Qualification Pack

Renewable Energy

QP Code: SGJ/Q4008

Version: 1.0

NSQF Level: 4.5

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Contents

Qualification Pack

SGJ/Q4008: Renewable Energy

Brief Job Description

The course is designed to undertake training for World Skill competition. The Aspirant would be responsible for designing sub-system for the installation of on grid, off grid and hybrid renewable energy plants including wind and solar energy. The individual at work complete, commission, maintain and optimize the renewable energy plant with safety standards.

Personal Attributes

The individual at work complete, commission, maintain and optimize the renewable energy plant with safety standards

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. SGJ/N4054: Basic of Solar and Wind Energy
2. SGJ/N4055: Tools and Equipment Used in Solar and Wind Energy
3. SGJ/N4056: Solar and Wind Turbine installation
4. SGJ/N4057: Planning and Designing
5. SGJ/N4058: Operation and Maintenance of Wind and Solar power Plant
6. SGJ/N4059: Health and Safety Practices in Solar and Wind Power
7. DGT/VSQ/N0101: Employability Skills (30 Hours)

Qualification Pack (QP) Parameters

Sector	Green Jobs
Sub-Sector	Renewable Energy
Occupation	Renewable Energy Professional
Country	India
NSQF Level	4.5

Credits	17
Aligned to NCO/ISCO/ISIC Code	NCO 2015/7421.1402
Minimum Educational Qualification & Experience	10th grade pass with 1 year NTC plus NAC OR 12th Class with 1 Year of experience relevant experience in concerned sector like Solar/ power sector OR Certificate-NSQF (4) with 1-2 Years of experience relevant experience in concerned sector like Solar/ power sector OR Completed 1st year of UG (UG Certificate) OR 10th grade pass with 1 year NTC plus CITS with 1 Year of experience experience in concerned sector like Solar/ power sector
Minimum Level of Education for Training in School	Not Applicable
Pre-Requisite License or Training	NA
Minimum Job Entry Age	19 Years
Last Reviewed On	NA
Next Review Date	31/01/2026
NSQC Approval Date	31/01/2024
Version	1.0
Reference code on NQR	QG-4.5-ES-01818-2024-V1-SCGJ
NQR Version	1

Remarks:

Total 510 Hours: (Theory: 160 hours+Practical:260 hours+ 30 hours of employability skills + 60 hours of On-the-Job Training (OJT)

SGJ/N4054: Basic of Solar and Wind Energy

Description

This unit is about basic elements on Solar and Wind Energy

Scope

The scope covers the following :

- Basics of Solar Photovoltaic Plant
- Basics of Wind Power Plant

Elements and Performance Criteria

Basics of Solar Photovoltaic Plant

To be competent, the user/individual on the job must be able to:

PC1. define Solar and explain terminology used in the Solar Industries

PC2. explain the Sun Path Diagram, Solar Radiation its effect on the performance of the plant

PC3. identify the different components of a Solar PV system and explain its basic operation

PC4. explain the types of Solar Photovoltaic Systems

PC5. discuss Technical Parameters and Performance of Solar PV Panel

PC6. explain Ohm’s Law and basics of electricity and electrical concepts

PC7. perform simple calculations to derive power and energy

PC8. explain and understand DNI, GHI, and Diffused Irradiance and irradiation

PC9. explain the working of different types of Solar PV systems

PC10. describe and assess the different types, sizes, and specifications of modules, inverters, charge controllers, cables, conduits, junction boxes, solar batteries, and allied accessories

PC11. explain and assess the manufacturing data specification sheets of different types of solar PV components

PC12. read and interpret various certification requirements for solar PV system components

PC13. demonstrate how to interpret signs, notices, and/or cautions at the project site

PC14. demonstrate how to acquire know-how of different types, sizes, and specifications of foundations/ footings

PC15. demonstrate to selection of the right footing/foundation as per site location including suitability of roof condition or suitability of soil

Basics of Wind Power Plant

To be competent, the user/individual on the job must be able to:

PC16. identify different types of Wind technology and overview of the Wind energy sector in India

PC17. illustrate key insights in the sector through various market research reports and magazines

PC18. identify different types of wind power plants, their components, and working principles

PC19. explain the benefits of wind energy over conventional sources of energy

PC20. describe the typical specifications, functioning, operating principle, warranties, and safe operating & handling procedures of different Wind power plant components like Blades, towers, motors, monitoring systems, and other components.

PC21. identify various ways to optimize material, energy/electricity consumption across processes and follow specified processes for waste disposal

PC22. explain how to analyze project site conditions

PC23. explain how to collect data on local weather conditions such as temperature range, flooding (in case of onshore), wind speed, humidity, wind direction, pressure, and rainfall and assess its impact on wind energy generation

PC24. discuss and analyze the wind data collected from the met mast for estimating wind potential

PC25. show pictures or videos of the working of the Wind Power plant

PC26. demonstrate how to analyze the daily, monthly, and annual wind resource data of the project site to evaluate the potential for wind energy generation

PC27. analyze the pre-site selection baseline data for project execution suitability

PC28. demonstrate how to verify the wind potential with other resources such as NREL/ATLAS

PC29. demonstrate how to prepare a contour map of the proposed wind plant site

PC30. demonstrate how to carry out route surveys

PC31. demonstrate how to prepare detailed site survey reports using GPS/DGPS and wind data analysis software

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. concept of current, voltage, power, resistors and capacitors

KU2. generation of DC electricity, electrical conductors and insulators

KU3. differentiate between AC and DC current

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. assess different source of information relating to generation of solar energy

