VIDHYADEEP UNIVERSITY
Holy Flame of Knowledge

THIRD-YEAR DIPLOMA ELECTRICAL ENGINEERING SYLLABUS

Semester: 5th

Course Code: 002203573 **Type of Course:** PEC-1

Course Name: SOLAR POWER TECHNOLOGIES

Course Prerequisites:

COURSE OBJECTIVE(S):

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Maintain the efficient operation of various types of solar power technologies

TEACHING & EXAMINATION SCHEME:

Teaching Scheme (Hrs/Week)				Examination Scheme					
Theory	Tutorial	Practical	Credit	SEE		CA			Total
				Th	Pr	MSE	PLE	LA	
3	1	0	4	60	0	20	20	0	100

SEE: Semester End Examination; CA: Continuous Assessment; Th: Theory; Pr: Practical; MSE: Mid Semester Examination; PLE: Participatory Learning Experience; LA: Laboratory Assessment

*TOTAL Theory Hours: No. of Th. and Tut.Hrs/Week*15 = 45*

COURSE CONTENT(S):

Unit No.	Content	Hours	Weightage (%)
1	**Solar Energy** 1.1 Solar Map of India: Global solar power radiation. 1.2 Different types of Solar water heaters: Construction, working, specifications and installation. 1.3 Solar Heating systems. 1.4 Solar drying and different types of Solar cookers 1.5 Solar lighting. 1.6 Preventive maintenance of all of the above.	9	18%
2	**Concentrated Solar Power (CSP)** 2.1 Concentrated Solar Power (CSP) plants or solar thermal electric systems 2.2 Parabolic Trough: Construction, working and specification 2.3 Parabolic Dish: Construction, working and specification 2.4 Power Tower, Fresnel Reflectors: Construction, working and specification 2.5 Solar Stirling engines 2.6 Preventive maintenance of all of the above	10	22%
3	**Solar PV System** 3.1 Solar PV cell: Types construction, working, Typical specifications of solar cells. 3.2 Solar PV working principle: Series and parallel connections of solar modules. 3.3 Solar Photovoltaic (PV) system: components layout and	11	28%

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	working. 3.4 Solar modules, arrays and their standard specifications. 3.5 Roof top and streetlight solar PV systems and typical specifications Maintenance of these systems.		
4	**Solar PV Electronics** 4.1 Solar Charge controllers: working and specifications, switchgear and cables 4.2 Batteries: Different types for solar PV systems, maintenance and specifications 4.3 Solar Inverters: working and specifications 4.4 Signal conditioning systems: working and specifications 4.5 Solar Power tracking: construction, working, tilt angle, solar radiation, I-V, P-V characteristics, maximum power point tracking (MPPT) Maintenance of these systems.	08	17%
5	**Solar PV Off-grid and Grid Tied Systems** 5.1 Solar off grid systems: layout and specifications 5.2 Solar Grid tied (on grid) systems: Working principle of grid-tied dc-ac inverter, grid synchronization and active power export 5.3 Net metering: main features and working 5.4 Solar-wind Hybrid systems: Layout and specifications	07	15%
	TOTAL	45	100%

Text Book(s):

Title of the Book	Author(s)	Publication
Renewable Energy Technologies	Vinod Thombr	Nirali Prakashan
Solar And Wind Energy	R P Ajwalia	Atul Prakashan
Solar & Wind Energy	Anup Goel	Technical Publication

Reference Book(s):

Title of the Book	Author(s)	Publication
Solar Photovoltaics: Fundamentals, Technologies and Applications	Solanki, Chetan Singh	PHI Learning
Renewable Energy Sources and Emerging Technologies	Kothari, D.P	PHI Learning

Web Material Link(s):

a) https://nptel.ac.in/courses/108102121/

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Equivalent/Corresponding Course on NPTEL (SWAYAM):

COURSE EVALUATION:

Sr. No.	Activity	Marks	Weightage
1	Semester End Examination (External Th)	60	60%
2	Internal Examination	40	40%
2(a)	Mid Semester Examination	20	
2(b)	Attendance	10	
2(c)	Assessment Types (Any One from 2(c).1 to 2(c).7)	10	
2(c).1	Subject (Course) based Mini-Project		
2(c).2	Industry/Site Visit & Report		
2(c).3	Assignment		
2(c).4	Seminar		
2(c).5	Case Study		
2(c).6	Surprise Class Quiz		
2(c).7	Design Exercise		
2(c).7	Presentation		
2(d)	Practical (if Applicable)		

* For 4 Credit Subjects

1 Credit = 25 Marks

Theory: 3 Credits = 75 Marks
Practicals:1 Credit = 25 Marks
SEE Evaluation will be of 100 marks and converted to 50 Marks (75 Th + 25 Pr)
CA Evaluation will be of 100 Marks and converted to 50 Marks. (75 Th + 25 Pr)

Distribution of Marks for Theory Evaluation as per Bloom's Taxonomy Level:

Level	Remember	Understand	Apply	Analyze	Evaluate	Create
% Weightage	30%	20%	10%	20%	10%	10%

COURSE OUTCOMES :*(in the range of 4 to 6)*

CO1	Maintain the solar non-electric equipment.
CO2	Maintain CSP plants
CO3	Maintain solar PV systems.
CO4	Maintain the DC-AC converters in EV applications
CO5	Select the batteries for EV applications.