of gas.
- Don't work with fire around BGP

Classroom Aids:

Computer, Projection Equipment, Power Point Presentation and software, Facilitator's Guide, Participant's Handbook

Tools, Equipment and Other Requirements

Good quality bricks, Sand, Cement, Stone chips, Extrusion pipe, Steel rod, Spade Lid, Container, Bucket, Iron hook, Thread, Woolen thread, Wooden block, Karnik : Tram karnik, Rusho, Level pipe, Matam, Tape, Nail, Compressor, 1 1/2 GI pipe, 1/2" - 1 1/2" Thread dye machine, 1/2" + 3/4" + 1" Knives set, Pipe spanner, Gastone, Spanner adjustable, Plier, Common Screw driver set, Spanner set, Measuring tape, Hacksaw frame and blade, Bench vice, Oven single and double, Cube cork, Ball valve, Gate valve, 3/8" GI Pipe, 1/2 " GI Pipe, 1/2" HD PVC Pipe, 1/2" Push pipe, 1/2" union, 3/4" - 1/2" GI Elbow, 1/2"-3" GI Nipple, 1/2" T, 1/2" Elbow, 1/2" Push elbow 1/2" Push socket, 3/4" - 1/2" Push elbow, 1/2" Pushunion, Sealing materials, Hubbox

Module 6: Install Cooking Apparatus

Mapped to SGJ/1402/OC6,V2.0

Terminal Outcomes:

- Install the Gas pipeline, regulator, Gas oven etc. Care to be taken to see that no ferrous metal is there in gas line as the Gas contains water vapour and hydrogen sulphide along with methane, which will cause corrosion of the gas line within very short time.
- Illustrate dos& don'ts of this gas usage,
- Maintain the gas line and other apparatus for security reasons.

Duration: 10:00	Duration: 20:00
Theory–Key Learning Outcomes	Practical–Key Learning Outcomes
<p>The candidate will be able to describe the followings:-</p> <ul style="list-style-type: none"> ● Follow the procedure to connect the gas pipeline and installation of regulator, Gas oven etc. ● Apply the safety precaution and care to be taken to see that no ferrous metal is there in gas line as the Gas contains water vapour and hydrogen sulphide along with methane, which will cause corrosion of the gas line within very short time. <p style="padding-left: 40px;">Procedure for regular maintenance of the gas line and other apparatus for security reasons.</p>	<p>The candidate will be able to demonstrate the followings:-</p> <ul style="list-style-type: none"> ● Gas pipeline installation, regulator, Gas oven etc. Care to be taken to see that no ferrous metal is there in gas line as the Gas contains water vapour and hydrogen sulphide along with methane, which will cause corrosion of the gas line within very short time. ● User must be trained with dos& don'ts of this gas usage, ● Regular maintenance of the gas line and other apparatus for security reasons.
Classroom Aids:	
Computer, Projection Equipment, Power Point Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
<p>Good quality bricks, Sand, Cement, Stone chips, Extrusion pipe, Steel rod, Spade Lid, Container, Bucket, Iron hook, Thread, Woolen thread, Wooden block, Karnik Tram karnik, Rusho, Level pipe, Matam, Tape, Nail, Compressor,</p> <p>1 1/2 GI pipe, 1/2" - 1 1/2" Thread dye machine, 1/2" + 3/4" + 1" Knives set, Pipe spanner Gastone, Spanner adjustable, Plier, Common Screw driver set, Spanner set, Measuring tape Hacksaw frame and blade, Bench vice, Oven single and double, Cube cork Ball valve, Gate valve, 3/8" GI Pipe, 1/2 " GI Pipe, 1/2" HD PVC Pipe, 1/2" Push pipe 1/2" union, 3/4" - 1/2" GI Elbow, 1/2"-3" GI Nipple, 1/2" T, 1/2" Elbow, 1/2" Push elbow 1/2" Push socket, 3/4" - 1/2" Push elbow, 1/2' Pushunion, Sealing materials Hubbox</p>	

Module 7: Carry out post BGP construction activities

Mapped to SGJ/1402/OC7,v2.0

Terminal Outcomes:

- Determine of carbon credit development and avoidance of fertilizer subsidy with use of Bio slurry and use of methane as a green substitute of LPG, wood, cattle dung and kerosene etc. are to be worked out for each sub zone, using BGP.
- Demonstrate the procedure step by step of the Plant maintenance which will be done on every 10th year on a regular basis.

