



GUJARAT TECHNOLOGICAL UNIVERSITY
Syllabus for Bachelor of Vocation (B.Voc.), 2nd Semester
Branch: Solar & Renewable Energy
Subject Name: Basics of Solar Photovoltaic
Subject Code: 1120704

Type of course: Core b,

Prerequisite: Basic of Solar Cells

Rationale: In the field of Solar & Renewable Energy, Solar energy is leading renewable source. It is essential to know the basic of solar cell and internal structure with their characteristic. Enhance the knowledge of solar cell manufacturing. Construction of Solar Photovoltaic modules. Design of solar PV module. Solar cell performance analysis technique. Solar radiation and its measurement.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE(E)	PA(M)	ESE(V)	PA(I)	
3	0	0	3	50	0	0	0	50

Content:

Sr. No.	Topic	No. of Hours	Module Weightage
01	Introduction to Solar Cell Introduction to Solar Cell, introduction to P-N junction, Space charge, Energy band diagram of P-N junction, P-N junction different bias condition, I-V relationship, P-N junction Qualitative analysis.	10	20%
02	Design of solar cell: Basics of Solar Photovoltaic, Photovoltaic effect, Principle of photovoltaic conversion, Solar cell Characteristic and design, Short circuit current, open circuit voltage, Fill factor, Efficiency. Loss in solar cells, effect of series and shunt resistance, Effect of temperature, Analytical Techniques. Types of Solar Cell	12	30%
03	Solar Photovoltaic Modules: Solar PV modules from solar cells, Cell Series and Parallel Connection, Mismatch in Series Parallel Connection, design and structure of PV module, PV module Power output. Block Diagram of Solar PV system.	12	30%
04	Solar Radiation: The SUN and The Earth position, The SUN and Earth movement, angle of sunrays on Solar Collector, SUN Tracking, Estimation of Solar Radiation Energy, Measurement of Solar Radiation	10	20%
TOTAL		42	100

Distribution of marks weightage for cognitive level:

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	20	10	-	-	-

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze, E: Evaluate C: Create above Levels (Revised Bloom's Taxonomy)



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Reference Books:

1. Solar Photovoltaic: Fundamentals, Technologies and Application, Chetan Singh Solanki, PHI Learning Pvt., Ltd., 2009.
2. Renewable Energy Source & Emerging Technologies, D P Kothari, K C Singal. PHI Learning Pvt. Ltd.
3. Renewable Energy Technologies; A Practical Guide for Beginners, Chetan Singh Solanki, PHI School Books (2008)

Course Outcome:

Sr.No.	CO statement	Marks% weightage
CO1	Basics of Solar PV Cell and PN junction	20
CO2	Learn the fundamentals Characteristic of Solar PV Cell.	30
CO3	Detail knowledge of Solar Photovoltaic Modules Construction.	25
CO4	Ability to understand solar radiation and measurement	25