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Basics of Solar Photovoltaic Plant	**25**	**25**	**-**	**-**
PC1. define Solar and explain terminology used in the Solar Industries	2	-	-	-
PC2. explain the Sun Path Diagram, Solar Radiation its effect on the performance of the plant	2	2	-	-
PC3. identify the different components of a Solar PV system and explain its basic operation	2	3	-	-
PC4. explain the types of Solar Photovoltaic Systems	2	1	-	-
PC5. discuss Technical Parameters and Performance of Solar PV Panel	2	1	-	-
PC6. explain Ohm's Law and basics of electricity and electrical concepts	2	-	-	-
PC7. perform simple calculations to derive power and energy	2	-	-	-
PC8. explain and understand DNI, GHI, and Diffused Irradiance and irradiation	2	-	-	-
PC9. explain the working of different types of Solar PV systems	2	3	-	-
PC10. describe and assess the different types, sizes, and specifications of modules, inverters, charge controllers, cables, conduits, junction boxes, solar batteries, and allied accessories	2	4	-	-
PC11. explain and assess the manufacturing data specification sheets of different types of solar PV components	1	2	-	-
PC12. read and interpret various certification requirements for solar PV system components	1	2	-	-
PC13. demonstrate how to interpret signs, notices, and/or cautions at the project site	1	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC14. demonstrate how to acquire know-how of different types, sizes, and specifications of foundations/ footings	1	3	-	-
PC15. demonstrate to selection of the right footing/foundation as per site location including suitability of roof condition or suitability of soil	1	2	-	-
Basics of Wind Power Plant	**30**	**20**	**-**	**-**
PC16. identify different types of Wind technology and overview of the Wind energy sector in India	2	1	-	-
PC17. illustrate key insights in the sector through various market research reports and magazines	1	-	-	-
PC18. identify different types of wind power plants, their components, and working principles	2	2	-	-
PC19. explain the benefits of wind energy over conventional sources of energy	2	-	-	-
PC20. describe the typical specifications, functioning, operating principle, warranties, and safe operating & handling procedures of different Wind power plant components like Blades, towers, motors, monitoring systems, and other components.	2	4	-	-
PC21. identify various ways to optimize material, energy/electricity consumption across processes and follow specified processes for waste disposal	2	2	-	-
PC22. explain how to analyze project site conditions	1	1	-	-
PC23. explain how to collect data on local weather conditions such as temperature range, flooding (in case of onshore), wind speed, humidity, wind direction, pressure, and rainfall and assess its impact on wind energy generation	2	1	-	-
PC24. discuss and analyze the wind data collected from the met mast for estimating wind potential	2	-	-	-
PC25. show pictures or videos of the working of the Wind Power plant	2	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC26. demonstrate how to analyze the daily, monthly, and annual wind resource data of the project site to evaluate the potential for wind energy generation	3	-	-	-
PC27. analyze the pre-site selection baseline data for project execution suitability	2	2	-	-
PC28. demonstrate how to verify the wind potential with other resources such as NREL/ATLAS	3	-	-	-
PC29. demonstrate how to prepare a contour map of the proposed wind plant site	1	3	-	-
PC30. demonstrate how to carry out route surveys	1	2	-	-
PC31. demonstrate how to prepare detailed site survey reports using GPS/DGPS and wind data analysis software	2	2	-	-
NOS Total	**55**	**45**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	SGJ/N4054
NOS Name	Basic of Solar and Wind Energy
Sector	Green Jobs
Sub-Sector	Renewable Energy
Occupation	Renewable Energy Professional
NSQF Level	4.5
Credits	3
Version	1.0
Last Reviewed Date	31/01/2024
Next Review Date	31/01/2026
NSQC Clearance Date	31/01/2024

SGJ/N4055: Tools and Equipment Used in Solar and Wind Energy

Description

This unit is about Tools and Equipment used in Solar and Wind Energy generation.

Scope

The scope covers the following :

- Identification of Tools and equipment

Elements and Performance Criteria

Identification of Tools and equipment

To be competent, the user/individual on the job must be able to:

PC1. discuss and demonstrate use of electrical tools used in Solar plants for installation, operation, and maintenance

PC2. discuss and demonstrate use of mechanical tools used in Solar plants for installation

PC3. discuss and demonstrate use of electrical tools used in Wind for installation, operation, and maintenance

PC4. prepare a toolkit list for installation, testing and commissioning, Operation and Maintenance

PC5. discuss checking and detection of Damaged tools

PC6. discuss Basic Hand Tools used in Solar Photovoltaic power plants

PC7. discuss the Measuring and Testing Instruments used in Solar and Wind plants

PC8. discuss the Cordless drill used for different purposes

PC9. discuss about Anemometer used in Wind plants

PC10. show how to Identify all the tools & equipment needed for the erection of wind power plant components

PC11. demonstrate how to use Spirit Level and where to use

PC12. demonstrate the use of Tri square

PC13. illustrate how to use Tripod Laser Beam for marking to get accuracy

PC14. demonstrate how to use Water Level Pipe

PC15. show how to use Socket Wrench

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. The purpose, uses, care and storage of materials

KU2. The importance of keeping a tidy work area

KU3. The ways in which working practices can minimize wastage and help to manage costs whilst maintaining quality

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. • operate/use different tools such as screw driver, inspection fixtures, wire cutter, pliers,
• tester, spanner, etc

GS2. handle tools and equipment and maintain them in a good condition

GS3. read specification of tools used in maintenance activities

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Identification of Tools and equipment	**20**	**30**	**-**	**-**
PC1. discuss and demonstrate use of electrical tools used in Solar plants for installation, operation, and maintenance	2	2	-	-
PC2. discuss and demonstrate use of mechanical tools used in Solar plants for installation	2	2	-	-
PC3. discuss and demonstrate use of electrical tools used in Wind for installation, operation, and maintenance	1	3	-	-
PC4. prepare a toolkit list for installation, testing and commissioning, Operation and Maintenance	2	3	-	-
PC5. discuss checking and detection of Damaged tools	1	2	-	-
PC6. discuss Basic Hand Tools used in Solar Photovoltaic power plants	2	2	-	-
PC7. discuss the Measuring and Testing Instruments used in Solar and Wind plants	2	3	-	-
PC8. discuss the Cordless drill used for different purposes	1	2	-	-
PC9. discuss about Anemometer used in Wind plants	1	1	-	-
PC10. show how to Identify all the tools & equipment needed for the erection of wind power plant components	1	3	-	-
PC11. demonstrate how to use Spirit Level and where to use	1	2	-	-
PC12. demonstrate the use of Tri square	1	1	-	-
PC13. illustrate how to use Tripod Laser Beam for marking to get accuracy	1	1	-	-
PC14. demonstrate how to use Water Level Pipe	1	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC15. show how to use Socket Wrench	1	1	-	-
NOS Total	**20**	**30**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	SGJ/N4055
NOS Name	Tools and Equipment Used in Solar and Wind Energy
Sector	Green Jobs
Sub-Sector	Renewable Energy
Occupation	Renewable Energy Professional
NSQF Level	4.5
Credits	1
Version	1.0
Last Reviewed Date	31/01/2024
Next Review Date	31/01/2026
NSQC Clearance Date	31/01/2024

