

Subject Code: 1ET4030305	Subject Title: Computer Aided Electrical Drawing, Drafting and Simulation
Pre-Requisite	--

RATIONALE:

The Computer Aided Drawing (CAD) software used by just about every Engineering and Design office in the world. It is used by Electrical and Mechanical Engineers, Civil and Architects Engineers, Aeronautical Engineers plus many other engineering disciplines.

All equipment, installations, circuits and other electrical and electronic systems in commercial, power and industrial sector need drawings for their manufacturing, installation, operation and maintenance.

The Computer Aided Drawing (CAD) and simulation (MATLAB/SIMULINK, PSpice, MULTISIM) software will be used to perform various practical exercises in this course. This will enable the students to become competent for working in the fast growing information technology environment by enhancing their computer aided drawing, designing skills in the field of electrical and electronics engineering.

COURSE OBJECTIVE:

The Computer Aided Drawing (CAD) software is popular because it can be customized to suit an individual's needs. Students are able to acquire different learning outcomes.

1. Use various symbols and notations in electrical and electronics engineering drawings.
2. Interpret drawings, draw interferences and workout other technical details.
3. Draw various electrical and electronics circuits according to standard practices using CAD Software.
4. Simulate/test simple electrical and electronics circuits using Simulation software.

TEACHING AND EVALUATION SCHEME:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)			
Lecture	Tutorial	Practical	Credit	Theory		Practical	
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment
0	-	4	2	-	-	40	60

DETAILS OF COURSE CONTENTS:

Sr No	Topics and Sub-topics	Total Hours
1	Drawing and drafting of basic electrical components using Auto-CAD 1.1 General electrical symbols 1.2 R-L Series and Parallel circuit	12

	1.3 R-C series and parallel circuit 1.4 R-L-C series and parallel circuit, 1.5 layouts of domestic, commercial and industrial wiring, 1.6 Cross Sectional view of fuse, Different types of switches, Cross sectional view of cables	
2	Drawing and drafting of electrical machines using AutoCAD 2.1 D.C. machine parts and cross sectional view (Yoke, Commutator, poles, brush, armature, terminal box 2.2 A.C. machine parts and cross sectional view(rotor, stator, frame, rotor slot, stator slot and winding) 2.3 A.C. and D.C. winding diagrams 2.4 Cross section view of single phase Transformer, Power transformer (Including core, winding, bushing, conservator tank, protecting equipments and accessories)	12
3	Drawing and drafting of electronics circuit using AutoCAD 3.1 Symbols and notations of: Electronic components - Resistor, Inductor, transformer and Capacitor Semiconductor device Diodes, Zener diode, Transistors PNP/ NPN, Tunnel diode, photo diode, FET, MOSFET,IGBT, UJT etc. 3.2 Half-wave, full-wave and bridge rectifier, 3.3 Power amplifier and voltage amplifier and 3.4 Different types of oscillators circuits	14
4	Drawing and drafting of Electrical power system using Auto CAD 4.1 Symbols used in Electrical Power system 4.2 Sectional view of (i) Insulators (ii) Circuit Breakers (iii) Lightning Arresters (iv) 11 KV Pole Mounted Substation 4.3 Single line diagrams of (i) 11KV/132KV Substation (ii) 220 KV Substation 4.4 Layout of Thermal Power Station and Hydro Power Station.	12
5	Simulation of Electrical and Electronics circuits 5.1 Understand the applications of simulation for different electrical and electronic circuits. 5.2 Works with “Mat Lab”, “Circuits maker”, PSIM software. 5.3 Analysis of different electrical and electronics circuits with circuit maker software.	06

COURSE OUTCOME:

1. Use various symbols and notations in electrical and electronics engineering drawings.
2. Interpret drawings, draw interferences and workout other technical details.
3. Draw various electrical and electronics circuits according to standard practices

using CAD software.

4. Simulate/test simple electrical and electronics circuits using Simulation software

LIST OF PRACTICAL:

- 1 Draw electrical and electronic symbols using AUTO-CAD and take print out
- 2 Draw D.C. and A.C machine parts using AUTO-CAD and take print out
Draw D.C machine winding diagram using AUTO-CAD and take print out
- 3 Draw A.C machine winding diagram using AUTO-CAD and take print out
- 4 Draw different types of rectifier circuit using AUTO-CAD and take print out of :
(a)Single phase half wave (b)Single phase full wave (c)Bridge rectifier
- 5 Draw R-C couple amplifier circuit using AUTO-CAD and take print out
- 6 Draw the following oscillator circuit using AUTO-CAD and take print of (a)Hartley oscillator (b) Colpit oscillator.
- 7 Draw the following oscillator circuit using AUTO-CAD and take print of (a) Phase-Shift Oscillator (b) Wien Bridge Oscillator.
- 8 To draw single line diagram of power plant in Auto CAD.
- 9 To draw single line diagram of substation in Auto CAD.
- 10 To draw single line diagram of power transmission and distribution system in Auto CAD.
- 11 To simulate different electrical circuits.
- 12 To simulate different electronic circuits.

LIST OF REFERENCES:

1. AutoCAD software.
2. PSIM/ WORK BENCH software.
3. Books

SR. NO.	NAME	AUTHOR	PUBLICATION
1	AutoCAD Electrical 2018 For electrical control designers	Prof. Sham Tickoo	BPB Publications
2	Mastering AutoCAD 2013 and AutoCAD LT 2013	George Omura	Sybex, New Delhi, Latest edition
3	Computer aided electrical drawing	Yogesh M.	PHI Learning Pvt. Ltd.
4	AutoCAD 2013 for Engineers and Designers	Prof. Sham Tickoo	Dream tech press, New Delhi, Latest edition.

5	Mastering electronics workbench: Version 5 and Multisim Version 6	John Adams	McGraw-Hill, New Delhi, Latest edition
6	Introduction to PSpice Using OrCAD For Circuits And Electronics	Muhammad H. Rashid	PHI Learning, New Delhi, Latest edition