

SEMESTER	DEPARTMENT	COURSE TITLE
<i>Seventh</i>	<i>Power Engineering</i>	<i>Power Systems II</i>
COURSE CODE	HOURS 3	COURSE SPECIFICATIONS
<i>EP705</i>	UNITS 3	<i>Theoretical Content</i>
<p>1. Investigate Resonance Characteristics in AC Circuits.</p> <ul style="list-style-type: none"> ➤ Gain an understanding in the subject of resonance at power frequencies under different component configurations. ➤ Do numerical exercises in resonant circuits. ➤ Understand the properties and components of an Impulse Generator. 		
<p>2. Measure Power and Power Factor in Single and 3-phase Circuits.</p> <ul style="list-style-type: none"> ➤ Understand the theoretical aspects of the measurement of Power in AC circuits (Using Voltmeters, ammeters, and a watt-meter verify the Power reading of the Watt-meter for various complex loads.) ➤ Understand the meaning and implication of using the Two Watt-meter method of measuring Power in a 3-phase circuit ➤ Understand Power measurement in Unbalanced circuits 		
<p>3. Investigate Electrical Transients In DC & AC Circuits.</p> <ul style="list-style-type: none"> ➤ Understand the description of a Transient and the Steady state conditions. Analyse and deduce the expressions for the transient responses with time. ➤ Understand why transients are important in electrical circuits ➤ Investigate the charge and discharge of a Inductor , Capacitor, resistor circuit using a dc and ac sources in switch mode. Use values where resonant properties are present. 		
<p>4. Investigate Properties of Different Type of Transmission Lines.</p> <ul style="list-style-type: none"> ➤ Investigate the Power losses in ‘Medium lines’ and their effects on voltage regulation. ➤ Investigate the Power losses in ‘Long lines’ and their effects on voltage regulation and Power capacity. 		
<p>5. Determine Symmetrical Components of an un-balanced 3-phase circuit.</p> <p>Understand the concepts of:</p> <ul style="list-style-type: none"> ➤ Positive Sequence voltage 		

- Negative Sequence voltage
- Zero Sequence voltage
- Demonstrate the effect on phase of symmetrical components.

6. Determine Properties of Faults on Lines.

Study the following faults on three phase lines;

- Un balanced faults on the lines
- Single line – earth fault.
- Double line to earth fault
- Line to Line fault.

References:

1-*Elements of Power System*, by W. Stevenson.

2- *Power System Analysis*, John J. Grainger & William D. Stevenson JR. 1994.