SGJ/N4056: Solar and Wind Turbine installation

Description

This unit is about Solar and Wind Turbine installation

Scope

The scope covers the following :

- Solar Photovoltaic Plant Installation Techniques and best practices
- Wind Turbine Installation Techniques and best practices

Elements and Performance Criteria

Solar Photovoltaic Plant Installation Techniques and best practices

To be competent, the user/individual on the job must be able to:

PC1. discuss best solar panel Installation Processes

PC2. explain grid-tied PV systems, off-grid and hybrid PV systems

PC3. read and Interpret the Single Line Diagrams, Layouts, and drawings

PC4. explain DO's and Don'ts of material handling

PC5. read and interpret the Bill of Material to verify the delivery of components on-site and understand performing quality checks of material

PC6. explain how to install electrical components including inverters, batteries, junction boxes and energy meters

PC7. perform pre-installation checks for electrical components

PC8. identify and acquire know-how of installation of cables and conduits

PC9. explain dos and Don'ts of DC wiring

PC10. identify and understand the use of tools &tackles used for cable and conduit installation

PC11. explain and perform Different types of Earthing and its installation

PC12. identify the significance and types of earth faults as per standards

PC13. demonstrate how to assess the load to be connected to the Solar PV system and how to prepare the load profile

PC14. install on-grid Solar Photovoltaic System

PC15. install Solar panels on the slanted roof

PC16. install off-grid Solar Photovoltaic Systems

PC17. demonstrate how to assess the site conditions for the safe installation of a Solar PV system

PC18. install Balance of System (BOS) such as ACDB, DCDB, inverter and install on a wooden plyboard maintaining proper distance

PC19. show how to use the End Clamp and Mid Clamp

PC20. installation of the module mounting structure in the proper orientation

PC21. demonstrate how to do the Alignment of the module

PC22. measure the orientation of the roof as well as the structure

PC23. measure the tilt angle of the Module Mounting Structure as well as the deviation from the actual

PC24. show how to measure the distance between the Inverter, ACDB, and DCDB

PC25. show how to install the Module Mounting Structure according to the AutoCAD drawing

PC26. show how to strip the wire

PC27. show how to crimp the lugs

PC28. show how to properly connect the MC4 connector with the cable

PC29. show how to perform all the test related with strings

PC30. show how to perform all the test related with module mounting structure

PC31. demonstrate the commissioning of inverter

PC32. show how to perform all the test related with Inverter

PC33. show how to perform test related with Resistance and Continuity test

Wind Turbine Installation Techniques and best practices

To be competent, the user/individual on the job must be able to:

PC34. discuss best Installation Methods

PC35. explain to identify the relevant technical and schematic drawings

PC36. explain how to carry out the alignment of the turbine hub gearbox assembly with the turbine generator gearbox assembly

PC37. explain how to ensure the readiness of plant and equipment for erection

PC38. explain how to prepare the site for the erection of mechanical components

PC39. explain how to conduct a route survey for each WTG base point

PC40. discuss how to carry out the erection of the tower shells as per standard operating procedures

PC41. explain to perform torquing of the joints to ensure optimum tightness

PC42. discuss to carry out the correct placement of the nacelle assembly at the top of the tower shell

PC43. discuss to carry out the proper alignment of the nacelle assembly with the center of the tower foundation

PC44. explain how to carry out fixing of nacelle assembly with the tower shell using nuts and bolts

PC45. explain how to carry out proper alignment of blades with the turbine hub

PC46. explain how to carry out proper fixing of the turbine hub with the blades with the nacelle assembly

PC47. explain how to perform the planning and sourcing of construction power supply

PC48. explain how to install allied components like lights, AHUs for control rooms, etc.

PC49. discuss carrying out the laying of U/G cables in trenches as per the design

PC50. discuss carrying out the laying of the earth mat as per design drawings

PC51. discuss to ensure the cable connections of the generator terminal box are as per design

PC52. discuss to carry out pre-installation tests like earthing resistance, coil resistance, etc

PC53. explain how to carry out the installation of WTG in the nacelle assembly

PC54. explain how to ensure the alignment of WTG with gearbox

PC55. discuss carrying out the cable termination of WTG with the control panel

PC56. discuss carrying out the installation of CMS measuring equipment and sensors as per design

PC57. explain how to install wind turbine's electronic components such as I/O units, programmable logic controllers, etc

PC58. demonstrate to identify and mark the area where the tower is to be installed

PC59. demonstrate how to select the appropriate PPE (Personal Protective Equipment) to carry out the specific activity

PC60. show how to arrange all tools, tackles, equipment, and associated components

PC61. perform to carry out routine cleaning of tools, machines, and equipment

PC62. show to install anemometer as per schematic drawing

PC63. demonstrate to identify ways to optimize the usage of material including water in various tasks/activities/processes

PC64. analyze the single-line diagram, technical drawings/wiring/circuit diagrams, and schematic diagrams

PC65. analyze the related manuals, blueprints, and schematic diagrams to determine the tasks, tools, equipment, and parts needed

PC66. show to identify relevant technical and schematic drawings

PC67. show how to perform the route survey for laying of O/H line or U/G cables

PC68. show how to do Testing of Wind Turbine

PC69. show how to detect faults in the wind turbine system

PC70. show how to perform commissioning of Wind turbine system

PC71. show how to detect faults using drone

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. ducting, wiring and connectors systems for commercial, domestic, residential agricultural and industrial use and when and identify their applications used for PV and Wind installation in several conditions (i.e. different types of roofs and ground installation)

KU2. different mechanical and electrical technical solutions for assembly structures

KU3. engineering plant layout ,SLD, building/ land drawings/blueprints, schematics, and manufacturers manuals

KU4. specification and installation techniques related to PV panels and small wind generators

KU5. international and locally applicable standards and regulations for safety procedures related to installation

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. read warnings, instructions and other text material on product labels, components etc