Duration: 15:00	Duration: 45:00
Theory–Key Learning Outcomes	Practical–Key Learning Outcomes
<p>The candidate will be able to describe the followings:-</p> <ul style="list-style-type: none"> • Determination of carbon credit development and avoidance of fertilizer subsidy with use of Bio slurry and use of methane as a green substitute of LPG, wood, cattle dung and kerosene etc. are to be worked out for each sub zone, using BGP & community participation in doing so. • Procedure for linking dry/liquid Bio slurry of BGP for organic nutrient management of different agricultural and horticultural crops, replacing chemical fertilizers. • Procedure for general maintenance of the Plant needs to be refreshed on every 10th year on a regular basis. . 	<p>The candidate will be able to demonstrate the followings:-</p> <ul style="list-style-type: none"> • Determination of carbon credit development and avoidance of fertilizer subsidy with use of Bio slurry and use of methane as a green substitute of LPG, wood, cattle dung and kerosene etc. are to be worked out for each sub zone, using BGP & community participation in doing so. • Linking dry/liquid Bio slurry of BGP for organic nutrient management of different agricultural and horticultural crops, replacing chemical fertilizers. • The Plant needs to be refreshed on every 10th year on a regular basis. Firstly remove all the cowdung from the plant and it be washed. After drying for two days, the inner wall of the plant is to be painted with 5 kg cement mixed with water. After drying, the plant is to be filled with cowdung following the same rule, as followed for the first filling. The same is also to be done in presence of trained technical expert.
Classroom Aids:	
Computer, Projection Equipment, Power Point Presentation and software, Facilitator’s Guide, Participant’s Handbook	
Tools, Equipment and Other Requirements	
Good quality bricks, Sand, Cement, Stone chips, Extrusion pipe, Steel rod, Spade Lid, Container, Bucket, Iron hook, Thread, Woolen thread, Wooden block, Karnik : Tram karnik, Rusho, Level pipe, Matam, Tape, Nail, Compressor, 1 1/2 GI pipe, 1/2” - 1 1/2” Thread dye machine, 1/2” + 3/4”+1” Knives set, Pipe spanner, Gastone, Spanner adjustable, Plier, Common Screw driver set, Spanner set, Measuring tape, Hacksaw frame and blade, Bench vice, Oven single and double, Cube cork, Ball valve, Gate valve, 3/8” GI Pipe, 1/2 “ GI Pipe, 1/2” HD PVC Pipe, 1/2” Push pipe, 1/2” union, 3/4” - 1/2” GI Elbow, 1/2”-3” GI Nipple, 1/2” T, 1/2” Elbow, 1/2” Push elbow, 1/2” Push socket, 3/4” - 1/2” Push elbow, 1/2’ Pushunion, Sealing materials Hubbox	

Module 8: Demonstrate the procedure of Bio slurry manure making and Marketing of Organically grown crops

Mapped to SGJ/1402/OC8,v2.0

Terminal Outcomes:

- Collect the bio slurry produced from the biogas plant as a by-product in the Outlet Chamber,
- Demonstrate the procedure of mixing the liquid bio slurry with chopped pseudo stem of Banana to increase the potash content of the bio slurry manure.
- Collect the liquid bio slurry at an upper elevation to make it dried under sun shine and air or it may be directly used in the field as liquid manure at already worked out doses with such frequencies, identified for different crops.
- Mix the liquid bio slurry with vermicomposting manure to enrich the quality and reduce the dosage of individual manure,
- Follow the procedure for dry Bio slurry manure can be mixed with microbial bio fertilizers and bio pesticides for value addition and enriched manure preparation and organic way of crop cultivation.
- Use the Bio slurry for fishery, as a source of feed.
- Illustrate the requirement of bio slurry produced for the cultivation of land and production of crops, vegetables, oil-seeds, pulses and fodder.
- Demonstrate the marketing procedure for organic product
- Calculate the profit percentage for the selling the product in “Organic huts/markets”,
- Identify the scope & way of e-commerce in selling the produce to the consumers.

