Program : **Diploma in Electrical and Electronics Engineering, Renewable Energy**	
Course Code : **6037**	Course Title: **Electrical Computer Aided Drafting lab (ECAD Lab)**
Semester : **6**	Credits: **1.5**
Course Category: **Program Core**	
Periods per week: **3 (L:0 T:0 P:3)**	Periods per semester: **45**

Course Objectives:

- To familiarize the tools used in electrical drafting software
- To practice drafting tools for electrical installations and machineries for drafting

Course Prerequisites:

Topic	Course code	Course name	Semester
Basics of AutoCAD		CAD lab	2
Basics of Electrical circuits		Fundamentals of electrical circuits	3
Winding diagrams and sectional view of DC machines		DC Machines & Traction Motors	3
Wiring schemes for industrial installations		Electrical Installation Design & Estimation	4
Starters used in induction motors,AC machine windings.		Induction Machines	4

Course Outcomes:

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

COn	Description	Duration (Hours)	Cognitive Level
CO1	Identify electrical symbols, draw control & power circuits of induction motor starters using drafting software.	10	Applying

CO2	Construct sectional view of electrical machineries and its winding diagrams using drafting software.	10	Applying
CO3	Draw wiring schemes for industrial installations and panel board wiring diagram as per standards using drafting software.	11	Applying
CO4	Draw the single line layout of substations using drafting software.	8	Applying
	Lab Exam	6	

CO-PO Mapping:

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

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

Course Outline:

Module Outcome	Description	Duration (Hours)	Cognitive level
CO1	**Identify electrical symbols and draw control & power circuits of induction motor starters using drafting software.**		
M1.01	Identify drawing tools & electrical symbols used in electrical drafting software.	3	Understanding
M1.02	Identify elementary connections and wire numbering in electrical drafting. 1. Star connection 2. Delta Connection	2	Understanding
M1.03	Draw the control and power circuits of induction motor starters using drafting software. 1. Direct Online Starter 2. Star Delta Starter	5	Applying

CO2	**Construct sectional view of electrical machineries and draw winding diagrams using drafting software.**		
M2.01	Construct sectional view of a dc machine	4	Applying
M2.02	Draw the developed winding diagrams used in DC and AC machines. 1. Lap winding 2. Wave winding 3. Mush winding	6	Applying
	Lab Exam	3	
CO3	**Draw wiring schemes for industrial installations and panel board wiring diagram as per standards using drafting software.**		
M3.01	Draw wiring schemes for industrial installations 1. Wiring scheme of pump set. 2. Wiring scheme of a small workshop with two induction motors.	5	Applying
M3.02	Draw the panel board wiring diagrams per IS standard using drafting software. 1. Alternator panel wiring diagram. 2. OCB panel wiring diagram of substation.	6	Applying
CO4	**Draw the single line layout of substations using drafting software.**		
M4.01	Draw the single line layout of 33kV substation using electrical drafting software.	4	Applying
M4.02	Draw the single line layout of 110kV substation using electrical drafting software.	4	Applying
	Lab exam	3	

Text / Reference:

T/R	Book Title/Author
T1	Electrical Engineering Drawing by S K Bhattacharya
T2	Electrical Drawing by P O Kuttappan
R2	Electrical Estimation and Costing, by M Ramalingam
R3	Computer Aided Electrical Drawing ， Yogesh M, Publisher: PHI Learning Pvt. Ltd. ISBN: 9788120349537, 9788120349537
R4	ELECTRICAL SYSTEM DESIGN CALCULATION: ELECTRICAL ENGINEERING by Kamal Krishna Maity
R5	Auto cad Electrical 2018 Black Book

Online Resources:

Sl.No	Website Link
1	https://nptel.ac.in/courses/108107112/
2	https://www.doityourself.com/stry/how-to-design-an-electrical-panel-board
3	https://www.youtube.com/watch?v=jrUSjutkUsE
4	https://www.youtube.com/watch?v=c167AGMhImc