Course: ELECTRICAL MEASUREMENT LAB (EI181411)

Branch and Semester: B. Tech. 4th Semester (EE and IE)

I.   Course Objectives:
1. To learn how to measure different unknown electrical components like capacitance, inductance, power measurements etc .
2. To examine AC bridges for the measurement of inductance, capacitance and frequency.
3. To develop the skill to perform the experiments individually on various electrical systems under different variable situations.

II   Course Outcomes:

After completion of the course the students will be able to

1. Apply their knowledge to measure electrical quantities using standard analog and digital measuring instruments.
2. Measure different electrical parameters using conventional bridges and acquire data through digital measuring instruments and interpret the data.
3. Calibrate and test single phase energy meter and to measure 3-phase active power with balanced 3-phase R-L load.
4. Calibrate and test single phase current and potential transformers and measures the core loss in magnetic circuit

III   Laboratory Manual: The manual has two parts:

PART I:

It includes electrical measuring experiments to be solved using Virtual lab online simulator designed by IIT Kharagpur. There are seven experiments in the manual covering the entire electrical measuring syllabus.

Part II: It includes nine hardware experiments. Students perform the experiments using different measuring kits.

IV Evaluation:

Electrical Measurements Lab is a single credit course. Continuous evaluation (CE) carries 15 marks and End Semester Examination (ESE) carries 35 marks.

Laboratory Faculty in-charge:

1. **Dr. Rhittwikraj Moudgollya, Assistant Professor, IE**
2. **Mrs. Dhritika Saikia, Assistant Professor, EE**
3. **Dr. Mridusmita Sharma, Assistant Professor, EE**

LIST OF EXPERIMENTS

Part I (Virtual Lab)

1. Measurement of Capacitance by Carey Foster Bridge

2. To study the Kelvin Double Bridge for Low resistance measurement

3. Measurement of Self-Inductance by Maxwell's Bridge

4. Measurement of Capacitance by Schering Bridge

5. Measurement of Self Inductance accurately by Anderson's Bridge

6. Measurement Of High Resistance by Megohm Bridge method

7. Measurement of Capacitance by De Sauty's Modified Bridge

Part II (Hardware Experiments)

1. To Measure the Low Resistance by Kelvin Double Bridge

2. Measurement of Self Inductance accurately by Anderson's Bridge

3. Measurement of Self-Inductance by Maxwell's Bridge

4. Measurement of Capacitance by Wien Bridge

5. Measurement of Capacitance by Schering Bridge

6. Calibration of single phase energy meter with resistive load

7. To Measure 3-phase Power by Two Wattmeter Method

8. 1-Phase Current Transformer Testing

9. 1-Phase Potential Transformer Testing

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RUBRICS FOR ASSESSMENT

(Part I & Part II)

Category of evaluation	Components	% Allotment of Marks to the components		
		0-30%	**31-60%**	**61-100%**
CONTINUOUS AND COMPREHENSIVE EVALUATION	**Attendance and Preparedness (10%)**	Student is present but not prepared for the laboratory classes	Student is present but not well prepared	Student is present & familiar with lab manual
	Part I -Ability to do experiments on virtual lab (5%)	Not able to complete the experiment in simulator	Able to complete the experiment in simulator partially	Able to complete the experiment in simulator fully
	Part II – Hardware Experiments (5%)	Not able to complete the experiment	Complete the experiment partially	Complete the experiment fully
RESULT & ANALYSIS	**Experiment performance and result findings (10%)**	Missing several important details	Missing some important details	Details are well covered
	Reports (30%)	Results contain errors	Results are well presented but have some errors	Results are well presented without any errors
Test & Viva-voce	**Familiarity with experiments and knowledge of related concepts (40%)**	Able to answer at least 30% questions	Able to answer at least 50% questions	Able to answer at least 80% questions