Duration:10:00	Duration: 20:00
Theory–Key Learning Outcomes	Practical–Key Learning Outcomes
<p>The student will able to describe the following:-</p> <ul style="list-style-type: none"> • Procedure to the followed to produce bio slurry. • Uses of bio slurry for fishery as a source of feed. • Compare the cost of production which will get reduced over conventional production system. • Procedure for selling the organic products to local market/organic hut. • The scope & way of e-commerce in selling the produce to the consumers, 	<p>The students will be able to do the following activities:</p> <ul style="list-style-type: none"> • The bio slurry produced from the biogas plant as a by-product, is to be collected in the Outlet Chamber, • The liquid bio slurry thus produced, may be mixed with chopped pseudo stem of Banana to increase the potash content of the bio slurry manure. • The liquid bio slurry can either be collected or placed at an upper elevation to make it dried under sun shine and air or it may be directly used in the field as liquid manure at already worked out doses with such frequencies, identified for different crops. • The liquid bio slurry can be mixed with vermicomposting manure to enrich the quality and reduce the dosage of individual manure, • Dried Bio slurry manure can be mixed with microbial bio fertilizers and bio pesticides

	<p>for value addition and enriched manure preparation and organic way of crop cultivation.</p> <ul style="list-style-type: none"> • Uses of Bio slurry for fishery, as a source of feed. • Calculate the cost of production conventional production system over organic production system of farming • Estimate the profit for organic farming by selling the product directly to the consumers. • Evaluate the scope & way of e-commerce in selling the produce to the consumers.
<p>Classroom Aids:</p>	
<p>Computer, Projection Equipment, Power Point Presentation and software, Facilitator's Guide, Participant's Handbook</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>Good quality bricks, Sand, Cement, Stone chips, Extrusion pipe, Steel rod, Spade Lid, Container, Bucket, Iron hook, Thread, Woolen thread, Wooden block, Karnik : Tram karnik, Rusho, Level pipe, Matam, Tape, Nail, Compressor, 1 1/2 GI pipe, 1/2"- 1 1/2" Thread dye machine, 1/2" + 3/4"+1" Knives set, Pipe spanner, Gastone, Spanner adjustable, Plier, Common Screw driver set, Spanner set, Measuring tape, Hacksaw frame and blade, Bench vice, Oven single and double, Cube cork, Ball valve, Gate valve, 3/8" GI Pipe, 1/2 " GI Pipe, 1/2" HD PVC Pipe, 1/2" Push pipe, 1/2" union, 3/4" - 1/2" GI Elbow, 1/2"-3" GI Nipple, 1/2" T, 1/2" Elbow, 1/2" Push elbow, 1/2" Push socket, 3/4" - 1/2" Push elbow, 1/2' Pushunion, Sealing materials Hubbox</p>	

Module 9: Work in real job situation with special emphasis on basic safety and hazards in this domain

Mapped to SGJ/1402/OC9,v2.0

Terminal Outcomes:

Assessor will check report prepared for this component of 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. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for 60 Hours.)

Duration:00:00	Duration:60:00
Theory–Key Learning Outcomes	Practical–Key Learning Outcomes
	<ul style="list-style-type: none"> Assessor will check report prepared for this component of 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. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for 60 Hours.)
Classroom Aids:	

Module 10: Employability skills

Mapped to DGT/VSQ/N0102, v 1.0

Terminal Outcomes:

- Demonstrate a comprehensive knowledge of constitutional values and apply them in their actions, decisions, and interactions, thereby upholding the principles of the constitution.
- Develop proficiency in basic English skills, including reading, writing, listening, and speaking, enabling effective communication in everyday situations.
- Exhibit proficiency in basic communication skills, including active listening, effective verbal and nonverbal communication, and clarity in expressing ideas, fostering successful interpersonal interactions.
- Explain financial and legal literacy, including understanding key financial concepts, making informed financial decisions, and navigating legal frameworks related to personal and business finances.
- Interpret digital tools and technologies, navigating online platforms, and practicing safe and responsible digital behavior.

- | |
|---|
| <ul style="list-style-type: none"> Discuss the importance of Employability Skills in meeting the job requirements. Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen. Discuss 21st century skills such as Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for |
|---|

continuous learning etc. in personal and professional life.

