Course title: B. Voc. In Electrical appliances services & Maintenance

Semester: Sixth

S no	Paper Title	Paper category	Credits			Total credits	EoSE duration(hrs)		
			Theory	Practical	Self/Project/Industry		T	P	S
1.	Microprocessors	SC	4	2	-	6	4	3	
2.	Control System Engineering	SC	4	2	-	6	4	3	
3.	Power System Switchgear and Protection	SC	4	2	-	6	4	3	
Total						18			

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SYLLABUS- Microprocessors

Architecture

Architecture of 8085 microprocessor, instruction set, Programming using assembly language (8085) for looping, decision making, counting, indexing, searching, Interrupts and subroutine.

Interfacing Memory

Introduction of Interfacing memory, input/output and other peripherals e.g., 8255, 8253/54, 8259 and 8257

Converters

Introduction to Data (A/D and D/A) converters and its application

SYLLABUS- Control System Engineering

Introduction to Control System

Industrial Control examples, Control hardware and their models, Feedback Control: Open-Loop and Closed-loop systems. Benefits of Feedback.

Mathematical Models of Physical System

Concept of physical system, physical model and mathematical model, Mechanical system (mass-spring) system and rotational system, Electrical system – RLC series and RLC parallel system, Concept of transfer function, Block diagram representation, Block diagram reduction, Signal flow graph representation, Mason's gain formula.

Time Response Analysis

Standard test signals. Time response of first and second order systems for standard test inputs, Application of initial and final value theorem, Concept of Stability, Routh-Hurwitz Criteria.

Frequency-response Analysis

Relationship between time and frequency response, Polar plots, gain and phase margin. Closed-loop frequency response.

SYLLABUS- Power System Switchgear and Protection

Protective relays

Functional characteristics of relays, Primary and backup protection, Classification of relays, Types of Electromagnetic relays, over current relays, Distance relays, Earth fault protection.

Protection of Transmission Line

Over current protection of radial feeder, parallel feeder and ring mains using time and current grading, Distance protection. Effect of arcing and power swings, Bus-Bar Protection.

Protection of Transformers

Differential protection of 3-phase transformers, CT connections. Buchholtz protection, Current and Voltage Transformers, Coupling Capacitor Voltage Transformer.

Circuit Breakers

Classification of switchgear and fields of application and relative merits, Theories of current interruption, energy balance and recovery rate theories, Construction and operation of bulk oil, air blast and minimum oil circuit breakers, sulphur Hexafluoride, vacuum circuit breakers, Rating of circuit breakers, Basics of Sub-station automation, GIS switchyard.