

MARTHANDAM COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

ELECTRICAL MACHINES LABORATORY

Equipments Available in the Lab

Sl.No	Name of the Equipments	Quantity
1	DC Shunt Generator coupled with DC Shunt Motor	2
2	DC Compound Generator coupled with DC Shunt Motor	2
3.	DC Series Generator coupled with DC Shunt Motor	1
4.	3-Phase Alternator coupled with DC Shunt Motor	4
5.	DC Shunt Motor with Loading set	2
6.	DC Compound Motor with Loading set	1
7.	DC Series Motor with Loading set	1
8.	Single Phase Induction Motor with Loading set	2
9.	Three Phase Slip Ring Induction Motor with Loading set	1
10.	Three Phase Squirrel Cage Induction Motor with Loading set	3
11.	Three Phase Synchronous Motor with Loading set	1
12.	Three Phase Rectifier Panel	1
13.	36 V / 25 A Rectifier Panel	2
14.	AC Distribution Panel	1
15.	DC Distribution Panel	1

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COURSES OFFERED

Sl.No	Odd Sem (Course code & Name)	Class	Even Sem (Course code & Name)	Class
1	EE3311 Electrical Machines Laboratory - I	II Year EEE	EE3411- Electrical Machines Laboratory – II	II year EEE
2			BE3272- Basic Electrical, Electronics And Instrumentation Engineering Laboratory	I Year CIVIL
3			BE3271-Basic Electrical And Electronics Engineering Laboratory	I Year MECH

2023-2024 ODD SEMESTER

EE3311 ELECTRICAL MACHINES LABORATORY - I

COURSE OBJECTIVES:

- To expose the students to determine the characteristics of DC machines and transformers by performing experiments on these machines.
- To provide hands on experience to evaluate the performance parameters of DC machines and transformer by conducting suitable tests

COURSE OUTCOMES:

At the end of the course students will be able to:

CO1: Construct the circuit with appropriate connections for the given DC machine/transformer.

CO2: Experimentally determine the characteristics of different types of DC machines.

CO3: Demonstrate the speed control techniques for a DC motor for industrial applications.

CO4: Identify suitable methods for testing of transformer and DC machines.

CO5: Predetermine the performance parameters of transformers and DC motor.

CO6: Understand DC motor starters and 3-phase transformer connections.

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LIST OF EXPERIMENTS:

1. Open circuit and load characteristics of DC shunt generator- calculation of critical resistance and critical speed.
2. Load characteristics of DC compound generator with differential and cumulative connections.
3. Load test on DC shunt motor.
4. Load test on DC compound motor.
5. Load test on DC series motor.
6. Swinburne's test and speed control of DC shunt motor.
7. Hopkinson's test on DC motor – generator set.
8. Load test on single-phase transformer and three phase transformers.
9. Open circuit and short circuit tests on single phase transformer.
10. Sumpner's test on single phase transformers.
11. Separation of no-load losses in single phase transformer.
12. Study of starters and 3-phase transformers connections.

2023-2024 EVEN SEMESTER

EE3411 ELECTRICAL MACHINES LABORATORY – II

COURSE OBJECTIVES:

To expose the students to the operation of synchronous machines and induction motors and give them experimental skill.

COURSE OUTCOMES:

At the end of the course, the student should have the:

CO1: Ability to understand and analyze EMF and MMF methods

CO2: Ability to analyze the characteristics of V and Inverted V curves

CO3: Acquire hands on experience of conducting various tests on alternators and obtaining their performance indices using standard analytical as well as graphical methods to understand the importance of Synchronous machines

CO4: Acquire hands on experience of conducting various tests on induction motors and obtaining their performance indices using standard analytical as well as graphical methods to understand the importance of single and three phase Induction motors

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CO5: Ability to acquire knowledge on separation of losses

LIST OF EXPERIMENTS

1. Regulation of three phase alternator by EMF and MMF methods.
2. Regulation of three phase alternator by ZPF and ASA methods.
3. Regulation of three phase salient pole alternator by slip test.
4. Measurements of negative sequence and zero sequence impedance of alternators.
5. V and Inverted V curves of Three Phase Synchronous Motor.
6. Load test on three-phase induction motor.
7. No load and blocked rotor tests on three-phase induction motor (Determination of equivalent circuit parameters).
8. Separation of No-load losses of three-phase induction motor.
9. Load test on single-phase induction motor.
10. No load and blocked rotor test on single-phase induction motor.
11. Study of Induction Motor Starters

BE3272 BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION
ENGINEERING LABORATORY

COURSE OBJECTIVES:

- To train the students in conducting load tests electrical machines
- To gain practical experience in experimentally obtaining the characteristics of electronic devices and rectifiers
- To train the students to measure three phase power and displacement

COURSE OUTCOMES:

After completing this course, the students will be able to

CO1: Use experimental methods to verify the Ohm's law and Kirchhoff's Law and to measure three phase power

CO2: Analyze experimentally the load characteristics of electrical machines

CO3: Analyze the characteristics of basic electronic devices

CO4: Use LVDT to measure displacement

LIST OF EXPERIMENTS

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1. Verification of ohms and Kirchhoff's Laws.
2. Three Phase Power Measurement
3. Load test on DC Shunt Motor.
4. Load test on Self Excited DC Generator
5. Load test on Single phase Transformer
6. Load Test on Induction Motor
7. Characteristics of PN and Zener Diodes
8. Characteristics of BJT, SCR and MOSFET
9. Design and analysis of Half wave and Full Wave rectifiers
10. Measurement of displacement of LVDT

BE3271 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
LABORATORY

COURSE OBJECTIVES:

To expose the students to the operation of synchronous machines and induction motors and give them experimental skill.

COURSE OUTCOMES:

At the end of the course, the student should have the:

CO1: Ability to understand and analyze EMF and MMF methods

CO2: Ability to analyze the characteristics of V and Inverted V curves

CO3: Acquire hands on experience of conducting various tests on alternators and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of Synchronous machines

CO4: Acquire hands on experience of conducting various tests on induction motors and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of single and three phase Induction motors

CO5: Ability to acquire knowledge on separation of losses

LIST OF EXPERIMENTS

1. Regulation of three phase alternator by EMF and MMF methods.
2. Regulation of three phase alternator by ZPF and ASA methods.
3. Regulation of three phase salient pole alternator by slip test.

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4. Measurements of negative sequence and zero sequence impedance of alternators.
5. V and Inverted V curves of Three Phase Synchronous Motor.
6. Load test on three-phase induction motor.
7. No load and blocked rotor tests on three-phase induction motor (Determination of equivalent circuit parameters).
8. Separation of No-load losses of three-phase induction motor.
9. Load test on single-phase induction motor.
10. No load and blocked rotor test on single-phase induction motor.
11. Study of Induction Motor Starters