# Lesson Plan

Name of the Faculty : Sh. Lalit Prakash Discipline : Electrical Engineering

Semester : 5th Semester

Subject : Solar Panel Installation and Maintenance Lesson Plan Duration : 13-15 Week as per academic calendar

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| **Week** | **Theory** | | **Practical** | |
| **Lecture**  **Day** | **Topic (including assignment / test)** | **Practical**  **Week** | **Topic** |
|  | 1 | Photo voltaic effect |  |  |
|  | 2 | Basic of PV system |  |  |
|  | 3 | PV Cell, PV panel, PV module |  |  |
|  | 4 | PV Arrays, Photovoltaic I-V Characteristics Curves, conversion efficiency |  |  |
|  | 5 | Selection of Site: Site assessment tools |  |  |
|  | 6 | Site Location, Climate Condition |  |  |
|  | 7 | Solar Irradiance |  |  |
|  | 8 | Solar Insolation, Sun Angle and PV Orientation, Shading analysis |  |  |
|  | 9 | Tilt angle and its significance in solar panel orientation |  |  |
|  | 10 | PV Module: Series and Parallel connection of PV |  |  |
|  | 11 | Charger Controller: Function, type of charge controller |  |  |
|  | 12 | Inverter: Function, power ratings |  |  |
|  | 13 | Storage Battery: Battery parameters, battery bank |  |  |
|  | 14 | Types of batteries used in solar system |  |  |
|  | 15 | PV Mounting Structure: Roof mounted and ground mounted  Structure |  |  |
|  | 16 | Balance of Systems: Disconnecting switches, wires and cables, combiner boxes, net meter, protection devices, earthing and grounding, Solar tracking systems etc. |  |  |
|  | 17 | Installation Tool: Hand tool ,wire strippers, crimping tools |  |  |
|  | 18 | Nuts, and washers, Leveling tools, ground anchors, multimeter |  |  |

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|  | 19 | Clamp on meter, non-contact thermometer, angle finder etc |  |  |
|  | 20 | Types of Solar PV System: Standalone PV system, On Grid system, Off Grid system |  |  |
|  | 21 | Hybrid PV system, Comparison of Different types of PV system |  |  |
|  | 22 | Design Methodology for SPV system: Calculation of load, Size of solar panel |  |  |
|  | 23 | Battery sizing, Selection of inverter, Size of charge controller, Cable sizing etc |  |  |
|  | 24 | Connection of PV system components |  |  |
|  | 25 | Operating Hazardous Tools and Equipment: Personal protective equipment (PPE), Fall protection equipment/tools, Fire protection equipment |  |  |
|  | 26 | Safety of PV system: PV module safety, Electrical Safety, Battery safety |  |  |
|  | 27 | Marking and Labeling of PV components |  |  |
|  | 28 | Maintenance of Solar PV system |  |  |
|  | 29 | Maintenance of Battery |  |  |
|  | 30 | Installation and Troubleshooting of Solar PV system |  |  |