

# 19EE206

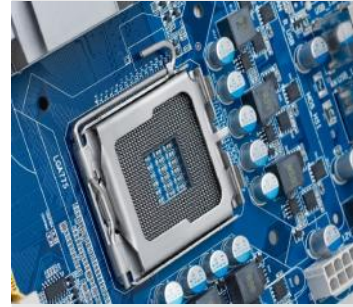
# ELECTRICAL MACHINES AND POWER UTILIZATION

Hours Per Week :

L	T	P	C
2	0	2	3

Total Hours :

L	T	P	WA/RA	SSH/HSH	CS	SA	S	BS
30	-	30	2	40	2	5	2	2



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## COURSE DESCRIPTION AND OBJECTIVES:

To familiarize the students with the basic electrical components used in agricultural operations. To impart knowledge about the AC/DC machines for agricultural applications techniques, skills and modern engineering tools necessary for engineering practice.

## COURSE OUTCOMES:

Upon completion of the course, student will able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Understand the different characteristics of electrical machines.	---
2	Analyse the principle of construction and working of various electrical instruments.	1,2
3	Apply electrical machines for agricultural applications.	1,3,5
4	Apply the various tests on transformers, motors and generators.	7

## SKILLS:

- ✓ Selection of electrical machines for desired applications.
- ✓ Troubleshooting of electrical machines.
- ✓ Understanding the working of motor, generators and their power measurement techniques.
- ✓ Practical measurement of physical quantities in the field by using sensors.

**UNIT - I****L-6**

**Magnetic Circuits:** Electro motive force, reluctance, laws of magnetic circuits, determination of ampere-turns for series and parallel magnetic circuits, hysteresis and eddy current losses.

**UNIT - II****L-6**

**Polyphase Circuits:** Various methods of three phase power measurement, power factor, reactive and apparent power, concept and analysis of balanced poly-phase circuit, series and parallel resonance.

**UNIT - III****L-6**

**DC Machines:** Principles, operation and performance of DC machine (Generator and Motor), EMF and torque equations, excitation of DC generator and their characteristics. DC motor characteristics, starting of shunt and series motor, starters, speed control methods-field and armature control.

**UNIT - IV****L-6**

**Transformers :** Principle of working, construction of single phase transformer, EMF equation, Phasor diagram on load, leakage reactance, voltage regulation, power and energy efficiency, open circuit and short circuit tests.

**UNIT - V****L-6**

**Three Phase Induction Motors:** Construction, operation, phasor diagram, effect of rotorresistance, torque equation, starting and speed control methods.

**Single Phase Induction Motor:** Double field revolving theory, equivalent circuit, characteristics, Phase split, shaded pole motors.

**LABORATORY EXPERIMENTS****LIST OF EXPERIMENTS****TOTAL HOURS: 30**

1. To study power consumed in a three-phase circuit.
2. Two lights in series controlled by one switch.
3. Two lights in parallel controlled by one switch.
4. To obtain load characteristics of DC shunt/series /compound generator.
5. To study DC motor starters.
6. To study characteristics of DC shunt / series motors.
7. To perform load-test on 3 phase Induction motor and to plot torque v/s speed
8. To perform open circuit and short circuit tests on single phase transformer to obtain equivalent circuit.
9. To study star-delta starters physically and to draw electrical connection diagram.
10. To study star-delta starters physically and to start the 3 phase induction motor using it.
11. To study star-delta starters physically and to reverse the direction of 3 phase Induction Motor.
12. To perform no load and blocked –rotor test on 1-phase induction motor.
13. To determine the parameters of equivalent ckt drawn on the basis of double revolving field theory.
14. To perform load-test on 1-phase induction motor and plot torque-speed characteristics.
15. Practical examinations.

**TEXT BOOKS:**

1. Anwani M L., 1997, "Basic Electrical Engineering". Dhanpat Rai & Co.(P) LTD., New Delhi.
2. Thareja BL & Theraja AK, 2005, "A text book of Electrical Technology. Vol.II", S.Chand& Company Ltd.,New Delhi.

**REFERENCE BOOKS:**

1. Vincent Del Toro, 2000,"Electrical Engineering Fundamentals". Prentice-Hall of India Private Ltd.,New Delhi.

