



SARVAJANIK UNIVERSITY
Sarvajani College of Engineering and Technology
Bachelor of Technology



B.Tech.Electrical Semester V	
Subject Name: Electrical Panel Design and CAD	Subject Code: BTEL15503

Type of course:	Open Elective
Prerequisite:	Basics of Power Systems, Switchgear & Protection
Rationale:	It covers all the basic calculations of electrical engineering, different types of Electrical Control panels viz: MCC panels, PCC panels, APFC panels, etc. ELECTRICAL CONTROL PANEL DESIGNING is the brain center for all industrial electrical & automation projects and represent a vital element in the proper working and performance of these systems. Control panels are most often equipped with push buttons, analog instruments, Monitoring devices Controllers and other accessories to control and monitor field devices. This course covers a wide variety of applications in creating and developing all types of Conventional Electrical Panels

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	150
3	0	2	4	60	25	15	30	20	

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination.

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage (%)
1.	Basic Electrical Calculations for Calculating Equipment Ratings : Full load current; Power factor calculations ; Total connected load ; Selection of motor starters ; Selection of switch gears ; Power factor correction methods.	6	13
2	Types of Electrical Control Panels : Motor Control Center MCC, Power Control Center PCC, Automatic Power factor Control APFC Panel, Automatic Mains Failure AMF Panels, Automatic Transfer Switch ATS Panels; Power Distribution Panels	6	13
3	Preparation of General Arrangement GA Drawings : Sizing of Various Compartments in Panels; Non Compartmental Panels; Sizing of Cables and Cable Entry; Busbar Routing; Cable Terminations; GA Drawing for required Civil Works	6	13
4	Preparation of General Arrangement GA Drawings :	6	13



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	Ingress Protection (IP) ; Switchgear Mountings; Cable & Busbar Supports		
5	Fabrication Calculations : Cold rolled close annealed (CRCA) Materials or equivalent; Powder Coating Process, Bending,	6	13
6	Busbar Calculations : Aluminum & Copper, Current Carrying Capacity, Total Weight of Busbars ; Ratings of Busbars	6	13
7	Power and Control Wiring for various Electrical Control Panels Motor Starters, ATS, AMF, APFC, MCC, PCC, etc	6	13
8	Use of CAD Software : Introduction to various CAD software available in the market	3	9

Suggested Specification table with Marks (Theory/Practical):

% Distribution of Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	20	30	10	10	10

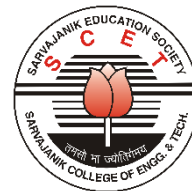
Legends: R: Remembrance, **U:** Understanding; **A:** Application, **N:** Analyze, **E:** Evaluate **C:** Create and above Levels (**Revised Bloom’s Taxonomy**)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from the above table.

Note :Practicals would be based on the above Chapters. It would be a mix of Electrical Design and On CAD Software



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Reference Text Books:

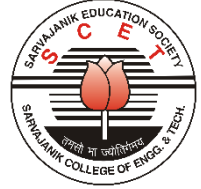
Sr. No.	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1.	AutoCAD Electrical 2022 Black Book	Gaurav Verma, Matt Weber	1774590301 Cadcamae Works (International Edition)	2021	2nd
2.	AutoCAD Electrical 2018 Black Book Paperback – 1 January 2018	Gaurav Verma	BPB (Indian Edition)	2018	1st
3.	Get started with AutoCAD Electrical (Full version - Parts 1, 2 and 3): An independently produced course with 18 hours of step by step lessons	James Richardson	978- 0995749221; Musselburgh Press	2020	1st
4.	AutoCAD Electrical 2021: Fundamentals with NFPA Standards:	Autodesk Authorized Publisher	1952866395 Ascent, Center for Technical Knowledge	2020	1st
5	AutoCAD Electrical 2021 for Engineers and Designers	Prof. Sham Tickoo	9389898927 BPB (Indian Edition)	2020	1st

Course Outcome:

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % weightage
CO-1	Learning different features of industrial electrical panels.	10%
CO-2	Identifying the appropriate place for the wiring plan inside an electrical cabinet.	30%
CO-3	Learning the ergonomics of an electrical panel – what is this and why is this important.	30%
CO-4	Learn Standard color, materials, and IP rating of industrial electrical panels installed inside factories.	20%



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CO-5	Learn Good engineering practice for cable entries.	10%
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	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO-1	2	1	2		1		1	1		2	1	1			2
CO-2	2	3	3	1	2	1	3		2	1	1	1	3	2	1
CO-3	3	2	3	2	3	1	2		2	2	2	1	3	2	3
CO-4	2	3	3	2	3	1	3	1	2	1	2	1	3	1	3
CO-5	1	1	1		1		1	1		1	1	2	1		1