- Use basic English for everyday conversation in different contexts, in person and over the telephone. Read and understand routine information, notes, instructions, mails, letters etc. written in English. Write short messages, notes, letters, e-mails etc. in English.
- Demonstrate how to communicate in a well-mannered way with others. Apply verbal and non-verbal communication etiquette and active listening techniques in various settings. Demonstrate working with others in a team
- Show how to conduct oneself appropriately with all genders and PwD.
- Select financial institutions, products and services as per requirement. Carry out offline and online financial transactions, safely and securely. Identify common components of salary and compute income, expenses, taxes, investments etc.
- Show how to operate digital devices and use the associated applications and features, safely and securely. Use e-mail and social media platforms and virtual collaboration tools to work effectively. Use the features of word processor, spreadsheets and presentations. Create a biodata.
- Identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research. Identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity
- Identify different types of customers. Identify and respond to customer requests and needs in a professional manner

Classroom Aids:

Computer, Projection Equipment, Power Point Presentation and software, Facilitator's Guide, Participant's Handbook

Details Syllabus Content

Details of Theory Syllabus:

Sl. No	DETAILS	HOURS
1.	Biomass resource	5
	1. Introduction, Classification and properties of biomass, Biomass characterization, different energy conversion methods. 2. Bio Energy Resources, World Bio Energy Potential, India's Bio Energy Potential, Biomass Resources and classification, Physio-chemical characteristics. 3. Biomass Combustion, Loose biomass densification, Biomass based power generation and utilization for domestic cooking.	
2.	Overview of Biogas Systems	5
	1. Technology of Biogas production, Biogas Plants, Digester types, Digester design. 2. An overview of anaerobic processes for energy production – Bio methanation process – Biogas plant design, operation, fault checking, maintenance. Biogas appliances, engines - Clean-up of biogas. 3. Chemical reaction of bio methanation process. 4. Dung, Vegetable Waste and Municipal Waste based Biogas plants. 5. Biogas as fuel for transportation, Lighting, Running Dual Fuel Engines, Electricity generation.	

	6. Biogas Bottling Plant Technology.	
3.	Overview of Biomass Gasifiers	10
	<ol style="list-style-type: none"> 1. History , Principle , Design of Bio mass Gasifiers , updraft gasifier, down draft gasifier. 2. Zero carbon biomass gasification plants, Gasification of plastic-rich waste. 3. Applications for cooking, electricity generation, Gasifier Engines, Operation of spark ignition and compression ignition engine with wood gas, methanol, ethanol and biogas. 4. Biomass integrated gasification/combined cycles systems, gasification, pyrolysis, liquification. 5. Biomass pre- treatment and processing, Case studies, biodiesel, improved biomass cookstove, biohydrogen generation. 6. Electricity generation from biomass gasifier, engine systems, bio-gasoline, bio-diesel and dual fuel engine. 	
4.	Appropriate site for installation of Bio Gas Plant	10
	<ol style="list-style-type: none"> 1. Introduction to bio gas. Difference between Biogas and LPG/CNG. Advantages of Biogas. 2. Criteria for selection of site or suitable location. 3. Based on factors such as avoidance of water inundation/marshy land/tall tree, availability of cow dung in nearby areas, maximum 200 ft. distance from kitchen point and a minimum 40 ft. distance from pond/river/ tube well etc. 4. Verify that water is available in the vicinity for making a water solution of dung to be given in the input inlet. 5. Confirm the availability of labour for giving daily input. 6. Procedure to mixing sufficient water to prepare input. 7. Procedure for collection of bio slurry output at regular interval. 8. Methods of construction of shed over bio slurry collection chamber. 	
5.	Construction of a Bio Gas Plant with proper care and safety	15
	<ol style="list-style-type: none"> 1. Fixed Dome Dinabandhu Model family size Bio Gas Plant construction requires construction technology and materials as per soil and climatic condition of the State. 2. Identify the components required for the construction of BGP. 3. Decide the size of Bio Gas plant as per availability of raw materials. 4. Select the types of Indian digester as per the design. 5. Check the availability of raw materials for the construction at constructions site. 6. Calculate the man power required to complete the job. 7. Follow the instructions from supervisor time to time for installation of gas pipeline which is required technical supervision. 8. Follow the procedure for excavation work and plant construction work. 9. Assess possible risk and hazards in the work environment and exercise safety precautions to minimize injury to self and others, 10. Comply relevant safety practices as the work deals with inflatable gas, don't 	

