

## ELECTRICAL POWER DISTRIBUTION SYSTEM

<b>PE-II: EPS</b>																													
Course Code	Category	Hours / Week			Credits	Maximum Marks																							
<b>BPSC10</b>	<b>Elective</b>	L	T	P	C	CIA	SEE	Total																					
		3	0	0	3	30	70	100																					
<b>Contact Classes: 45</b>		<b>Total Tutorials: Nil</b>		<b>Total Practical Classes: Nil</b>			<b>Total Classes: 45</b>																						
<p><b>I. COURSE OVERVIEW:</b>                      Electric power distribution system plays an important role in the efficient operation of a modern industrial plant. Such a system includes high voltage circuit breakers, switchgear, transformers, motor control centers, electric motors, variable speed drive sheds' trouble-free electrical system is essential for an interruption-free plant operation. This course will cover all aspects of power distribution, including system planning, equipment selection and application, system grounding, protection and conformity with electrical code requirements, etc.</p>																													
<p><b>II. COURSE OBJECTIVES:</b>  <b>The students will try to learn:</b></p> <ol style="list-style-type: none"> <li>I. The application of SCADA in power distribution systems.</li> <li>II. The distribution management and distribution automation.</li> <li>III. The Maintenance and AI techniques of automated distribution systems</li> </ol>																													
<p><b>III. COURSE OUTCOMES:</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: left; padding: 5px;"><b>After successful completion of the course, students will be able to:</b></th> </tr> </thead> <tbody> <tr> <td style="width: 10%; text-align: center;">CO 1</td> <td style="width: 70%;">Understand the importance of load forecasting in Distribution system to meet the future electrical load demands</td> <td style="width: 20%; text-align: center;">Understand</td> </tr> <tr> <td style="text-align: center;">CO 2</td> <td>Apply different types of power factor correction methods to increase the efficiency of the distribution system</td> <td style="text-align: center;">Apply</td> </tr> <tr> <td style="text-align: center;">CO 3</td> <td>Analyze communication systems, remote metering, automatic meter for collecting the data that's needed for billing purposes</td> <td style="text-align: center;">Analyze</td> </tr> <tr> <td style="text-align: center;">CO 4</td> <td>Make use of SCADA in distribution automation to maintain efficiency, process data for smarter decisions</td> <td style="text-align: center;">Understand</td> </tr> <tr> <td style="text-align: center;">CO 5</td> <td>Examine placement of optimal switching devices for monitoring and to increase the efficiency of the distribution system</td> <td style="text-align: center;">Evaluate</td> </tr> <tr> <td style="text-align: center;">CO 6</td> <td>Apply AI techniques in electrical distribution system to enhance efficiency, reliability, and quality of electric service.</td> <td style="text-align: center;">Apply</td> </tr> </tbody> </table>									<b>After successful completion of the course, students will be able to:</b>			CO 1	Understand the importance of load forecasting in Distribution system to meet the future electrical load demands	Understand	CO 2	Apply different types of power factor correction methods to increase the efficiency of the distribution system	Apply	CO 3	Analyze communication systems, remote metering, automatic meter for collecting the data that's needed for billing purposes	Analyze	CO 4	Make use of SCADA in distribution automation to maintain efficiency, process data for smarter decisions	Understand	CO 5	Examine placement of optimal switching devices for monitoring and to increase the efficiency of the distribution system	Evaluate	CO 6	Apply AI techniques in electrical distribution system to enhance efficiency, reliability, and quality of electric service.	Apply
<b>After successful completion of the course, students will be able to:</b>																													
CO 1	Understand the importance of load forecasting in Distribution system to meet the future electrical load demands	Understand																											
CO 2	Apply different types of power factor correction methods to increase the efficiency of the distribution system	Apply																											
CO 3	Analyze communication systems, remote metering, automatic meter for collecting the data that's needed for billing purposes	Analyze																											
CO 4	Make use of SCADA in distribution automation to maintain efficiency, process data for smarter decisions	Understand																											
CO 5	Examine placement of optimal switching devices for monitoring and to increase the efficiency of the distribution system	Evaluate																											
CO 6	Apply AI techniques in electrical distribution system to enhance efficiency, reliability, and quality of electric service.	Apply																											
<p><b>IV. SYLLABUS</b></p> <p><b>MODULE –I: DISTRIBUTION OF POWER(09)</b>                      Distribution of power, management, power loads, load forecasting short-term and long-term, power system loading, technological forecasting</p> <p><b>MODULE –II: ADVANTAGES OF DISTRIBUTION MANAGEMENT SYSTEM(10)</b>                      Advantages of distribution management system (D.M.S.): Distribution Automation, definition, restoration, reconfiguration of distribution network, different methods and constraints, power factor correction.</p> <p><b>MODULE –III: INTERCONNECTION OF DISTRIBUTION(08)</b>                      Interconnection of distribution, control, communication systems, remote metering, automatic meter reading and its implementation; SCADA: Introduction, block diagram, SCADA applied to distribution automation.                      Common Functions of SCADA: Advantages of distribution automation through SCADA.</p>																													

#### **MODULE –IV: OPTIMAL SWITCHING DEVICE PLACEMENT(09)**

Calculation of optimum number of switches, capacitors, optimum switching device placement in radial, distribution systems, sectionalizing switches, types, benefits, bellman's optimality principle, remote terminal units, energy efficiency in electrical distribution, monitoring

#### **MODULE –V: MAINTENANCE OF AUTOMATED DISTRIBUTION SYSTEMS (09)**

Maintenance of automated distribution systems, difficulties in implementing distribution, automation in actual practice, urban, rural distribution, energy management, AI techniques applied to distribution automation.

##### **V. Text Books:**

1. AS Pabla, "Electric Power Distribution", Tata McGraw Hill Publishing Co. Ltd., 4<sup>th</sup> Edition, 2012.
2. MK Khedkar, GMDhole, "A Text Book of Electrical power Distribution Automation", University Science Press, NewDelhi, 2<sup>nd</sup> Edition, 2010.

##### **VI. Reference Books:**

1. Anthony J Panseni, "Electrical Distribution Engineering", CRC Press, 2<sup>nd</sup> Edition, 2010.
2. James Momoh, "Electric Power Distribution, automation, protection & control", CRC Press 2<sup>nd</sup> Edition, 2006.

##### **VII. Web References:**

1. <https://www.nptelvideos.in/2012/11/distribution-automation.html>
2. <https://www.powersystem.org/distribution-automation>
3. <https://www.sciencedirect.com>

##### **VIII. E-Text Books:**

1. <https://www.schneider-electric.us/documents/customers/utility/br-distribution-feeder-automation.pdf>
2. <https://www.pdf.semanticscholar.org/099e/bffd3b296af4aa0ef7b777721f178be6b28.pdf>