

**Course Name** : Electrical Engineering Group

**Course Code:** EE / EP

**Semester** : Fourth

**Subject Title** : Transmission & Distribution  
of Electric Power.

**Subject Code:** 9060

**Teaching and Examination Scheme :**

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
03	01	--	03	80	20	--	--	--	100

**Rationale:**

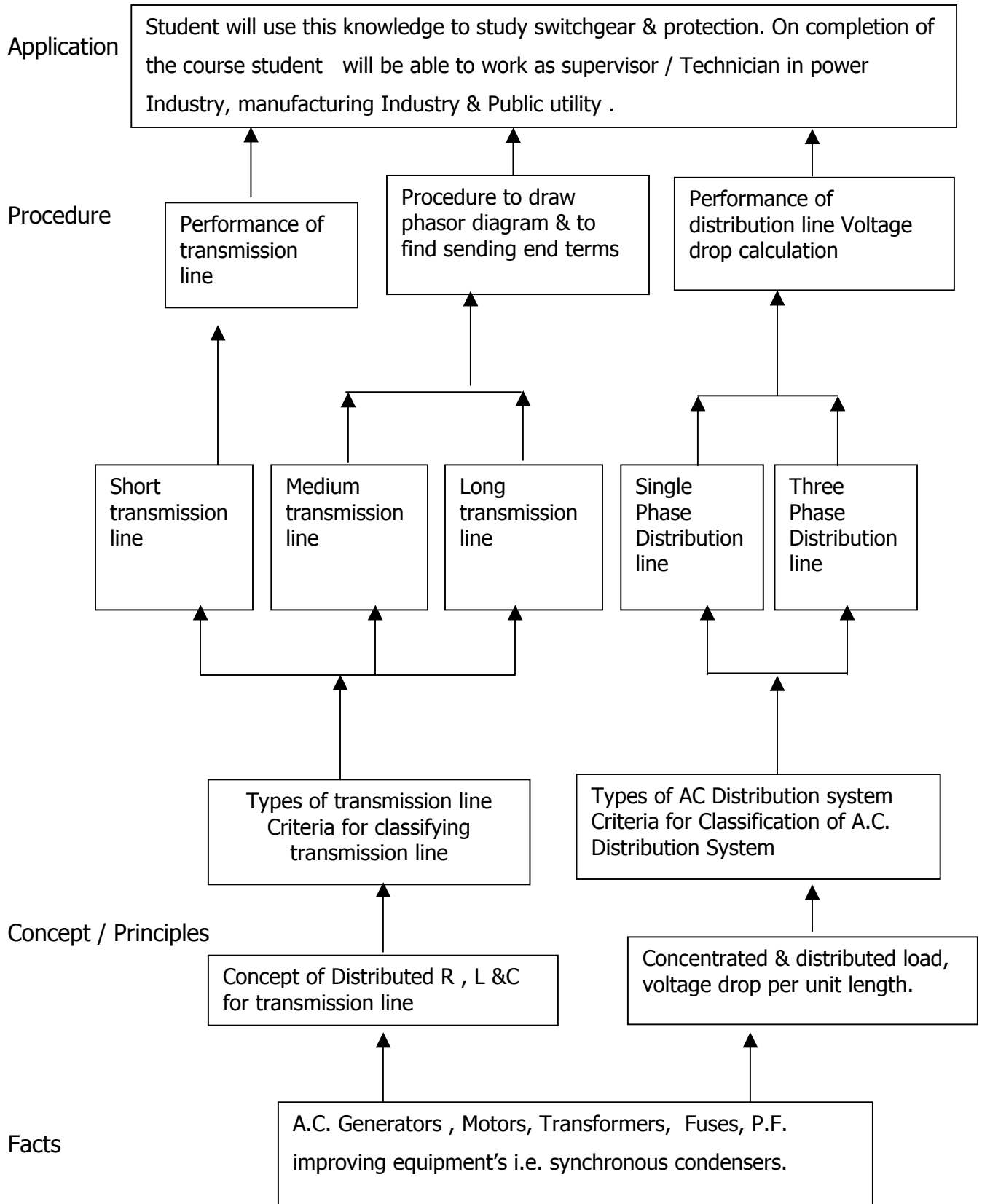
Electrical diploma pass outs should know systems for electrical energy transmission & distribution. They also will be able to identify various components & their functions. They will be able to measure system performance. They will use this knowledge in studying switchgear & protection. On completing the study of generation, transmission & distribution, he/she will be able to work as technician/supervisor in power industry, manufacturing industry & public utilities.

**Objective:**

The student will be able to:

1. Know various types of transmission & distribution systems.
2. Identify various components & Know their functions.
3. Draw substation layout as per the requirements.
4. Calculate voltage regulation & efficiency of transmission system.
5. Calculate voltage drop of distribution system.