	<p>give bleaching water, soap, urea etc. in Bio gas Plant</p> <p>11. Confirm that there is no leakage of gas, or don't work with fire around BGP</p> <p>12. Ensure that the necessary protective equipments are available.</p>	
6.	Installation of cooking apparatus	15
	<ol style="list-style-type: none"> 1. Follow the procedure to connect the gas pipeline and installation of regulator, Gas oven etc. 2. Apply the safety precaution and care to be taken to see that no ferrous metal is there in gas line as the Gas contains water vapour and hydrogen sulphide along with methane, which will cause corrosion of the gas line within very short time. 3. Procedure for regular maintenance of the gas line and other apparatus for security reasons. 	
7.	Post BGP construction activities	15
	<ol style="list-style-type: none"> 1. Determination of carbon credit development and avoidance of fertilizer subsidy with use of Bio slurry and use of methane as a green substitute of LPG, wood, cattle dung and kerosene etc are to be worked out for each sub zone, using BGP & community participation in doing so. 2. Procedure for linking dry/liquid Bio slurry of BGP for organic nutrient management of different agricultural and horticultural crops, replacing chemical fertilizers. 3. Procedure for general maintenance of the Plant needs to be refreshed on every 10th year on a regular basis. 	
8.	Preparation of Bio slurry manure and Marketing of Organically grown crops	15
	<ol style="list-style-type: none"> 1. Procedure to be followed to produce bio slurry. 2. Uses of bio slurry for fishery as a source of feed. 3. Compare the cost of production which will get reduced over conventional production system. 4. Procedure for selling the organic products to local market/organic hut. 5. The scope & way of e-commerce in selling the produce to the consumers. 	

Details of Practical Syllabus:

Sl. No	DETAILS	HOURS
1.	Biomass resource assessment	20
	<ol style="list-style-type: none"> 1. Identify Bio Energy Resources 2. Select suitable biomass for generation of bio energy. 3. Check the availability of biomass. 4. Demonstrate Physio-chemical characteristics of biomass. 4. Verify Biomass Combustion potential and Loose biomass densification capacity. 5. Find Biomass based power generation and domestic cooking process. 	
2.	Demonstration of Biogas Systems	20
	<ol style="list-style-type: none"> 1. Demonstrate Biogas plant design and Digester design. 2. Demonstrate various Chemical reaction involve in bio methanation process. 3. Demonstrate construction of Dung, Vegetable Waste and Municipal Waste based Biogas 	

	plants. 4. Demonstrate Biogas Bottling system and procedure.	
3.	Demonstration of Biomass Gasifiers	20
	<ol style="list-style-type: none"> 1. Demonstrate Design of Bio mass Gasifiers , updraft gasifier, down draft gasifier. 2. Demonstrate construction of Zero carbon biomass gasification plants. 3. Construct gasifier for Gasification of plastic-rich waste. 4. Demonstrate Biomass integrated gasification cycles systems, gasification, pyrolysis, liquification cycles. 5. Demonstrate Biomass pre- treatment and processing 6. Demonstrate biodiesel, improved biomass cookstove, biohydrogen generation procedure with the chart/videos. 7. Demonstrate Electricity generation process from biomass gasifier, engine systems, bio-gasoline, bio-diesel and duel fuel engine with the chart/videos. 	
4.	Selection of Site for installation of Bio Gas Plant	20
	<ol style="list-style-type: none"> 1. Demonstration of Biogas generation process with the chart/videos. 2. Select suitable location based on factors such as avoidance of water inundation/marshy land/tall tree. 3. Check the availability of cow dung in nearby areas, maximum 200 ft. distance from kitchen point and a minimum 40 ft. distance from pond/river/ tube well etc. 4. Verify that water is available in the vicinity for making a water solution of dung to be given in the input inlet, 5. Confirm the availability of labour for giving daily input 6. Mix sufficient water to prepare input and also collect bio slurry output at regular interval, 7. Construct plastic/straw shed over bio slurry collection chamber and keep sufficient space to uplift & dry the collected bio slurry. 	
5.	Procedure for construction of BGP	70
	<ol style="list-style-type: none"> 5. Fixed Dome Dinabandhu Model family size Bio Gas Plant construction requires construction technology and materials as per soil and climatic condition of the State, 6. Carry out the soil test to find the type of construction with the help of supervisor. 7. Mark the construction area for BGP 8. Find the construction materials are required as per technical specification for a particular type of BGP for different agro-climatic condition. 9. List and identify the Construction materials which include bricks, sand, stone chips, cement, pipe, iron rod, biogas oven, etc. 10. Find the man days required to complete the construction, after construction, 15 days is required for curing and then loading of the chamber is to be done with cow dung mixed with water through inlet under loamy & sandy soil. 11. Find the man days required for construction at hilly areas. 12. Follow the procedure for installation of gas pipeline which needs technical supervision. 13. After completion of Plant construction, the constructed structure has to be cured with water for 15 days. Then a mixture of cow dung and water 1 kg each is to be given through inlet pipeline and the pipeline fittings has to be completed. Then the valve is to be closed for seven days and it is to be seen whether watery cow dung is coming out from the outlet pipeline. If it comes out, then 50 kg each of cow dung and water has to be given. 9. Checks to be made whether gas is coming out through the burner in the kitchen 	