GS2. interact with co-workers in order to coordinate work processes

GS3. fill in job completion form after production activity is completed

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Solar Photovoltaic Plant Installation Techniques and best practices	**20**	**40**	**-**	**-**
PC1. discuss best solar panel Installation Processes	1	-	-	-
PC2. explain grid-tied PV systems, off-grid and hybrid PV systems	2	-	-	-
PC3. read and Interpret the Single Line Diagrams, Layouts, and drawings	2	-	-	-
PC4. explain DO's and Don'ts of material handling	1	-	-	-
PC5. read and interpret the Bill of Material to verify the delivery of components on-site and understand performing quality checks of material	1	-	-	-
PC6. explain how to install electrical components including inverters, batteries, junction boxes and energy meters	-	2	-	-
PC7. perform pre-installation checks for electrical components	-	1	-	-
PC8. identify and acquire know-how of installation of cables and conduits	-	1	-	-
PC9. explain dos and Don'ts of DC wiring	1	-	-	-
PC10. identify and understand the use of tools &tackles used for cable and conduit installation	1	1	-	-
PC11. explain and perform Different types of Earthing and its installation	1	1	-	-
PC12. identify the significance and types of earth faults as per standards	1	1	-	-
PC13. demonstrate how to assess the load to be connected to the Solar PV system and how to prepare the load profile	2	1	-	-
PC14. install on-grid Solar Photovoltaic System	-	2	-	-
PC15. install Solar panels on the slanted roof	-	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC16. install off-grid Solar Photovoltaic Systems	-	3	-	-
PC17. demonstrate how to assess the site conditions for the safe installation of a Solar PV system	1	1	-	-
PC18. install Balance of System (BOS) such as ACDB, DCDB, inverter and install on a wooden plyboard maintaining proper distance	-	2	-	-
PC19. show how to use the End Clamp and Mid Clamp	-	1	-	-
PC20. installation of the module mounting structure in the proper orientation	-	1	-	-
PC21. demonstrate how to do the Alignment of the module	-	1	-	-
PC22. measure the orientation of the roof as well as the structure	-	1	-	-
PC23. measure the tilt angle of the Module Mounting Structure as well as the deviation from the actual	-	1	-	-
PC24. show how to measure the distance between the Inverter, ACDB, and DCDB	-	1	-	-
PC25. show how to install the Module Mounting Structure according to the AutoCAD drawing	1	1	-	-
PC26. show how to strip the wire	-	1	-	-
PC27. show how to crimp the lugs	-	1	-	-
PC28. show how to properly connect the MC4 connector with the cable	-	2	-	-
PC29. show how to perform all the test related with strings	1	2	-	-
PC30. show how to perform all the test related with module mounting structure	1	2	-	-
PC31. demonstrate the commissioning of inverter	1	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC32. show how to perform all the test related with Inverter	1	2	-	-
PC33. show how to perform test related with Resistance and Continuity test	1	2	-	-
Wind Turbine Installation Techniques and best practices	**30**	**55**	**-**	**-**
PC34. discuss best Installation Methods	2	-	-	-
PC35. explain to identify the relevant technical and schematic drawings	3	-	-	-
PC36. explain how to carry out the alignment of the turbine hub gearbox assembly with the turbine generator gearbox assembly	-	3	-	-
PC37. explain how to ensure the readiness of plant and equipment for erection	3	-	-	-
PC38. explain how to prepare the site for the erection of mechanical components	2	2	-	-
PC39. explain how to conduct a route survey for each WTG base point	-	2	-	-
PC40. discuss how to carry out the erection of the tower shells as per standard operating procedures	1	3	-	-
PC41. explain to perform torquing of the joints to ensure optimum tightness	1	1	-	-
PC42. discuss to carry out the correct placement of the nacelle assembly at the top of the tower shell	1	3	-	-
PC43. discuss to carry out the proper alignment of the nacelle assembly with the center of the tower foundation	1	3	-	-
PC44. explain how to carry out fixing of nacelle assembly with the tower shell using nuts and bolts	1	2	-	-
PC45. explain how to carry out proper alignment of blades with the turbine hub	-	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC46. explain how to carry out proper fixing of the turbine hub with the blades with the nacelle assembly	-	3	-	-
PC47. explain how to perform the planning and sourcing of construction power supply	2	-	-	-
PC48. explain how to install allied components like lights, AHUs for control rooms, etc.	1	2	-	-
PC49. discuss carrying out the laying of U/G cables in trenches as per the design	1	1	-	-
PC50. discuss carrying out the laying of the earth mat as per design drawings	1	-	-	-
PC51. discuss to ensure the cable connections of the generator terminal box are as per design	2	-	-	-
PC52. discuss to carry out pre-installation tests like earthing resistance, coil resistance, etc	1	-	-	-
PC53. explain how to carry out the installation of WTG in the nacelle assembly	-	2	-	-
PC54. explain how to ensure the alignment of WTG with gearbox	-	2	-	-
PC55. discuss carrying out the cable termination of WTG with the control panel	1	1	-	-
PC56. discuss carrying out the installation of CMS measuring equipment and sensors as per design	-	2	-	-
PC57. explain how to install wind turbine's electronic components such as I/O units, programmable logic controllers, etc	1	3	-	-
PC58. demonstrate to identify and mark the area where the tower is to be installed	-	1	-	-
PC59. demonstrate how to select the appropriate PPE (Personal Protective Equipment) to carry out the specific activity	-	2	-	-
PC60. show how to arrange all tools, tackles, equipment, and associated components	-	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC61. perform to carry out routine cleaning of tools, machines, and equipment	-	1	-	-
PC62. show to install anemometer as per schematic drawing	-	1	-	-
PC63. demonstrate to identify ways to optimize the usage of material including water in various tasks/activities/processes	-	1	-	-
PC64. analyze the single-line diagram, technical drawings/wiring/circuit diagrams, and schematic diagrams	2	-	-	-
PC65. analyze the related manuals, blueprints, and schematic diagrams to determine the tasks, tools, equipment, and parts needed	2	-	-	-
PC66. show to identify relevant technical and schematic drawings	1	2	-	-
PC67. show how to perform the route survey for laying of O/H line or U/G cables	-	2	-	-
PC68. show how to do Testing of Wind Turbine	-	1	-	-
PC69. show how to detect faults in the wind turbine system	-	1	-	-
PC70. show how to perform commissioning of Wind turbine system	-	2	-	-
PC71. show how to detect faults using drone	-	1	-	-
NOS Total	**50**	**95**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	SGJ/N4056
NOS Name	Solar and Wind Turbine installation
Sector	Green Jobs
Sub-Sector	Renewable Energy
Occupation	Renewable Energy Professional
NSQF Level	4.5
Credits	4
Version	1.0
Last Reviewed Date	31/01/2024
Next Review Date	31/01/2026
NSQC Clearance Date	31/01/2024

