GUJARAT TECHNOLOGICAL UNIVERSITY
Syllabus for Bachelor of Vocation (B.Voc.), 3rd Semester
Branch: Solar & Renewable Energy
Subject Name: Power Electronics for Solar PV System
Subject Code: 1130701

Type of course: Engineering Science

Prerequisite: Zeal to learn the subject

Rationale: Communication Skills in English is to help students understand the process of communication in link with Non-verbal Communication. The curriculum also targets the understanding of different barriers that creep into communication process.

Teaching and Examination Scheme:

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

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End SemesterExamination; PA- Progressive Assessment

Contents:

Sr. No.	Content	Total Hrs.	Module % Weightage
1	**Power Semiconductor Devices:** Diode, Thyristor, MOSFET, IGBT; Static characteristics of these devices; Operation of power devices as switches.	08	15
2	**AC-DC converter:** Single phase half-wave and full-wave diode rectifiers, Three phase diode rectifier**,** Single phase half wave and full wave controlled rectifiers, Three phase half wave, full wave or bridge rectifier.	10	25
3	**DC-DC Converters for Solar PV Systems:** Linear voltage regulator, Introduction of switch mode power supply, Principle of Basic DC-DC converter topologies: Buck, Boost and Buck-Boost converter.	08	20
4	**Inverters for Solar PV Systems:** Working principle of inverter, single phase and 3 phase inverters, PWM methods and PWM inverter, Operation of grid-tied and off-grid inverter.	08	20
5	**Solar Photovoltaic Systems:** Overview of solar energy and PV technology, Components of a solar PV system, MPPT techniques and algorithms, Energy Storage Systems in Solar PV Applications, Efficiency optimization and design considerations.	08	20
	Total	**42**	**100**

Reference Books:

1. 1 P.S. Bimbhra, "Power Electronics", Khanna Publishers, New Delhi, 2012.
2. N. Mohan, T. M. Undeland, W.M. Robbins, "Power Electronics: Converters, Applications and Design", Wiley India Edition, 2007.
3. Muhammad H. Rashid ,"Power Electronics: Circuits, Devices, and Applications" Pearson Education India, 2009.

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	10	15	15	--	--

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

Course Outcomes:

Sr. No.	CO Statement	Marks % Weightage
CO-1	Understanding of Power Semiconductor Devices	20%
CO-2	Power Converter Construction for Solar PV Systems	45%
CO-3	Analysis of Power Converters in Solar PV Applications	15%
CO-4	Appreciation of Power Converter Applications in Solar PV Systems	20%

List of Open Source Software/learning website:
https://nptel.ac.in.