Program: **Diploma in Electrical and Electronics Engineering**	
Course Code: **4037**	Course Title: **Induction Machines lab**
Semester: **4**	Credits: **1.5**
Course Category: **Program Core**	
Periods per week: **3 (L: 0 T: 0 P:3)**	Periods per semester: **45**

Course Objectives:

- To know the parts, nameplate data, polarity and connections oftransformers and induction motors.
- To recognizethe performance characteristics of transformer and induction motors,

Course Prerequisites:

Topic	Course Code	Course name	Semester
Basics of electric circuits		Fundamentals of Electric Circuits	3
Basics of measurements		Electrical and Electronics Measurements & Instrumentation	3
Knowledge of measurements		Electrical and Electronics Measurements Lab	3
Knowledge in Electrical machines		DC Machines & Traction Motors	3

Course Outcomes:

On completion of the course, the students will be able to:-

COn	Description	Duration (Hours)	Cognitive Level
CO1	Identify the parts, collect nameplate data, polarity and connections of transformers.	9	Applying
CO2	Identify the losses and develop the performance characteristics of transformers.	12	Applying

CO3	Identify the nameplate data, parts, polarity, different connections and classification of three phase induction motors.	6	Applying
CO4	Develop the performance characteristics of three phase squirrel cage and slip-ring inductions motors, and calculate the losses.	12	Applying
	Lab Exam	6	

CO-PO Mapping

Corse Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1				2			
CO2				3			
CO3				3			
CO4				3			

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline

Module Outcome	Name of Experiment	Duration (Hours)	Cognitive Level
CO1	**Identify the parts, collect nameplate data, polarity and connections of transformers.**		
M1.01	i. Identify and Collect the nameplate details of transformers ii. Identify the parts of single phase and three phase transformers iii. Organize polarity test on Single phase transformer.	6	Applying
M1.02	Construct a three phase transformer using three single phase transformers	3	Applying

CO2	**Identify the losses and develop the performance characteristics of transformers.**		
M2.01	Apply direct loading technique on a transformer to Determine efficiency and regulation at given power factor.	3	Applying
M2.02	Experiment with transformers to Pre-determine efficiency and regulation at various power factors and plot output v/s efficiency and PF v/s regulation.	3	Applying
M2.03	Develop a circuit to conduct OC and SC tests on a single phase transformer to determine values of equivalent circuit parameters and to draw equivalent circuits referred to primary/secondary.	6	Applying
	Series test - I	3	
CO3	**Identify the nameplate data, parts, polarity, different connections and classification of three phase induction motors.**		
M3.01	i. Identify and Collect nameplate data of induction motors. ii. Identify the parts of induction motors. iii. Organize stator resistance test on three phase induction motors.	3	Applying
M3.02	i. Organize polarity test on three phase squirrel cage/ slip-ring induction motor. ii. Develop a star - delta starter for the three phase induction motor.	3	Applying
CO4	**Develop the performance characteristics of three phase squirrel cage and slip-ring inductions motors and calculate the losses.**		
M4.01	Construct a circuit for conducting no load test on a three phase induction motor and separate no load losses.	3	Applying
M4.02	Construct a circuit to conduct load test on a three phase induction motor and to plot performance characteristics.	3	Applying
M4.03	Construct a circuit to conduct no load and blocked rotor tests on a three phase induction motor, determine values of equivalent circuit parameters & draw the equivalent circuit.	3	Applying
M4.04	Construct a circuit for no load and blocked rotor tests on a three phase induction motor and draw the circle diagram.	3	Applying
	Series test - II	3	

Text / Reference

T/R	Book Title/Author
T1	BL Theraja. Electrical technology. Vol- II: S Chand & co.
R1	JB Gupta. Theory and performance of electrical Machines: S. K. Kataria & Sons
R2	SK Sahdev. Electrical Machines. Cambridge university press

Online Resources

Sl.No	Website Link
1	Virtual Lab http://vlabs.iitb.ac.in/vlab/labsee.html
2	http://em-coep.vlabs.ac.in/List%20of%20experiments.html?domain=Electrical%20Engineering
3	http://vem-iitg.vlabs.ac.in/
4	https://www.ee.iitb.ac.in/course/~emlab/lab-manual.html
5	https://www.pscmr.ac.in/eee_labmanuals/2-2_ELECTRICAL%20MACHINES-I%20LAB.pdf
6	http://vvitengineering.com/lab/EE6411-ELECTRICAL-MACHINES-LABORATORY-I.pdf