BRILLIANT INSTITUTE OF ENGINEERING & TECHNOLOGY-**QA**
(Approved by A.I.C.T.E, New Delhi, Affiliated to SBTET, Hyderabad, Accredited by NAAC with 'A' Grade)
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

EE209ES: ELECTRICAL CIRCUITS LAB (R25)

COURSE: B.TECH **B.Tech. I Year II Sem**

Course Objectives:

- To design electrical systems and analyze them by applying various Network Theorems
- To measure three phase Active and Reactive power.
- To understand the concept of resonance.

Course Outcomes: After successful completion of the course, the student will be able to:

- Analyze complex DC and AC linear circuits
- Apply concepts of electrical circuits across engineering
- Evaluate response of a given network by using theorems.

The following experiments are required to be conducted as compulsory

1. Verification of Series and Parallel Resonance using any circuit simulation software (LT Spice etc...).
2. Determination of Time response of first order RL and RC circuit for periodic non sinusoidal inputs Time Constant and Steady-state error using any circuit simulation software (LT Spice etc...).
3. Determination of Two port network parameters – Z, Y, Transmission and Hybrid parameters.
4. Measurement of 3-phase power in Balanced Star connected load using Two-Wattmeter method.
5. Determination of Co-efficient of coupling, self and mutual inductance in m a g n e t i c Coupled Circuits.
6. Frequency domain analysis of Low-pass filter and High-pass filters using circuit simulation software (LT Spice etc...).
7. Verification of Superposition and Maximum Power Transfer theorems using any circuit simulation software (LT Spice etc...).
8. Verification of Thevenin's and Norton's theorems using any circuit simulation software (LT Spice etc...).

In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted

1. Measurement of Active Power for Delta connected balanced loads.
2. Measurement of Reactive Power for Star and Delta connected balanced loads.
3. Frequency domain analysis of Band-pass filters.
4. Frequency domain analysis of Band-stop filters
5. Determination of Time response of first order RL, RC circuit for periodic non – sinusoidal inputs – Time Constant and Steady state error.
6. Verification of Compensation theorem.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

EE209ES: BASIC ELECTRICAL ENGINEERING LAB (R25)

COURSE: B.TECH **B.Tech. I Year I & II Sem.**

Course Objectives:

- To measure the electrical parameters for different types of DC and AC circuits Using conventional and theorems approach.
- To study the transient response of various R, L and C circuits using different excitations.
- To determine the performance of different types of DC, AC machines and Transformers.

Course Outcomes: After learning the contents of this paper the student must be able to

- Verify the basic Electrical circuits through different experiments.
- Evaluate the performance calculations of Electrical Machines and Transformers Throughvarious testing methods.
- Analyze the transient responses of R, L and C circuits for different input conditions.

List of experiments/demonstrations:

PART- A (compulsory)

1. Verification of KVL and KCL
2. Verification of Thevinen's and Norton's theorem
3. Transient Response of Series RL and RC circuits for DC excitation
4. Resonance in series RLC circuit
5. Calculations and Verification of Impedance and Current of RL, RC and RLC seriescircuits
6. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of aSingle-Phase Transformer
7. Performance Characteristics of a DC Shunt Motor
8. Torque-Speed Characteristics of a Three-phase Induction Motor.

PART-B (any two experiments from the given list)

1. Verification of Superposition theorem.
2. Three Phase Transformer: Verification of Relationship between Voltages and Currents(Star-Delta, Delta-Delta, Delta-star, Star-Star)
3. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
4. Measurement of Active and Reactive Power in a balanced Three-phase circuit
5. No-Load Characteristics of a Three-phase Alternator

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

EE209ES: ELEMENTS OF ELECTRICAL AND ELECTRONIC ENGINEERING LAB (R25)

COURSE: B.TECH **B.Tech. I Year II Sem**

Course Objectives:

1. To introduce the concepts of electrical circuits and its components.
2. To understand magnetic circuits, DC circuits and AC single phase and three phase circuits.
3. To study and understand the different types of DC, AC machines and Transformers.
4. To import the knowledge of various electrical installations.
5. To introduce the concept of power, power factor and its improvement.
6. To introduce the concepts of diodes and transistors.
7. To impart the knowledge of various configurations, characteristics and applications.

