
Solar PV Installation and Maintenance – SS1 Scheme of Work

First Term

Week 1

- Introduction to Renewable Energy
- Meaning, types, and importance of renewable energy sources

Week 2

- Solar energy: meaning, uses, and importance in Nigeria

Week 3

- Components of a Solar PV system (solar panels, charge controller, inverter, batteries, wiring)

Week 4

- Types of solar PV systems (stand-alone/off-grid, grid-tied, hybrid systems)

Week 5

- Basic electricity concepts for solar installation (current, voltage, power, resistance, Ohm's law)

Week 6

- Safety precautions in solar PV installation and maintenance

Week 7

- Tools and equipment used in solar installation and their uses

Week 8

- Site assessment for solar installation (shading, orientation, tilt angle)

Week 9

- Mounting structures for solar panels – types and importance

Week 10

- Practical: Identifying and assembling solar PV components

Week 11

- Revision

Week 12

- Examination
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Second Term

Week 1

- Solar panels: types (monocrystalline, polycrystalline, thin-film), characteristics, and efficiency

Week 2

- Batteries for solar PV systems – types, uses, care, and maintenance

Week 3

- Charge controllers – functions, types (PWM, MPPT), and installation

Week 4

- Inverters – meaning, types (pure sine wave, modified sine wave), and applications

Week 5

- Cables and wiring in solar systems – types, sizes, and color codes

Week 6

- Energy audit: meaning, importance, and process

Week 7

- Load estimation and system sizing (matching energy needs to solar capacity)

Week 8

- Practical: Calculating daily energy requirements for a household

Week 9

- Design of a simple solar home system

Week 10

- Project: Prepare a load estimation chart for a 2-bedroom household

Week 11

- Revision

Week 12

- Examination
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Third Term

Week 1

- Solar PV installation process: step-by-step guide

Week 2

- Connection of solar panels (series and parallel arrangements)

Week 3

- Battery bank wiring and safety precautions

Week 4

- Inverter installation and connection to household appliances

Week 5

- Troubleshooting common solar PV problems (low output, battery drain, inverter fault)

Week 6

- Routine maintenance practices in solar PV systems

Week 7

- Importance of record keeping in solar installation projects

Week 8

- Practical: Complete wiring of a small solar PV system for lighting

Week 9

- Mini-project: Group solar installation demonstration in school workshop

Week 10

- Field trip: Visit to a solar PV installation site or renewable energy company

Week 11

- Revision

Week 12

- Examination

Solar PV Installation and Maintenance – SS2 Scheme of Work

First Term

Week 1

- Review of SS1 solar PV concepts

Week 2

- Advanced solar panel configuration (series-parallel, string sizing)

Week 3

- Battery technologies – deep cycle, lithium-ion, gel, AGM batteries

Week 4

- Factors affecting battery performance and lifespan

Week 5

- Sizing of charge controllers and inverters for different systems

Week 6

- Solar PV system wiring diagrams and circuit protection (fuses, breakers, surge protectors)

Week 7

- Earthing and lightning protection in solar PV systems

Week 8

- Practical: Drawing and interpreting solar PV wiring diagrams

Week 9

- Installation of solar water pumps and solar-powered streetlights

Week 10

- Project: Design a solar system for a small school computer lab

Week 11

- Revision

Week 12

- Examination

Second Term

Week 1

- Maintenance practices: preventive, corrective, and predictive maintenance

Week 2

- Solar panel cleaning techniques and safety

Week 3

- Battery maintenance: electrolyte level check, equalization charging, safety tips

Week 4

- Inverter troubleshooting and repair basics

Week 5

- Charge controller fault detection and correction

Week 6

- Testing and measuring tools (multimeter, clamp meter, solar irradiance meter)

Week 7

- Practical: Testing solar panels and batteries with a multimeter

Week 8

- Case studies of common solar PV system failures in Nigeria

Week 9

- Health and safety regulations in solar PV maintenance

Week 10

- Project: Prepare a maintenance checklist for a 1kVA solar home system

Week 11

- Revision

Week 12

- Examination

Third Term

Week 1

- Hybrid solar PV systems – design and applications

Week 2

- Grid-tied solar systems – benefits and limitations

Week 3

- Net metering and energy policies in Nigeria

Week 4

- Solar PV economics – cost analysis and payback period

Week 5

- Renewable energy policies in Nigeria (REA, NERC, NESI initiatives)

Week 6

- Role of international organizations in promoting solar adoption in Nigeria

Week 7

- Entrepreneurship opportunities in solar installation and maintenance

Week 8

- Project: Business plan for a small solar PV installation service

Week 9

- Field trip: Visit to a renewable energy research institute

Week 10

- Revision

Week 11

- Examination
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Solar PV Installation and Maintenance – SS3

Scheme of Work

First Term

Week 1

- Review of SS1–SS2 concepts

Week 2

- Advanced system sizing for residential and commercial buildings

Week 3

- Solar PV system design software (basic introduction)

Week 4

- Smart solar solutions (IoT monitoring, solar mini-grids)

Week 5

- Solar-powered appliances (refrigerators, pumps, fans)

Week 6

- Case studies of large solar projects in Nigeria (Rural electrification, CBN solar program)

Week 7

- Solar project planning and management

Week 8

- Project: Design a solar system for a rural health clinic

Week 9

- Presentation of student projects

Week 10

- Revision

Week 11

- Examination
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Second Term

Week 1

- Costing of solar PV installations – components, labor, logistics

Week 2

- Pricing strategies and quotations for clients

Week 3

- Record keeping and customer service in solar business

Week 4

- Marketing solar PV products and services in Nigeria

Week 5

- Funding opportunities for solar businesses (grants, loans, cooperatives)

Week 6

- Government incentives and subsidies for renewable energy

Week 7

- Practical: Prepare a quotation for a 5kVA solar installation project

Week 8

- Project: Develop a marketing strategy for a solar business startup

Week 9

- Mini-exhibition: Students showcase solar PV business ideas

Week 10

- Revision

Week 11

- Examination
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Third Term

Week 1

- Revision of SS1–SS3 concepts

Week 2

- Mock WAEC/NECO solar PV practical's (wiring, connection, maintenance tasks)

Week 3

- Global career opportunities in solar PV installation and maintenance

Week 4

- Sustainability and environmental benefits of solar PV in Nigeria

Week 5

- Future trends in solar technology (bifacial panels, flexible PVs, solar storage innovations)

Week 6

- Student presentation: “The Role of Solar PV in Nigeria’s Energy Future”

Week 7–8

- Comprehensive revision of core topics

Week 9–10

- Mock examinations

Week 11–12

- WAEC/NECO Examinations
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