

Subject Code: 1ET4030402	Subject Title: Transmission and Distribution of Electrical Power
Pre-Requisite	--

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 equipments. 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, knowledge of operation various control equipments independently in normal and abnormal conditions. Essential efforts are made in this course to develop above skills in the students.

COURSE OBJECTIVE:

The course content should be taught and implemented with the aim to develop different types of skills so that students are able to acquire following competency:

1. Operate and maintain various transmission and distribution system.

TEACHING AND EVALUATION SCHEME:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)			
Lecture	Tutorial	Practical	Credit	Theory		Practical	
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment
4	-	2	5	60	40	20	30

DETAILS OF COURSE CONTENTS:

Sr No	Topics and Sub-topics	Total Hours	% Weightage
1	Transmission Line Components 1.1 State the features of different transmission systems. 1.2 State the need for different types of insulators. 1.3 State the features of different types of conductors 1.4 Explain the criteria for spacing of conductors 1.5 Solve simple numerical problems	12	25

2	Performance Of Transmission Lines 2.1 Discriminate between skin effect, proximity effect, Ferranti effect and corona 2.2 Differentiate between efficiency and regulation of a transmission line 2.3 State the effect of low power factor on the performance 2.4 Explain the effects of R, L and C on 1-ph and 3-ph transmission line. 2.5 Differentiate the features of the short, medium and long transmission lines 2.6 Describe the importance and functions of the load dispatch centre. 2.7 Solve simple numerical problems	12	20
3	EHV Transmission 3.1 State the need for EHV transmission 3b. State the features of HVAC transmission 3.2 State the features of HVDC transmission 3.3 Describe the impact of wind power and solar power on the transmission system 3.4 Describe the impact of other renewable energy on the transmission system 3.5 State the need for FACTS devices 3.6 State the salient features of FACTS devices	08	15
4	Distribution System Components 4.1 State the need for distribution system 4.2 With sketches describe the various connection schemes of the distribution system 4.3 Describe the Impact of wind power on the distribution system 4.4 Describe the measures to be adapted to take of the distributed generation in the distribution system 4.5 Solve simple numerical problems	10	20
5	Sub-Station And Cables 5.1 State the need for electrical substations 5.2 Sketch the elevation layout of a typical 11/33/66/110 kV electrical substation with various switchgear and typical spacing between them and the ground level as well. 5.3 State the selection of the bus bar and their arrangement.	14	20

	5.4 With sketches describe the various types of earthing adapted for substations. 5.5 State the procedures to undertake the earth test and megger test 5.6 State the features of unarmored and armored cables 5.7 State the features of different types of cables used in a substation 5.8 Select the cables for relevant applications using data sheets/catalogues 5.9 Solve simple numerical problems on selecting cables		
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COURSE OUTCOME:

Students are able to acquire different course outcomes.

1. Differentiate various types of transmission and distribution systems.
2. Interpret the various transmission concepts
3. Maintain voltage regulation and efficiency of transmission system.
4. Minimize the voltage drop of distribution systems.

LIST OF PRACTICAL:

- 1 Demonstrate cable jointing procedures of unarmored cables
- 2 Demonstrate cable jointing procedures of armored cables
- 3 Prepare a report on different type of insulators and bushings used in transmission system with their specifications.
- 4 Prepare a report about types of cables used in distribution system by visiting nearby cable suppliers/industries or otherwise with the help of internet
- 5 Prepare Technical Report after visit to the Load Dispatch Centre.
Prepare a report on different type of Transmission Towers used in the industry
- 6 Prepare a report after studying distribution system of a residential colony.
- 7 Prepare a report on substation with its layout after visiting a nearby substation
- 8 Use crimping tools to fit lugs at cable ends of unarmored cables
- 9 Use crimping tools to fit lugs at cable ends of armored cables
- 10 Use earth testers
- 11 Undertake pipe earthing / Plate earthing

LIST OF REFERENCES:

SR. No.	Title of Books	Author	Publication
1	Principles of power system	Mehta V. K.	S. Chand and Co., New Delhi,

2	Transmission and Distribution of electrical energy	Gupta J. B.	S. K. Khanna, New Delhi
3	Electric Power Transmission and Distribution	Sivanagaraju S. Satyanarayana S.	Pearson Learning, New Delhi,
4	A Course in electrical Power	Soni-Gupta- Bhatnagar	Dhanpat Rai, New Delhi
5	Electrical Power System	Wadhwa C. L.	New Age, New Delhi

LIST OF LEARNING WEBSITES

1. <https://www.google.com>
2. <https://www.youtube.com>