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| <b>SEMESTER</b><br><i>Seventh</i>  | <b>DEPARTMENT</b><br><i>Power Engineering</i> | <b>COURSE TITLE</b><br><i>Power Systems II Lab</i>       |
| <b>COURSE CODE</b><br><i>EP706</i>   | <b>HOURS: 3</b><br><b>UNITS: 1</b>            | <b>COURSE SPECIFICATIONS</b><br><i>Practical Content</i> |
| <p><b>1. Investigate Resonance Characteristics in AC Circuits.</b></p> <ul style="list-style-type: none"> <li>➤ Investigate current and voltage changes with variation in capacity around Resonance in high Q series circuits.</li> <li>➤ Repeat the investigation for parallel.</li> <li>➤ Design build and test an Impulse Generator</li> </ul>  |   |  |
| <p><b>2. Measure Power and Power Factor in Single and 3-phase Circuits.</b></p> <ul style="list-style-type: none"> <li>➤ Using Voltmeters, ammeters, and a watt-meter verify the Power reading of the Watt-meter for various complex loads.</li> <li>➤ Using the TWO watt-meter method verify the power consumed by a 3-phase balanced complex circuit.</li> <li>➤ Using the TWO watt-meter method verify the power consumed by a 3-phase unbalanced complex circuit.</li> </ul>   |   |  |
| <p><b>3. Investigate Electrical Transients in DC &amp; AC Circuits.</b></p> <ul style="list-style-type: none"> <li>➤ Investigate the charge and discharge of a Capacitor, resistor circuit using a dc and ac sources in switch mode.</li> <li>➤ Investigate the charge and discharge of a Inductor , resistor circuit using a dc and ac sources in switch mode.</li> <li>➤ 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.</li> </ul> |   |  |
| <p><b>4. Investigate Properties of Different Type of Transmission Lines.</b></p> <ul style="list-style-type: none"> <li>➤ Investigate the Power losses in ‘Medium lines’ and their effects on voltage regulation.</li> <li>➤ Investigate the Power losses in ‘Long lines’ and their effects on voltage regulation and Power capacity.</li> </ul>   |   |  |

**5. Determine Symmetrical Components of an un-balanced 3-phase Circuit.**

Measure the:

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

**6. Determine Properties of Faults on Lines.**

Investigate 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.