	and if found that the gas is not flaming, the full air to be passed and after closing the valve, checks are to be made on the next day.	
6.	Installation of cooking apparatus	20
	<ol style="list-style-type: none"> 1. Gas pipeline installation, regulator, Gas oven etc. Care to be taken to see that no ferrous metal is there in gas line as the Gas contains water vapour and hydrogen sulphide along with methane, which will cause corrosion of the gas line within very short time. 2. User must be trained with dos& don'ts of this gas usage, Regular maintenance of the gas line and other apparatus for security reasons. 	
7.	Post BGP construction activities	50
	<ol style="list-style-type: none"> 1. Determination of carbon credit development and avoidance of fertilizer subsidy with use of Bio slurry and use of methane as a green substitute of LPG, wood, cattle dung and kerosene etc. are to be worked out for each sub zone, using BGP & community participation in doing so. 2. Linking dry/liquid Bio slurry of BGP for organic nutrient management of different agricultural and horticultural crops, replacing chemical fertilizers. 3. The Plant needs to be refreshed on every 10th year on a regular basis. Firstly remove all the cowdung from the plant and it be washed. After drying for two days, the inner wall of the plant is to be painted with 5 kg cement mixed with water. After drying, the plant is to be filled with cowdung following the same rule, as followed for the first filling. The same is also to be done in presence of trained technical expert. 	
8.	Preparation of Bio slurry manure and Marketing of Organically grown crops	20
	<ol style="list-style-type: none"> 1. The bio slurry produced from the biogas plant as a by-product, is to be collected in the Outlet Chamber, 2. The liquid bio slurry thus produced, may be mixed with chopped pseudo stem of Banana to increase the potash content of the bio slurry manure. 3. The liquid bio slurry can either be collected or placed at an upper elevation to make it dried under sun shine and air or it may be directly used in the field as liquid manure at already worked out doses with such frequencies, identified for different crops. 4. The liquid bio slurry can be mixed with vermicomposting manure to enrich the quality and reduce the dosage of individual manure, 5. Dried Bio slurry manure can be mixed with microbial bio fertilizers and bio pesticides for value addition and enriched manure preparation and organic way of crop cultivation. 6. Uses of Bio slurry for fishery, as a source of feed. 7. The bio slurry produced by one family size BGP will be sufficient to supply the entire nutrient for 1 acre of land for any area with 300% cropping intensity with crops like Paddy, wheat, maize, vegetables, oilseeds, pulses and fodder at already worked-out doses. 8. Calculate the cost of production conventional production system over organic production system of farming 9. Estimate the profit for organic farming by selling the product directly to the consumers. 10. Evaluate the scope & way of e-commerce in selling the produce to the consumers. 	

Syllabus of Employability Skill:

Introduction to Employability Skills Duration: 1.5 Hours

After completing this programme, participants will be able to:

Discuss the Employability Skills required for jobs in various industries

List different learning and employability related GOI and private portals and their usage

Constitutional values - Citizenship Duration: 1.5 Hours

Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen

Show how to practice different environmentally sustainable practices.

Becoming a Professional in the 21st Century Duration: 2.5 Hours

Discuss importance of relevant 21st century skills.

Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.

Describe the benefits of continuous learning.

Basic English Skills Duration: 10 Hours

Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone

Read and interpret text written in basic English

Write a short note/paragraph / letter/e-mail using basic English

Career Development & Goal Setting Duration: 2 Hours

Create a career development plan with well-defined short- and long-term goals

Communication Skills Duration: 5 Hours

Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.

