Program : **Diploma in Electrical and Electronics Engineering**	
Course Code : **5038**	Course Title: **Industrial Electrical Engineering Lab**
Semester : **5**	Credits: **1.5**
Course Category: **Program Core**	
Periods per week: **3 (L:0 T:0 P:3)**	Periods per semester: **45**

Course Objectives:

- To develop Industrial and panel wiring with its maintenance
- To identify the cable sizes and perform conduit and cable works
- To develop starters for induction motors
- To practice routine maintenance of DG Sets

Course Pre-requisites:

Topic	Course code	Course name	Semester
Basics of Electrical circuits		Fundamentals of electric circuits	3
Induction Motors		Induction Machines	4

Course Outcomes:

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

Con	Description	Duration (Hours)	Cognitive Level
CO1	Demonstrate and perform Industrial and panel wiring with its maintenance	9	Applying
CO2	Identify the cable sizes and perform conduit and cable works	9	Applying
CO3	Develop different types of starters for induction motors and demonstrate the maintenance of different motors	12	Applying
CO4	Apply day to day routine maintenance of DG Sets	9	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	**Demonstrate and perform Industrial and panel wiring with its maintenance.**		
M1.01	Outline the dismantling and assembling of switchgears in simple electrical installations and identify various elements	3	Applying
M1.02	Design and develop industrial and panel wiring	3	Applying
M1.03	Demonstrate the procedure to fabricate different types of cable tray bending 45º and 90º.	3	Applying
CO2	**Identify the cable sizes and perform conduit and cable works**		
M2.01	Carry out bending of PVC conduits.	1	Applying
M2.02	Demonstrate the procedures to practice laying of cables and trunking of cables	1	Applying
M2.03	Demonstrate the procedures to practice different types of cable jointing.	1	Applying
M2.04	Identify the procedures to practice glanding of cables,	3	Applying
M 2.05	Apply cable bending, stripping, crimping and connecting sockets.	3	Applying
	Lab Exam - 1	3	
CO3	**Develop different types of starters for induction motors and demonstrate the maintenance of different motors**		
M3.01	Identify the common maintenance activities carried out on a single phase and 3 phase induction motor	1	Applying
M3.02	Develop Contactor control circuits using Push button NO /NC contacts.	2	Applying
M3.03	Organize and connect star delta and DOL starter to a three phase squirrel cage induction motor	3	Applying
M3.04	Organize and connect rotor resistance starter to a three phase slip ring induction motor	1	Applying
M3.05	Build control circuits for motors using ON/OFF switch locally and remote control.	2	Applying
M3.06	Develop suitable circuit to change the direction of rotation of three phase induction motor using contactors	3	Applying
CO4	**Apply day to day routine maintenance of DG Sets**		
M4.01	Identify the application of single phase preventer	3	Applying
M4.02	Choose starting method and Practice on changing of lubricant, coolant of DG Sets.	3	Applying
M4.03	Organize and Examine the working on DG Set panel and its protection.	3	Applying
	Lab Exam - 2	3	

Text / Reference:

T/R	Book Title/Author
T1	Electric Motor Drives | First Edition | By Pearson by V Rajini (Author), VS Nagarajan (Author)
R1	SK Bhattacharya (Author), S. Chatterjee (Author),Industrial Electronics and Control, TTTI Chandigarh.
R2	Illustrated Guide to the National Electrical Code (Illustrated Guide to the National Electrical Code (Nec)) by Charles Miller (Author)

Online Resources:

Sl.No	Website Link
1	https://nptel.ac.in/courses/108102046/
2	https://www.daltco.com/sites/daltco.com/files/resource/schneider-wiring-diagram-book.pdf
3	https://www.edata.omron.com.au/eData/IO_Systems/Y222-E1-01.pdf
4	https://www.bcew.com/pdf/IS_6.pdf

Suggested Open-ended Experiments:

Students can do open ended experiments as a group of 3-5. There is no duplication in experiments in between groups. This is mainly for the purpose of continuous internal evaluation and a score of 15 marks. Students should prepare a separate report on open ended experiment of their choice.

Example:

Design and develop a simple panel board.