SGJ/N4057: Planning and Designing

Description

This unit is about Planning and Designing of Wind and Solar Plant

Scope

The scope covers the following :

- Planning and designing of Wind and Solar power plant

Elements and Performance Criteria

Plan and design Wind and Solar power plant

To be competent, the user/individual on the job must be able to:

PC1. explain the parameter to be kept in mind before designing an ON grid Solar Photovoltaic Plant

PC2. explain how to design the solar plant using an Excel sheet and perform all the calculations

PC3. explain how to do Site feasibility using Google Earth Pro for a given Site Location

PC4. explain the designing of off-grid and hybrid solar plants

PC5. discuss how to do plant design using PV Syst software

PC6. discuss the financial analysis and payback period calculation of the Solar Plant

PC7. explain how to design a solar plant using helioscope software

PC8. discuss the difference between helioscope and PV Syst Software

PC9. explain how to draw an Electrical Single Line diagram using AutoCAD

PC10. discuss the Solar policy of solar required while designing of solar plant

PC11. discuss how to draw plant layouts using AutoCAD

PC12. discuss about Wind Pro used for wind plant designing

PC13. explain the parameter to be kept in mind before designing an ON grid Solar Photovoltaic Plant

PC14. discuss about Wind Pro used for wind plant designing

PC15. discuss about Mean Power density curve from Wind Atlas

PC16. explain about Wind Rose diagram

PC17. discuss about the Mean wind speed

PC18. discuss the Wind speed variability monthly, annually, and hourly

PC19. demonstrate how to draw the layout of the plant for a given site location using Google Earth Pro and select the best area for Solar plant installation

PC20. calculate shadow free area available and download the kmz file

PC21. show how to read electricity bills

PC22. design a Solar Photovoltaic plant for a given site location and also define the maximum capacity of the plant on an Excel sheet

PC23. design a Solar plant using PV Syst and perform shadow analysis

PC24. calculate the performance ratio and Capacity Utilization Factor
PC25. draw a Single line diagram of a plant
PC26. show how to do a load assessment of a building
PC27. illustrate how to read a single-line diagram
PC28. design a wind plant using Wind Atlas
PC29. show how to download and read the Wind rose diagram and download the wind frequency, wind speed, and wind power diagram
PC30. show to download and read mean wind speed at different heights
PC31. show how to view and download the Energy Yield calculation using Wind Atlas

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. different types of standards, drawings, installation descriptions, and manuals
KU2. different types of materials and installation techniques to be used indifferent environments
KU3. different design software available in the market and the main products used by design teams
KU4. the value and uses of energy potential charts for different renewable energies sources i.e. Photovoltaic and Wind Power

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. to be filled
GS2. express statements or information clearly so that others can hear and understand
GS3. read and understand manuals, health and safety instructions, memos, other company documents
GS4. identify various colour codes as per standard electrical, mechanical and civil nomenclature

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Plan and design Wind and Solar power plant	**30**	**50**	**-**	**-**
PC1. explain the parameter to be kept in mind before designing an ON grid Solar Photovoltaic Plant	1	-	-	-
PC2. explain how to design the solar plant using an Excel sheet and perform all the calculations	1	2	-	-
PC3. explain how to do Site feasibility using Google Earth Pro for a given Site Location	1	1	-	-
PC4. explain the designing of off-grid and hybrid solar plants	1	2	-	-
PC5. discuss how to do plant design using PV Syst software	1	2	-	-
PC6. discuss the financial analysis and payback period calculation of the Solar Plant	1	1	-	-
PC7. explain how to design a solar plant using helioscope software	1	2	-	-
PC8. discuss the difference between helioscope and PV Syst Software	1	-	-	-
PC9. explain how to draw an Electrical Single Line diagram using AutoCAD	1	2	-	-
PC10. discuss the Solar policy of solar required while designing of solar plant	1	-	-	-
PC11. discuss how to draw plant layouts using AutoCAD	1	2	-	-
PC12. discuss about Wind Pro used for wind plant designing	1	4	-	-
PC13. explain the parameter to be kept in mind before designing an ON grid Solar Photovoltaic Plant	1	2	-	-
PC14. discuss about Wind Pro used for wind plant designing	1	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC15. discuss about Mean Power density curve from Wind Atlas	1	3	-	-
PC16. explain about Wind Rose diagram	1	-	-	-
PC17. discuss about the Mean wind speed	1	-	-	-
PC18. discuss the Wind speed variability monthly, annually, and hourly	1	-	-	-
PC19. demonstrate how to draw the layout of the plant for a given site location using Google Earth Pro and select the best area for Solar plant installation	1	2	-	-
PC20. calculate shadow free area available and download the kmz file	-	2	-	-
PC21. show how to read electricity bills	1	1	-	-
PC22. design a Solar Photovoltaic plant for a given site location and also define the maximum capacity of the plant on an Excel sheet	1	2	-	-
PC23. design a Solar plant using PV Syst and perform shadow analysis	1	3	-	-
PC24. calculate the performance ratio and Capacity Utilization Factor	1	2	-	-
PC25. draw a Single line diagram of a plant	1	2	-	-
PC26. show how to do a load assessment of a building	1	1	-	-
PC27. illustrate how to read a single-line diagram	1	1	-	-
PC28. design a wind plant using Wind Atlas	1	2	-	-
PC29. show how to download and read the Wind rose diagram and download the wind frequency, wind speed, and wind power diagram	1	2	-	-
PC30. show to download and read mean wind speed at different heights	1	2	-	-
PC31. show how to view and download the Energy Yield calculation using Wind Atlas	1	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
NOS Total	**30**	**50**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	SGJ/N4057
NOS Name	Planning and Designing
Sector	Green Jobs
Sub-Sector	Renewable Energy
Occupation	Renewable Energy Professional
NSQF Level	4.5
Credits	3
Version	1.0
Last Reviewed Date	31/01/2024
Next Review Date	31/01/2026
NSQC Clearance Date	31/01/2024

SGJ/N4058: Operation and Maintenance of Wind and Solar power Plant

Description

This unit is about Operation and Maintenance of Wind and Solar power Plant

Scope

The scope covers the following :

- Operation and Maintenance of Wind and Solar Power Plant

Elements and Performance Criteria

Operation and Maintenance of Wind and Solar Power Plant

To be competent, the user/individual on the job must be able to:

PC1. explain how to do Visual Inspection using drone technology

PC2. explain Thermography analysis

PC3. discuss how to forecast the generation

PC4. discuss types of maintenance and its importance

PC5. discuss physical cleaning of components

PC6. discuss electrical cleaning of contacts

PC7. explain how to Commission on protection relays (ABB CM-UFD. M34) using a universal relay test set and commissioning tool

PC8. different faults in Solar Power plant

PC9. identify required approvals and permit to work (PTW) from the concerned authority

PC10. discuss to ensure that the system is shut down before carrying out work

PC11. explain how to carry out maintenance activities for mechanical components of WTG as per standard operating procedures

PC12. explain how to carry out testing of WTG and associated components on a universal testing machine (UTM), and compression testing machine (CTM)

PC13. explain the importance of performing repair or replacement of faulty mechanical components of wind power plants as per standard operating procedures

PC14. explain how to conduct readiness tests on post-replacement equipment

PC15. demonstrate IV curve tracing over on the PV panel with SEAWARD PV 220/200

PC16. demonstrate thermography analysis on solar panels

PC17. show to do the cleaning of the inverter fan and other components

PC18. show anti-islanding protection of the inverter

PC19. show how to identify faults in the inverter

PC20. carry out operation of mechanical components of wind power plant

PC21. carry out maintenance of mechanical components of wind power plant

PC22. demonstrate to select the appropriate PPE (Personal Protective Equipment) to carry out the specific activity

PC23. demonstrate perform visual inspection of the mechanical components of a wind power plant and record any defects

PC24. demonstrate to measure and record parameters post-maintenance activities

PC25. demonstrate how to carry out repair or replacement of faulty mechanical components of a wind power plant as per standard operating procedures

PC26. demonstrate how to report to the supervisor in case of any deviations from standard values

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. industrial regulations and standards applicable to different types of installations

KU2. verification standards, methods, and reports to be used to record verification results

KU3. types of measuring instruments

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. read from different sources- books screens in machines and signage

GS2. express statements or information clearly so that others can hear and understand

GS3. take decision with systematic course of actions and/or response

GS4. apply domain knowledge, observations and data to select course of action to perform tasks related to solar photovoltaic systems

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Operation and Maintenance of Wind and Solar Power Plant	**15**	**40**	**-**	**-**
PC1. explain how to do Visual Inspection using drone technology	1	1	-	-
PC2. explain Thermography analysis	1	1	-	-
PC3. discuss how to forecast the generation	1	-	-	-
PC4. discuss types of maintenance and its importance	1	-	-	-
PC5. discuss physical cleaning of components	1	1	-	-
PC6. discuss electrical cleaning of contacts	1	1	-	-
PC7. explain how to Commission on protection relays (ABB CM-UFD. M34) using a universal relay test set and commissioning tool	2	4	-	-
PC8. different faults in Solar Power plant	1	2	-	-
PC9. identify required approvals and permit to work (PTW) from the concerned authority	1	1	-	-
PC10. discuss to ensure that the system is shut down before carrying out work	-	1	-	-
PC11. explain how to carry out maintenance activities for mechanical components of WTG as per standard operating procedures	-	2	-	-
PC12. explain how to carry out testing of WTG and associated components on a universal testing machine (UTM), and compression testing machine (CTM)	-	2	-	-
PC13. explain the importance of performing repair or replacement of faulty mechanical components of wind power plants as per standard operating procedures	1	2	-	-
PC14. explain how to conduct readiness tests on post-replacement equipment	1	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC15. demonstrate IV curve tracing over on the PV panel with SEAWARD PV 220/200	-	2	-	-
PC16. demonstrate thermography analysis on solar panels	-	2	-	-
PC17. show to do the cleaning of the inverter fan and other components	1	2	-	-
PC18. show anti-islanding protection of the inverter	1	1	-	-
PC19. show how to identify faults in the inverter	-	2	-	-
PC20. carry out operation of mechanical components of wind power plant	-	2	-	-
PC21. carry out maintenance of mechanical components of wind power plant	-	2	-	-
PC22. demonstrate to select the appropriate PPE (Personal Protective Equipment) to carry out the specific activity	-	1	-	-
PC23. demonstrate perform visual inspection of the mechanical components of a wind power plant and record any defects	-	1	-	-
PC24. demonstrate to measure and record parameters post-maintenance activities	1	1	-	-
PC25. demonstrate how to carry out repair or replacement of faulty mechanical components of a wind power plant as per standard operating procedures	-	2	-	-
PC26. demonstrate how to report to the supervisor in case of any deviations from standard values	-	2	-	-
NOS Total	**15**	**40**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	SGJ/N4058
NOS Name	Operation and Maintenance of Wind and Solar power Plant
Sector	Green Jobs
Sub-Sector	Renewable Energy
Occupation	Renewable Energy Professional
NSQF Level	4.5
Credits	2
Version	1.0
Last Reviewed Date	31/01/2024
Next Review Date	31/01/2026
NSQC Clearance Date	31/01/2024

SGJ/N4059: Health and Safety Practices in Solar and Wind Power

Description

This unit is about Health and Safety at Solar and Wind Power Plant

Scope

The scope covers the following :

- Health and Safety Practices in Solar and Wind Power Plants

Elements and Performance Criteria

Health and Safety Practices in Solar and Wind Power Plants

To be competent, the user/individual on the job must be able to:

PC1. explain to identify the requirements for a safe work area

PC2. identify a contact person for reporting the violation of safety policies at the workplace and provide information about the incident/violation

PC3. explain purpose, uses, care, maintenance and storage of all the tools and equipment together with their safety implications

PC4. explain the importance of administering first aid

PC5. identify the personal protective equipment used for the specific purpose

PC6. identify the hazards associated with photovoltaic installations including electric shock and required mitigating measures

PC7. identify work safety procedures and instructions for working at height and handling heavy material

PC8. explain the importance of occupational health and safety standards and regulations for installation of Solar PV systems

PC9. incorporate good housekeeping practices and infection control guidelines

PC10. safe operating & handling procedures of different Wind power plants

PC11. discuss how to use the personal protective equipment required at the workplace

PC12. explain how to ensure personal hygiene at the workplace

PC13. discuss how to identify the location of first-aid materials and how to administer first-aid

PC14. explain how to report immediately to concerned authorities regarding signs and symptoms of illness

PC15. explain the safety operating procedures for the collection, segregation, and transportation of recyclable waste