Course Outcomes:

1. To analyze and solve electrical circuits using network laws and theorems.
2. To understand and analyze basic Electric and Magnetic circuits.
3. To study the working principles of Electrical Machines.
4. To introduce components of Low Voltage Electrical Installations.
5. To identify and characterize diodes and various types of transistors.

List of Experiments:

PART A: ELECTRICAL

1. Verification of KVL and KCL
2. (i) Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single Phase Transformer
   (ii) Verification of Relationship between Voltages and Currents (Star Delta, Delta Delta, Delta Star, Star Star) in a Three Phase Transformer
3. Measurement of Active and Reactive Power in a balanced Three phase circuit
4. Performance Characteristics of a Separately Excited DC Shunt Motor
5. Performance Characteristics of a Three phase Induction Motor
6. No Load Characteristics of a Three phase Alternator

PART B: ELECTRONICS

1. Study and operation of
   (i) Multimeters (ii) Function Generator (iii) Regulated Power Supplies (iv) CRO.
2. P-N Junction diode characteristics
3. Zener diode characteristics and Zener as voltage Regulator
4. Input and Output characteristics of Transistor in CB, CE configuration

5. Full Wave Rectifier with and without filters
6. Input and Output characteristics of FET in CS configuration

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EE307PC: ELECTRICAL MACHINES - I LAB (R25)

COURSE: B.TECH **B.Tech. II Year I Sem**

Course Objectives:

- To uncover the students to the operation of DC Generators.
- To know the operation of various types of DC Motors.
- To examine the performance of Single and Three Phase Transformers.

Course Outcomes: After successful completion of the course, the student will be able to:

- Start and control the Different DC Machines.
- Assess the performance of different machines using different testing methods
- Evaluate the performance of different Transformers using different testing methods

The following experiments are required to be conducted compulsory experiments

1. Magnetization characteristics of DC shunt generator (Determination of critical field resistance and Critical speed)
2. Load test on DC shunt generator (Determination of characteristics)
3. Load test on DC series generator (Determination of characteristics)
4. Hopkinson's test on DC shunt machines (Predetermination of efficiency)
5. Swinburne's test(Predetermination of efficiencies)
6. Brake test on DC compound motor (Determination of performance curves)
7. OC and SC Test on Single Phase Transformer
8. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta- Delta, Delta-star, Star-Star)

In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted:

1. Brake test on DC shunt motor (Determination of performance curves)
2. Load test on DC compound generator (Determination of characteristics).
3. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer
4. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
5. Speed control of DC shunt motor
6. Modeling of DC Machine using simulation tools.
7. Equivalent circuit of Transformer using simulation tools.

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EE308PC: ELECTRICAL MEASUREMENTS AND SENSORS LAB(R25)

COURSE: B.TECH **B.Tech. II Year I Sem.**

Course Objectives:

- To calibrate Watt, Energy and PF Meter and determination of three phase active & reactive powers.
- To determine unknown inductance, resistance, capacitance by performing experiments on DC Bridges
- & AC Bridges.
- To determine the ratio and phase angle errors of Instrument transformers.

Course Outcomes: After successful completion of the course, the student will be able to:

- Choose and test any measuring instruments.
- Find the accuracy of any instrument by performing experiments Calculate the various parameters using different types of measuring instruments.

The following experiments are required to be conducted as compulsory experiments:

1. Calibration and Testing of single-phase energy Meter.
2. Calibration of dynamometer power factor meter.
3. Crompton D.C. Potentiometer – Calibration of PMMC ammeter and PMMC voltmeter.
4. Kelvin's double Bridge – Measurement of resistance – Determination of Tolerance.
5. Dielectric oil testing using H.T. testing Kit.
6. Schering Bridge & Anderson Bridge.
7. Measurement of 3 - Phase reactive power with single-phase wattmeter.
8. Measurement of displacement with the help of LVDT.