## Learning Structure:



**Contents : Theory**

Chapter	Name of the Topic	Hours	Marks
<b>01</b>	<p><b>Basics Of Transmission.</b></p> <p>1.1 Introduction to transmission.</p> <p>1.2 Necessity of transmission of electricity.</p> <p>1.3 Classification &amp; comparison of different transmission systems.</p>	<b>03</b>	<b>04</b>
<b>02</b>	<p><b>Transmission Line Components.</b></p> <p>2.1 Introduction to line components.</p> <p>2.2 types of conductors-Copper, Aluminum &amp; state their trade names.</p> <p>2.3 Solid, Stranded &amp; bundled conductors.</p> <p>2.4 Line supports – requirements, types, and field of applications.</p> <p>2.5 Line insulators – requirements, types, and field of applications.</p> <p>2.6 Failure of insulator &amp; reasons of Failure.</p> <p>2.7 Distribution of potential over a string of suspension insulators.</p> <p>2.8 Concept of string efficiency, Methods of improving string efficiency.</p> <p>2.9 Corona – corona formation, advantages &amp; disadvantages, factors affecting corona, important terms related to corona.</p> <p>2.10 Spacing between Conductors.</p> <p>2.11 Calculation of Span length &amp; sag Calculation ( Numericals based on 2.7 , 2.8 &amp; 2.11)</p>	<b>10</b>	<b>16</b>

<p><b>03</b></p>	<p><b>Transmission Line Parameters</b></p> <p>3.1 R,L &amp; C of 1-ph &amp; 3-ph transmission line &amp; their effects on line.</p> <p>3.2 Skin effect, proximity effect &amp; Ferranti effect.</p> <p>3.3 Concept of transposition of conductors &amp; necessity.</p>	<p><b>03</b></p>	<p><b>06</b></p>
<p><b>04</b></p>	<p><b>Performance Of Transmission Line.</b></p> <p>4.1 Classification of transmission lines.</p> <p>4.2 Losses, Efficiency &amp; Regulation of line.</p> <p>4.3 Performance of single phase short transmission line(Numerical based on it )</p> <p>4.4 Effect of load power factor on performance.</p> <p>4.6 Medium transmission lines-End condenser, Nominal T &amp; Nominal <math>\pi</math> Network with vector diagram.</p> <p>4.7 General circuit &amp; Generalised Circuit Constants ( A, B, C, D )</p>	<p><b>10</b></p>	<p><b>16</b></p>
<p><b>05</b></p>	<p><b>Extra High Voltage Transmission.</b></p> <p>5.1 Introduction &amp; Requirement.</p> <p>5.2 EHVAC Transmission, Reasons for adoption &amp; limitations.</p> <p>5.3 HVDC Transmission – Advantages, Limitations.</p>	<p><b>03</b></p>	<p><b>06</b></p>
<p><b>06</b></p>	<p><b>Components Of Distributrion System.</b></p> <p>6.1 Introduction.</p> <p>6.2 Classification of distribution system.</p> <p>6.3 A.C distribution.</p> <p>6.4 Connection schemes of distribution system.</p> <p>6.5 Requirements of Distribution systems.</p> <p>6.6 Design consideration.</p> <p>6.7 A.C. distribution calculations.</p> <p>6.8 Methods of solving A.C.-1 phase &amp; 3 <math>\emptyset</math> -phase</p>	<p><b>10</b></p>	<p><b>16</b></p>

	connected ( balanced ) distribution system. ( Numericals based on 1-ph & 3-ph balanced distribution system)		
<b>07</b>	<p><b>Underground Cables.</b></p> <p>7.1 Introduction &amp; requirements.</p> <p>7.2 Classification of cables.</p> <p>7.3 Cable conductors.</p> <p>7.4 Cable construction.</p> <p>7.5 Cable insulation, Metallic sheathing &amp; mechanical protection.</p> <p>7.6 Comparison with overhead lines</p> <p>7.7 Cable laying</p>	<b>03</b>	<b>04</b>
<b>08</b>	<p><b>Substations.</b></p> <p>8.1 Introduction.</p> <p>8.2 Classification of indoor &amp; outdoor sub-stations.</p> <p>8.3 Advantages &amp; Disadvantages.</p> <p>8.4 Selection &amp; location of site.</p> <p>8.5 Main connection schemes.</p> <p>8.6 Equipment's circuit element of substations.</p> <p>8.6.1 In coming &amp; outgoing lines, Transformers, CT&amp;PT, Relays, CB's, fuses, Isolators, batteries, lightning arresters. Insulators.</p> <p>8.6.2 Bus bar's material, types in detail.</p> <p>Connection diagram and layout of sub-stations.</p>	<b>06</b>	<b>12</b>
<b>Total</b>		<b>48</b>	<b>80</b>

## Learning Resources:

### Books:

<b>Sr. No.</b>	<b>Name of Book</b>	<b>Author</b>	<b>Publication</b>
1	A Course in electrical power	Soni-Gupta-Bhatnagar.	Dhanpat Rai
2	Principals of power system	V. K. Mehta	S. Chand & Company
3	A Course in electrical power	S. L. Uppal.	S. K. Khanna
4	Transmission & distribution of electrical energy	J. B. Gupta	S. K. Khanna
5	Generation & transmission of electrical energy	A. T. Star	Pitman