PC16. explain the processes specified for the disposal of hazardous waste from the project site as per organizational norms

PC17. demonstrate to identify the requirements for a safe work area

PC18. demonstrate how to administer first aid

PC19. demonstrate the usage of personal protective equipment for ensuring safety during installation and O&M work

PC20. show work safety procedures and instructions for working at height and handling heavy material

PC21. demonstrate how and when to use appropriate Personal Protective Equipment (PPE) while performing work

PC22. demonstrate how to ensure personal hygiene at the workplace

PC23. demonstrate how to identify the location of first-aid materials and how to administer first-aid

PC24. demonstrate how to participate in emergency and evacuation drills to be able to take necessary action in case of accidents, fires, and natural calamities

PC25. perform the steps to clean and disinfect material, tools, equipment, and other supplies before starting work and after completing the job

PC26. show the safety operating procedures for the collection, segregation, and transportation of recyclable waste

PC27. show the processes specified for the disposal of hazardous waste from the project site

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. health and safety practices in Solar and Wind Power Plants

KU2. health and safety legislation, obligations, and documentation

KU3. safety procedures when working with electricity

KU4. the situations when personal protective equipment (PPE) must be used

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. fill safety formats for near miss, unsafe condition

GS2. identify potential safety risk and report to appropriate authority

GS3. interpret general safety guidelines, labels, charts and signage

GS4. communicate and collaborate with others to incorporate sustainable practices

GS5. complete statutory documents relevant to safety and hygiene

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Health and Safety Practices in Solar and Wind Power Plants	**20**	**20**	**-**	**-**
PC1. explain to identify the requirements for a safe work area	1	-	-	-
PC2. identify a contact person for reporting the violation of safety policies at the workplace and provide information about the incident/violation	1	-	-	-
PC3. explain purpose, uses, care, maintenance and storage of all the tools and equipment together with their safety implications	1	1	-	-
PC4. explain the importance of administering first aid	1	1	-	-
PC5. identify the personal protective equipment used for the specific purpose	1	1	-	-
PC6. identify the hazards associated with photovoltaic installations including electric shock and required mitigating measures	1	-	-	-
PC7. identify work safety procedures and instructions for working at height and handling heavy material	1	-	-	-
PC8. explain the importance of occupational health and safety standards and regulations for installation of Solar PV systems	1	-	-	-
PC9. incorporate good housekeeping practices and infection control guidelines	-	1	-	-
PC10. safe operating & handling procedures of different Wind power plants	1	2	-	-
PC11. discuss how to use the personal protective equipment required at the workplace	1	1	-	-
PC12. explain how to ensure personal hygiene at the workplace	1	1	-	-
PC13. discuss how to identify the location of first-aid materials and how to administer first-aid	1	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC14. explain how to report immediately to concerned authorities regarding signs and symptoms of illness	1	1	-	-
PC15. explain the safety operating procedures for the collection, segregation, and transportation of recyclable waste	1	1	-	-
PC16. explain the processes specified for the disposal of hazardous waste from the project site as per organizational norms	1	1	-	-
PC17. demonstrate to identify the requirements for a safe work area	1	-	-	-
PC18. demonstrate how to administer first aid	1	-	-	-
PC19. demonstrate the usage of personal protective equipment for ensuring safety during installation and O&M work	-	1	-	-
PC20. show work safety procedures and instructions for working at height and handling heavy material	-	1	-	-
PC21. demonstrate how and when to use appropriate Personal Protective Equipment (PPE) while performing work	-	1	-	-
PC22. demonstrate how to ensure personal hygiene at the workplace	1	1	-	-
PC23. demonstrate how to identify the location of first-aid materials and how to administer first-aid	1	-	-	-
PC24. demonstrate how to participate in emergency and evacuation drills to be able to take necessary action in case of accidents, fires, and natural calamities	1	1	-	-
PC25. perform the steps to clean and disinfect material, tools, equipment, and other supplies before starting work and after completing the job	-	1	-	-
PC26. show the safety operating procedures for the collection, segregation, and transportation of recyclable waste	-	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC27. show the processes specified for the disposal of hazardous waste from the project site	-	1	-	-
NOS Total	**20**	**20**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	SGJ/N4059
NOS Name	Health and Safety Practices in Solar and Wind Power
Sector	Green Jobs
Sub-Sector	Renewable Energy
Occupation	Renewable Energy Professional
NSQF Level	4.5
Credits	1
Version	1.0
Last Reviewed Date	31/01/2024
Next Review Date	31/01/2026
NSQC Clearance Date	31/01/2024

DGT/VSQ/N0101: Employability Skills (30 Hours)

Description

This unit is about employability skills, Constitutional values, becoming a professional in the 21st Century, digital, financial, and legal literacy, diversity and Inclusion, English and communication skills, customer service, entrepreneurship, and apprenticeship, getting ready for jobs and career development.

Scope

The scope covers the following :

- Introduction to Employability Skills
- Constitutional values - Citizenship
- Becoming a Professional in the 21st Century
- Basic English Skills
- Communication Skills
- Diversity & Inclusion
- Financial and Legal Literacy
- Essential Digital Skills
- Entrepreneurship
- Customer Service
- Getting ready for Apprenticeship & Jobs

Elements and Performance Criteria

Introduction to Employability Skills

To be competent, the user/individual on the job must be able to:

PC1. understand the significance of employability skills in meeting the job requirements

Constitutional values – Citizenship

To be competent, the user/individual on the job must be able to:

PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices

Becoming a Professional in the 21st Century

To be competent, the user/individual on the job must be able to:

PC3. explain 21st Century Skills such as Self-Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.

Basic English Skills

To be competent, the user/individual on the job must be able to:

PC4. speak with others using some basic English phrases or sentences

Communication Skills

To be competent, the user/individual on the job must be able to:

PC5. follow good manners while communicating with others

PC6. work with others in a team

Diversity & Inclusion

To be competent, the user/individual on the job must be able to:

PC7. communicate and behave appropriately with all genders and PwD

PC8. report any issues related to sexual harassment

Financial and Legal Literacy

To be competent, the user/individual on the job must be able to:

PC9. use various financial products and services safely and securely

PC10. calculate income, expenses, savings etc.

