

18PEE41	PHOTO VOLTAIC SYSTEM	L	T	P	C
		3	0	0	3
Course Objectives:					
1.	Understand the principle of direct solar energy conversion to power using PV technology.				
2.	Familiarize with the structure, materials and operation of solar cells, PV modules, and arrays.				
3.	Understand The concept to design PV systems for various applications.				
4.	Gain Knowledge on Socio-economic and environmental merits of photovoltaic systems for a variety of applications.				
Unit I	PHOTOVOLTAIC CELL FUNDAMENTALS AND MANUFACTURING	9	+	0	
Photovoltaic effect - Principle of direct solar energy conversion into electricity in a solar cell. Semiconductor properties, energy levels, basic equations. Solar cell, p-n junction, structure. Commercial solar cells - Production process of single crystalline silicon cells, multi crystalline silicon cells, amorphous silicon, cadmium telluride, copper indium gallium diselenide cells.					
Unit II	PV MODULE PERFORMANCE	9	+	0	
I-V characteristics of a PV module, maximum power point, cell efficiency, fill factor, effect of irradiation and temperature, casestudy					
Unit III	DESIGN OF PV SYSTEMS	9	+	0	
Design of solar PV systems and cost estimation. Case study of design of solar PV lantern, stand alone PV system - Home lighting and other appliances, solar water pumping systems.					
Unit IV	CLASSIFICATION OF PV SYSTEMS AND COMPONENTS	9	+	0	
Classification - Central Power Station System, Distributed PV System, Stand alone PV system, Grid Interactive PV System, small system for consumer applications, Hybrid solar PV system, Concentrator solar photovoltaic. System components - PV arrays, inverters, batteries, charge controls, net power meters. PV array installation, operation, costs, reliability.					
Unit V	PV SYSTEM APPLICATIONS	9	+	0	
Building-integrated photovoltaic units, grid-interacting central power stations, standalone devices for distributed power supply in remote and rural areas, solar cars, aircraft, space solar power satellites. Socio-economic and environmental merits of photovoltaic systems.					
Total (L+T)= 45 Periods					
Course Outcomes:					
<i>Upon completion of this course, the students will be able to:</i>					
CO1	:	<i>Remember with the fundamental concepts of Solar Photovoltaic system</i>			
CO2	:	<i>Understand the working operation of various components of photovoltaic system</i>			
CO3	:	<i>Apply the relevant design concepts in any organisation</i>			
CO4	:	<i>Analyze the performance of different PV system.</i>			
CO5	:	<i>Evaluate and suggest the economic practices to be carried out for different applications.</i>			
Reference Books:					
1.	Chetan Singh Solanki : Solar photovoltaics: Fundamentals Technology and Applications, Second Edition, PHI, 2012				
2.	Fundamentals of Photovoltaic Modules & Their Applications, by Gopal Nath Tiwari, ISBN:9781849730204, Publisher: Royal Society of Chemistry, 2010				
3.	Photovoltaic Systems, 2nd Edition, by James P. Dunlop, ISBN:9780826913081, Publisher:American Technical Publishers, Inc. 2010				
4.	Jha .A.R, "Solar Cell Technology and Applications", CRC Press, 2010.				

PO CO	CO Statement	PO1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO1 1
CO1	<i>Remember with the fundamental concepts of Solar Photovoltaic system</i>	1	1	1	1	1	2	3	1	1	1	2
CO2	<i>Understand the working operation of various components of photovoltaic system</i>	1	1	2	2	2	1	1	1	1	3	1
CO3	<i>Apply the relevant design concepts in any organisation</i>	1	1	3	3	1	1	3	1	1	2	1
CO4	<i>Analyze the performance of different PV system.</i>	2	3	2	3	3	1	2	2	1	2	2
CO5	<i>Evaluate and suggest the economic practices to be carried out for different applications.</i>	2	2	3	3	3	3	2	3	2	2	2