Explain the importance of active listening for effective communication

Discuss the significance of working collaboratively with others in a team

Diversity & Inclusion Duration: 2.5 Hours

Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD

Discuss the significance of escalating sexual harassment issues as per POSH act.

Financial and Legal Literacy Duration: 5 Hours

Outline the importance of selecting the right financial institution, product, and service

Demonstrate how to carry out offline and online financial transactions, safely and securely

List the common components of salary and compute income, expenditure, taxes, investments etc.

Discuss the legal rights, laws, and aids

Essential Digital Skills Duration: 10 Hours

Describe the role of digital technology in today's life

Demonstrate how to operate digital devices and use the associated applications and features, safely and securely

Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely

Create sample word documents, excel sheets and presentations using basic features

utilize virtual collaboration tools to work effectively

Entrepreneurship Duration: 7 Hours

Explain the types of entrepreneurship and enterprises

Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan

Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement

Create a sample business plan, for the selected business opportunity

Customer Service **Duration: 5 Hours**

Describe the significance of analyzing different types and needs of customers

Explain the significance of identifying customer needs and responding to them in a professional manner.

Discuss the significance of maintaining hygiene and dressing appropriately

Getting Ready for apprenticeship & Jobs **Duration: 8 Hours**

Create a professional Curriculum Vitae (CV)

Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively

Discuss the significance of maintaining hygiene and confidence during an interview

Perform a mock interview

List the steps for searching and registering for apprenticeship opportunities

List of Tools & Equipment

Bio Gas Plant & Bio Slurry Technician (for a Batch of 30 Candidates)			
S No.	Name of the Tools and Equipment	Specification	Quantity
1	Good quality bricks		550 pieces
2	Sand	Medium granules	60 cft
3	Cement	50 Kg	9 bags
4	Stone chips	1/2"	20cft
5.	Extrusion pipe	4' dia (2+2)	2 nos
6.	Steel rod	6 mm	5 kgs
7.	Spade		1 no
8.	Lid		1 no
9.	Container	15 ltr	2 nos
10.	Bucket	17 ltr	1 no
11	Iron hook		10 nos
12	Thread		500 gm
13	Woolen thread		250gms
14.	Wooden block	Of different size	As required
15	Karnik	Large, medium, small1	1 no each
16	Tram karnik		1 no
17	Rusho		1 no
18	Level pipe		30 ft
19	Matam		1no
20	Tape	3 mm	1 no
21	Nail	4"	As required
22	Compressor		1 no

23	1 1/2 GI pipe		12 ft
24	1/2" - 1 1/2" Thread dye machine		1 no
25	1/2" + 3/4"+1" Knives set		1 no
26	Pipe spanner	12" and 18"	1 no each
27	Gastone		2 nos
28	Spanner adjustable		2 nos
29	Plier		2 nos
30	Common Screw driver set		1 no
31	Spanner set	5-16	1 no
32	Measuring tape	30 ft	1 no
33	Hacksaw frame and blade		1 no each
34	Bench vice		1 no
35	Oven single and double		1 no each
36	Cube cork		2 nos
37	Ball valve		1 no
38	Gate valve		1 no
39	3/8" GI Pipe	20 ft	1 no
40	1/2 " GI Pipe	20 ft	1 no
41	1/2" HD PVC Pipe	20 ft	1 no
42	1/2" Push pipe	100 ft	1 no
43	1/2" union		1 no
44	3/4" - 1/2" GI Elbow		1 no
45	1/2"-3" GI Nipple		1 no
46	1/2" T		1 no
47	1/2" Elbow		1 no
48	1/2" Push elbow		1 no
49	1/2" Push socket		1 no
50	3/4" - 1/2" Push elbow		1 no
51	1/2' Pushunion		1 no
52	Sealing materials		250 gm
53	Hubbox		200 gm

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
CTS/ATS	Fitter/Mason/Plumber	5	Organic Agriculture / Bio gas set up	1	Training on set up of Bio Gas Plant	NA
Diploma	Mechanical Engineering / Civil Engineering	3		1		
B.E/B.Tech	Mechanical Engineering	2		1		
B.Sc.	Agriculture	3		1		

Trainer Certification	
Domain Certification	Platform Certification
Certified for Job Role: "Bio Gas Plant & Bio Slurry Technician" mapped to QP: SGJ/NSQF-2022/1402". Minimum accepted score is 80%.	Recommended that the Trainer is certified for the Job Role: "Trainer (VET and Skills)", mapped to the Qualification Pack: "MEP/Q2601, v2.0". Minimum accepted score is 80%

