GUJARAT TECHNOLOGICAL UNIVERSITY
Syllabus for Bachelor of Vocation (B.Voc), 5th Semester
Branch: Solar and Renewable Energy
Subject Name: Power Transmission and Distribution
Subject Code: 1150703

Type of course: Core
Prerequisite: NA

Rationale: The electricity is generated in bulk at remote places near to coal mines (thermal power plants, dams (hydro power) and transmitted to long distances and then distributed in cities and villages and to industry. The transmission and distribution of electric power is a complex issue which requires knowledge of different types of transmission lines and power equipment's. Technicians are required to operate and maintain the power transmission and distribution system so that electrical energy is continuously available to the consumers economically. It is therefore required that the technicians should be also able to work independently in the various area of transmission and distribution system. S/he should be able to operate various control equipment's independently in normal and abnormal conditions. Essential efforts are made in this course to develop above skills in the students. 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 Semester Examination; PA-Progressive Assessment

Content:

Sr. No.	Content	Total Hrs.	Module % Weightage
1	**Supply Systems** Electric Supply System, Typical a.c. Power Supply Scheme, Comparison of D.C. and A.C. Transmission, Comparison of overhead and underground power system, A.C. Transmission Advantages of High Transmission Voltage, Various Systems of Power Transmission Comparison of Conductor Material in Overhead System, Elements of a Transmission line.	10	25%
2	**Transmission Line Components and Analysis** Main Components of Overhead Lines, Conductor Materials, Line Supports, Insulators, Types of Insulators, Skin effect, proximity effect and Ferranti effect. Corona, Factors Affecting Corona, Important, Advantages and Disadvantages of Corona, Methods of Reducing Corona Effect.	12	25%
3	**Distribution Systems** Distribution System, Requirements of a Distribution System, Classification of Distribution Systems, A.C. Distribution, D.C. Distribution, Connection Schemes of Distribution System, Design Considerations in Distribution System.	08	20%
4	**Sub-Stations** Sub-Station, Classification of Sub-Stations, Comparison between Outdoor and Indoor Sub-Stations, Transformer Sub-Stations, Pole-Mounted Sub-Station, Symbols for Equipment in Sub-Stations, Equipment in a Transformer Sub-Station, Key Diagram of 66/11 kV Sub-Station, Key Diagram of 11kV/400 V Indoor Sub-Station.	08	20%

5	**Underground Cables and Earthing** Underground Cables, Classification of Cables, Construction of Cables, Insulating Materials for Cables, Earthing and its classification.	04	10%
	Total	**42**	**100**

Reference Books:

1. Principles of Power System: V. K. Mehta, Rohit Mehta, S. Chand Publications
2. Wind Power Technology: Earnest Joshua, PHI Learning Pvt. Ltd.
3. Solar Energy: S. P. Sukhatme, McGraw Hill Education India Pvt. Ltd.
4. Power System Analysis: Hadi Saadat, McGraw Hill Education India Pvt. Ltd.
5. Electrical Power systems: C. L .Wadhwa, New Age International Publishers
6. Electrical Power Systems: Dr. S. L. Uppal, Prof. S. Rao, Khanna Publications

Distribution of marks weightage for cognitive level:

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	15	10	05	05	0

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

Course Outcomes:

Sr. No.	CO Statement	Marks %Weightage
CO-1	Understand Supply Systems.	25
CO-2	Explain mechanical design of transmission line	25
CO-3	Compare DC and AC distribution	15
CO-4	Acquire knowledge about substation equipment's & layout.	20
CO-5	Understand types of cable and its construction and methods of earthing.	15