PC11. approach the concerned authorities for any exploitation as per legal rights and laws

Essential Digital Skills

To be competent, the user/individual on the job must be able to:

PC12. operate digital devices and use its features and applications securely and safely

PC13. use internet and social media platforms securely and safely

Entrepreneurship

To be competent, the user/individual on the job must be able to:

PC14. identify and assess opportunities for potential business

PC15. identify sources for arranging money and associated financial and legal challenges

Customer Service

To be competent, the user/individual on the job must be able to:

PC16. identify different types of customers

PC17. identify customer needs and address them appropriately

PC18. follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

To be competent, the user/individual on the job must be able to:

PC19. create a basic biodata

PC20. search for suitable jobs and apply

PC21. identify and register apprenticeship opportunities as per requirement

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. need for employability skills

KU2. various constitutional and personal values

KU3. different environmentally sustainable practices and their importance

KU4. Twenty first (21st) century skills and their importance

KU5. how to use basic spoken English language

KU6. Do and dont of effective communication

KU7. inclusivity and its importance

KU8. different types of disabilities and appropriate communication and behaviour towards PwD

KU9. different types of financial products and services

KU10. how to compute income and expenses
KU11. importance of maintaining safety and security in financial transactions
KU12. different legal rights and laws
KU13. how to operate digital devices and applications safely and securely
KU14. ways to identify business opportunities
KU15. types of customers and their needs
KU16. how to apply for a job and prepare for an interview
KU17. apprenticeship scheme and the process of registering on apprenticeship portal

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. communicate effectively using appropriate language
GS2. behave politely and appropriately with all
GS3. perform basic calculations
GS4. solve problems effectively
GS5. be careful and attentive at work
GS6. use time effectively
GS7. maintain hygiene and sanitisation to avoid infection

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Introduction to Employability Skills	**1**	**1**	**-**	**-**
PC1. understand the significance of employability skills in meeting the job requirements	-	-	-	-
Constitutional values – Citizenship	**1**	**1**	**-**	**-**
PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices	-	-	-	-
Becoming a Professional in the 21st Century	**1**	**3**	**-**	**-**
PC3. explain 21st Century Skills such as Self-Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.	-	-	-	-
Basic English Skills	**2**	**3**	**-**	**-**
PC4. speak with others using some basic English phrases or sentences	-	-	-	-
Communication Skills	**1**	**1**	**-**	**-**
PC5. follow good manners while communicating with others	-	-	-	-
PC6. work with others in a team	-	-	-	-
Diversity & Inclusion	**1**	**1**	**-**	**-**
PC7. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC8. report any issues related to sexual harassment	-	-	-	-
Financial and Legal Literacy	**3**	**4**	**-**	**-**
PC9. use various financial products and services safely and securely	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. calculate income, expenses, savings etc.	-	-	-	-
PC11. approach the concerned authorities for any exploitation as per legal rights and laws	-	-	-	-
Essential Digital Skills	**4**	**6**	**-**	**-**
PC12. operate digital devices and use its features and applications securely and safely	-	-	-	-
PC13. use internet and social media platforms securely and safely	-	-	-	-
Entrepreneurship	**3**	**5**	**-**	**-**
PC14. identify and assess opportunities for potential business	-	-	-	-
PC15. identify sources for arranging money and associated financial and legal challenges	-	-	-	-
Customer Service	**2**	**2**	**-**	**-**
PC16. identify different types of customers	-	-	-	-
PC17. identify customer needs and address them appropriately	-	-	-	-
PC18. follow appropriate hygiene and grooming standards	-	-	-	-
Getting ready for apprenticeship & Jobs	**1**	**3**	**-**	**-**
PC19. create a basic biodata	-	-	-	-
PC20. search for suitable jobs and apply	-	-	-	-
PC21. identify and register apprenticeship opportunities as per requirement	-	-	-	-
NOS Total	**20**	**30**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	DGT/VSQ/N0101
NOS Name	Employability Skills (30 Hours)
Sector	Cross Sectoral
Sub-Sector	Professional Skills
Occupation	Employability
NSQF Level	2
Credits	1
Version	1.0
Last Reviewed Date	24/02/2022
Next Review Date	23/02/2027
NSQC Clearance Date	24/02/2022

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

This section includes the processes involved in identifying, gathering, and interpreting information to evaluate the Candidate on the required competencies of the program.

Assessment is governed by the WorldSkills Assessment Strategy. The Strategy establishes the principles and techniques to which WorldSkills assessment and marking must conform. Expert assessment practice lies at the heart of the WorldSkills Competition. For this reason, it is the subject of continuing professional development and scrutiny. The growth of expertise in assessment will inform the future use and direction of the main assessment instruments used by the WorldSkills Competition: the Marking Scheme, Test Project, and Competition Information System (CIS).

Assessment at the WorldSkills Competition falls into two broad types: Measurement and Judgement. For both types of assessment, the use of explicit benchmarks against which to assess each Aspect is essential to guarantee quality.

The Marking Scheme must follow the weightings within the Standards. The Test Project is the assessment vehicle for the skill competition, and therefore also follows the Standards. The CIS enables the timely and accurate recording of marks; its capacity for scrutiny, support, and feedback is continuously expanding. The Marking Scheme, in outline, will lead the process of Test Project design. After this, the Marking Scheme and Test Project will be designed, developed, and verified through an iterative process, to ensure that both together optimize their relationship with the Standards and the Assessment Strategy. They will be agreed by the Experts and submitted to WSI for approval together, to demonstrate their quality and conformity with the Standards. Prior to submission for approval to WSI, the Marking Scheme and Test Project will liaise with the WSI Skill Advisors for quality assurance and to benefit from the capabilities of the CIS.

Minimum Aggregate Passing % at QP Level : 70

(**Please note**: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
SGJ/N4054.Basic of Solar and Wind Energy	55	45	-	-	100	20
SGJ/N4055.Tools and Equipment Used in Solar and Wind Energy	20	30	-	-	50	10
SGJ/N4056.Solar and Wind Turbine installation	50	95	-	-	145	28
SGJ/N4057.Planning and Designing	30	50	-	-	80	15
SGJ/N4058.Operation and Maintenance of Wind and Solar power Plant	15	40	-	-	55	11
SGJ/N4059.Health and Safety Practices in Solar and Wind Power	20	20	-	-	40	7

Qualification Pack

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
DGT/VSQ/N0101.Employability Skills (30 Hours)	20	30	-	-	50	9
Total	**210**	**310**	**-**	**-**	**520**	**100**

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training

Glossary

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.