

**GOVT. POLYTECHNIC MAYURBHANJ**  
**LESSON PLAN**

<b>Discipline : Mechatronics Engg.</b>		<b>Semester: 4th</b>		<b>Name of the Teaching Faculty : MANOJ KUMAR PRADHAN</b>	
<b>Subject :</b>		<b>Solar Power Technologies</b>			
<b>No. of Days / per week class allotted : 03</b>			<b>Semester From date : 22.12.2025</b>		<b>To Date : 18.04.2026</b>
<b>MONTH</b>	<b>Week</b>	<b>Day</b>	<b>UNIT</b>	<b>TOPICS</b>	
<b>DECEMBER</b>	Week 4	2nd	1	Current conduction in semiconductors; Atomic structure of silicon	
	Week 5	2nd	1	Energy band formation in semiconductor; P-Type and N-type material with silicon	
<b>JANUARY</b>	Week 1	4th	1	Formation of P-N junction of semiconductor; Principles for Electron-Hole Pair generation by Photon absorption	
	Week 1	6th	1	Photoelectric effect; Photo-conductive effect	
	Week 1	2nd	1	Photovoltaic effect; Materials for Opto-Electronic applications	
	Week 2	4th	1	Concept of solar cell; Main elements of silicon solar cell	
	Week 2	2nd	2	Current-Voltage (I-V) characteristics of a Photovoltaic cell; Power-Voltage (P-V) characteristics of a Photovoltaic cell	
	Week 3	4th	2	Equivalent circuit of a solar cell; Maximum power point (MPP)	
	Week 3	6th	2	Design considerations of Solar cells – Short circuit current (Isc); Open circuit voltage (Voc)	
	Week 3	2nd	2	Fill factor (FF); Energy losses & factors for loss	
	Week 4	4th	2	Efficiency; Factors limiting the efficiency of solar cells	
	Week 4	2nd	2	Impact of external parameters on solar cell performances – (i) Radiation	
	Week 5	4th	2	Impact of external parameters on solar cell performances – (ii) Temperature (iii) Wind velocity	
	Week 5	6th	2	<b>CLASS TEST - 1</b>	
<b>FEBRUARY</b>	Week 1	2nd	2	Review of Solar Cell Characteristics and Design Considerations	
	Week 1	4th	3	Classification of solar cells, Cell size; Single crystalline silicon cell	
	Week 1	6th	3	Polycrystalline silicon cell; Thin film solar cell – Amorphous Silicon	
	Week 2	2nd	3	Gallium Arsenide; Cadmium Telluride	
	Week 2	4th	3	Copper Indium Gallium Diselenide; Multi-junction solar cell	
	Week 3	2nd	3	Other non-silicon materials for photovoltaic cell fabrications	
	Week 3	4th	3	Production technology of Gallium Arsenide and Amorphous Solar Cell	
	Week 3	6th	3	Materials required for solar panel and formation of solar panel	
	Week 4	2nd	4	Dye-sensitised Solar Cell (DSSC) technology; Organic solar cell technology	
<b>MARCH</b>	Week 4	4th	4	Quantum Dot Solar cell technology; Concept of PV module, PV panel, PV array and its formation	
	Week 1	4th	4	Silicon Group and non-Silicon Group, PV cell, PV module, PV panel and PV array fabrication; Application of Nanotechnology in Solar Cell	
	Week 1	6th	4	Technical data sheet of solar PV panel	
	Week 2	2nd	4	Basic control diagram of PV system and its components	
	Week 2	4th	4	Power distribution layout of PV system	
	Week 3	2nd	5	How large-scale deployment of active solar energy is possible in Sweden and globally	
	Week 3	4th	5	Buying and selling heat and electric energy	
	Week 4	2nd	5	Grid aspects of large-scale deployment of solar cells	
<b>APRIL</b>	Week 4	4th	5	Environmental and socioeconomic aspects	
	Week 5	2nd	6	Solar Simulator and its application; Current-voltage analysis of solar cells	
	Week 1	4th	6	Power analysis	
	Week 1	6th	6	Light soaking and temperature cycling analysis	
	Week 1	2nd	7	Combinations of solar thermal and solar cell systems; Overview of different applications	
	Week 2	4th	7	District heating with solar thermal components; Introduction to microchip –micro controller – block diagram – architecture	
	Week 3	4th	7	Introduction to AVR family IC – features, block diagram, architecture, Basics of embedded control and software	
Week 3	6th	7	<b>CLASS TEST - 2</b>		