In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted:

1. Calibration LPF wattmeter – by Phantom testing.
2. Measurement of 3-phase power with single watt meter and two CTs.
3. C.T. testing using mutual Inductor – Measurement of % ratio error and phase angle of given CT by Null method.
4. PT testing by comparison – V. G. as Null detector – Measurement of % ratio error and phase angle of the given PT
5. Resistance strain gauge – strain measurements and Calibration.
6. Transformer turns ratio measurement using AC bridges.
7. Measurement of % ratio error and phase angle of given CT by comparison.
8. Demonstration of different sensors using trainer kit

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

EE407PC: ELECTRICAL MACHINES - II LAB(R25)

B.COURSE: B.TECH **B.Tech. II Year II Sem.**

Course Objectives:

- To understand the operation of Induction, Synchronous machines and Transformers.
- To study the performance analysis of Induction and Synchronous Machines through various
- testing methods.
- To analyze the performance of single and 3-phase transformer with experiments.

Course Outcomes: After successful completion of the course, the student will be able to:

- Assess the performance of different types of AC machines using different testing methods.
- Analyze the suitability of AC machines and Transformers for real word applications
- Determine the performance of single and three-phase transformers.

The following experiments are required to be conducted as compulsory experiments:

1. Sumpner's test on a pair of single-phase transformers
2. No-load & Blocked rotor tests on three phase Induction motor
3. Regulation of a three –phase alternator by synchronous impedance & MMF methods
4. 'V' and 'Inverted V' curves of a three—phase synchronous motor.
5. Equivalent Circuit of a single-phase induction motor
6. Determination of Xd and Xq of a salient pole synchronous machine
7. Brake Test on three phase Induction Motor
8. Regulation of three-phase alternator by ZPF and ASA methods

In addition to the above experiments, at least any two of the following experiments are required to be conducted from the following list:

1. Separation of core losses of a single-phase transformer
2. Efficiency of a three-phase alternator
3. Parallel operation of Single-phase Transformers
4. Measurement of sequence impedance of a three-phase alternator.
5. Scott Connection of transformer

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

EE408PC: CONTROL SYSTEMS LAB (R25)

B.COURSE: B.TECH **B.Tech. II Year II Sem.**

Course Objectives:

- Understand system representations like transfer function and state space, and assess system dynamic response.
- Evaluate system performance using both time and frequency domain analyses, identifying methods to enhance performance.
- Study controllers and compensators to improve system performance based on the assessments from time and frequency domain analyses.

Course Outcomes: After successful completion of the course, the student will be able to:

- Improve system performance by skilfully selecting appropriate controllers and compensators tailored to specific applications.
- Apply diverse time domain and frequency domain techniques to effectively assess and enhance system performance.
- Demonstrate the application of various control strategies to different systems such as power systems and electrical drives, showcasing adaptability and versatility in control applications.

The following experiments are required to be conducted compulsory experiments:

1. Time response of Second order system
2. Characteristics of Synchro's
3. Effect of feedback on DC servo motor
4. Transfer function of DC motor
5. Transfer function of DC generator
6. Lag and lead compensation – Magnitude and phase plot
7. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system using simulation tools.
8. State space model for classical transfer function using simulation tools.

In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted

1. Characteristics of AC servo motor
2. Temperature controller using PID
3. Effect of P, PD, PI, PID Controller on a second order systems
4. (a) Simulation of P, PI, PID Controller.
   (b) Linear system analysis (Time domain analysis, Error analysis) using suitable software
5. Programmable logic controller – Study and verification of truth tables of logic gates, simple Boolean expressions, and application of speed control of motor.
6. Design of Lead-Lag compensator for the given system and with specification using suitable software