



Semester – III

Subject Name: Electrical software skill - I

Subject Code: 09EE1305

Diploma Branches in which this subject is offered: Electrical Engineering

Objective: In the fast growing electrical field for understanding of installation of machinery, operation of any equipment, to do maintenance of any equipment and wiring of panel or buildings, knowledge of drawing reading and drawing making is required. For better understanding of various electrical circuit and working of components, knowledge of simulation software is required. Learning of software like CAD, PSIM and MULTISIM will enhance student's ability for working in this fast growing electrical market.

Credits Earned: 2 Credits

Course Outcomes: After learning the course the students should be able:

1. To identify and draw various electrical and electronics symbols.
2. To draw various electrical and electronics circuit using CAD software.
3. To read drawing prepared by CAD software.
4. To simulate various electrical and electronics circuit.
5. To prepare circuit on PCB for given electronics circuit.

Pre-requisite of course: Basic knowledge of DC circuit, AC circuit, electrical practices and electrical control panel.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term work	
0	0	4	2	00	30	20	25	25	100



Contents:

Unit	Topics	Contact Hours	Weightage (%)
1	Symbols and Schematic Drawing in AutoCAD <ul style="list-style-type: none">• Introduction• Basic CAD interface• Basic command for AutoCAD drawing• Draw general symbols used in electrical field Symbols of generator, transformer, AC and DC motor and their starter, different switches, measuring instrument and various electrical instrument• Draw general symbols used in electronics field Symbols of resistor, capacitor, inductor, diodes and various electronics switches	10	18
2	Electrical and Electronics Circuit Diagrams & Panel Layout <ul style="list-style-type: none">• Introduction• Draw combinational circuit Series and parallel circuit of resistor, inductor, capacitor and its combination• Draw house wiring diagram One switch for one fan, two way switch for one lamp (staircase wiring), complete wiring of one room, wiring of a house.• Draw different parts of electrical machine Winding diagram, pole, yoke etc.• Draw different electronics circuit• Prepare lighting panel layout	14	25
3	Simulation and Virtual Testing of Circuits <ul style="list-style-type: none">• Introduction• Basics features and commands of simulating software (PSIM/MULTISIM)• Simulate of various combinational circuits Series and parallel circuit of resistor, inductor, capacitor and its combination in ac circuit. Half wave, full wave and bridge rectifier, power amplifier and oscillator circuits• Measurement of voltage and current in various electrical and electronics circuit• Plot graph, waveform and analyze various combinational circuit Series and parallel circuit of resistor, inductor, capacitor and its combination in ac circuit. Half wave, full wave and bridge rectifier, power amplifier and oscillator circuits	26	46



4	Designing of PCB <ul style="list-style-type: none"> • Introduction • Basic of PCB designing software • Various sections of PCB designing software • Preparing PCB layout for electronic circuits 	06	11
----------	---	-----------	-----------

List of Experiments

Sr. No.	Unit No.	Name of Topics	Contact Hours
1	I	Draw general electrical symbols using CAD and take print out	2
2	I	Draw general electronics symbols using CAD and take print out	2
3	I	Draw DC and AC machine parts.	2
4	II	Draw combinational circuit of R,L,C component using CAD and take print out	4
5	II	Draw house wiring diagram and take print out	2
6	II	Draw basic electronics circuits using CAD and take print out	6
7	II	Draw different types of rectifier using CAD and take print out	2
8	III	Simulate combinational circuit of series R-L, R-C, R-L-C and observe voltage waveform and current waveform across each component.	6
9	III	Simulate combinational circuit of parallel R-L, R-C, R-L-C and observe current waveform and voltage waveform across each component.	6
10	III	Simulate star and delta connection of resistance and observe voltage and current relation in line and phase.	4
11	III	Simulate one switch two bulb wiring and two switch one bulb wiring.	2
12	III	Simulate midpoint full wave rectifier and half wave rectifier	4
13	III	Simulate bridge full wave rectifier.	4
14	IV	Develop PCB layout for electrical and electronics circuits.	6

References:

1. David Báez-López, Félix E. Guerrero-Castro, "Circuit analysis with multisim", Morgan and claypool publishers.
2. Gaurav Verma, "AutoCAD Electrical 2016 Black Book", CreateSpace Independent Publishing Platform, 2016.
3. George Omura, "Mastering AutoCAD 2013 and AutoCAD LT 2013", Sybex, New Delhi, 2013
4. Sham Tickoo, "AutoCAD 2013 for Engineers and Designers", Dream tech press, New Delhi, 2013



Instructional Method:

- a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
- b. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory.
- c. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- d. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory

Supplementary Resources:

1. <https://www.lynda.com/AutoCAD-tutorials/AutoCAD-Electrical-Essential-Training/456354-2.html>
2. https://www.myigetit.com/Library/Topics/31?name=AutoCAD_Electrical
3. <https://knowledge.autodesk.com/support/autocad-electrical/learn-explore/caas/CloudHelp/cloudhelp/2018/ENU/AutoCAD-Electrical/files/GUID-54861097-CA39-4D32-AB52-DCE2972D7C24-htm.html>
4. <https://powersimtech.com/support/resources/video-library/>
5. <http://www.ni.com/white-paper/10710/en/>
6. <http://www.ni.com/multisim/technical-resources/>