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
CTS/ATS	Fitter/Mason/Plumber	3	Organic Agriculture	1	Job role involving organic agriculture / Bio gas Plant set up	NA
Diploma	Civil Engineering	2		1		
B.E/B.Tech	Mechanical Engineering	1		1		
B.Sc.	Agriculture	2		1		

Assessor Certification	
Domain Certification	Platform Certification
Certified for Job Role: "Bio Gas Plant & Bio Slurry Technician" mapped to QP SGJ/NSQF-2022/1402". Minimum accepted score is 80%.	Recommended that the Assessor is certified for the Job Role: "Assessor (VET and Skills)", mapped to the Qualification Pack: "MEP/Q2701, v2.0". Minimum accepted score is 80%

Assessment Strategy

Assessment will be based on the concept of Independent Assessors empaneled with West Bengal State Council of Technical & Vocational Education & Skill Development (WBSCT&VE&SD), identified, selected, trained and certified on Assessment techniques. These Assessors would be aligned to assess as per the laid down criteria.

WBSCT&VE&SD would conduct assessment only at the training centers or designated testing centers authorized by WBSCT&VE&SD.

Ideally, the assessment will be a continuous process comprising of two distinct steps:

- A. Continuous assessment by Trainers
- B. Term end /Final Assessment by WBSCT&VE&SD

Each National Occupational Standard (NOS) in the respective QPs will be assigned weightage. Each Performance Criteria in the NOS will be assigned marks for theory and/or practical based on relative importance and criticality of function.

This will facilitate preparation of question bank / paper sets for each of the QPs. Each of these papers sets/question banks created by subject matter experts through WBSCT&VE&SD, especially with regard to the practical test and the defined tolerances, finish, accuracy etc.

The following tools are proposed to be used for final assessment:

- i. Written Test: This will comprise of (i) True/False Statements and/or (ii) Multiple Choice Questions and/or (iii) Matching Type Questions. Online system for this will be preferred.
- ii. Practical Test: This will comprise a test job to be prepared as per project briefing following appropriate working steps, using necessary tools, equipment and instruments. Through observation it will be possible to ascertain candidate's aptitude, attention to details, quality consciousness etc.
- iii. Structured Viva-voce: This tool will be used to assess the conceptual understanding and the behavioral aspects as regards the job role and the specific task at hand.

Marks distribution as per outcome

Course Name	Sr No	NOS / Outcome No.	NOS /Outcome Name	Th Hrs	Pr Hrs	Total marks Th	Total marks Pr
BIO GAS PLANT & BIO SLURRY TECHNICIAN	1	SGJ/ 1402/OC1,V2.0	Identify Biomass resource and Bio-energy potential	06	24	10	80
	2	SGJ/ 1402/OC2,V2.0	Illustrate mechanism of Biogas Systems	10	20	16	60
	3	SGJ/ 1402/OC3,V2.0	Explain the process of Biomass Gasifiers	12	18	20	60
	4	SGJ/ 1402/OC4,V2.0	Identify appropriate site for installing the BGP	12	18	20	60
	5	SGJ/ 1402/OC5,V2.0	Construct a Bio Gas Plant with proper care and safety	15	75	28	210
	6	SGJ/ 1402/OC6,V2.0	Install Cooking Apparatus	10	20	16	40
	7	SGJ/ 1402/OC7,V2.0	Carry out post BGP construction activities	15	45	24	120
	8	SGJ/ 1402/OC8,V2.0	Demonstrate the procedure of Bio slurry manure making and Marketing of Organically grown crops	10	20	16	50
	9	SGJ/1402/OC9,V2.0	Work in real job situation with special emphasis on basic safety and hazards in this domain.	0	60	0	120
	10	DGT/VSQ/N0102	Employability Skills - 60 Hrs		60	50	
TOTAL Theory 90 Hrs, Practical 240 Hrs, OJT - 60 hrs, Employability Skill- 60 Hrs						200	800

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to Be known and/or understood in order to accomplish or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training Outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT(M)	On-the-job training(Mandatory);trainees are mandated to complete specified hours of training on site
OJT(R)	On-the-job training(Recommended);trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psycho motor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards