

Flits Vocational Training Institute						
Advance Training Programme in Electrical & Electronic Engineering						
Programme content and time allocations						
No.	Module	Theory	Prac.	Total	No. of Days	Module Content
1		6	6	12	2	
2	Protective Devices and selection of cables for LV systems.	9	3	12	2	Characteristics, applications and selection of: HRC and Thermal fuses, Semiconductor fuses, MCB, MCCB, MPCB, RCD, ELR, EFR and PFR.
3	Control components and devices	3	3	6	1	Technical specifications, symbols and applications of: Reed switches, reed relay, push button switches and selector switches, limit and micro switches, electro-magnetic relays, latching relays, electro-magnetic contactors, auxiliary contact blocks, mechanical interlocks. Characteristics, applications and selection of: Thermal over load relay, CT type over current relays, electronic type over load relays, electro-magnetic type over load relays, solenoid actuators.
4	Sensors and Transducers	6	6	12	2	An overview of sensors and transducers. Principles and applications of: Electro-mechanical Pressure switches and sensors. Temperature sensors: Thermistor, RTD, Thermocouple and solid state types, non-electrical type temperature detectors, infra-red sensors. Position sensors: Inductive, capacitive and hall effect types. Linear and rotary type encoders: Incremental and Absolute types. Humidity, Gas and Smoke sensors. Photo electric sensors/switches: LDR, Infrared and Laser types. Use of Fiber optic cables sensor applications.
5	Sequence control circuits.	6	6	12	2	Time delay relays: Electro-mechanical clock, Analogue, Digital types, Pneumatic timers, ON-Delay, OFF delay types, Programmable timers, weekly timers. ON-Delay/OFF-Delay circuits. Time charts, Logical representation of circuits.
6	Single phase and poly phase Induction motors and starting methods.	9	18	27	4.5	Single phase motor parts, winding arrangements and terminals, Centrifugal switch, In-built over load protector. Characteristics and starting methods of:

						<ol style="list-style-type: none"> 1. Capacitor run motor. 2. Capacitor start-Capacitor run motor 3. Universal Motor: <p>Parts, Characteristics and speed controlling. Speed control of single-phase motors. Three phase Induction Motors: Main parts, Windings arrangement and terminals. Characteristics, kW capacity and rpm formula and slip, pole changing method of speed selection. D.O.L., S-D starting methods and control circuits. Soft starters. Auto transformer starters.</p>
7	Analogue Electronics	9	9	18	3	<p>Construction, Principal of operation characteristics and applications of Silicon Diode, Shottky Diode, Zener Diode, Diode numbering systems, data and applications. Construction, Principle of operation, characteristics and applications of BJT, FET and MOSET. Transistor numbering systems and relevant data. Transistor coupling methods. Multivibrators and LF oscillators. Introduction to Integrated circuit: Operational Amplifiers and IC Timers.</p>
8	AC to DC conversion and power supplies.	6	6	12	2	<p>Full wave and Half Wave rectification, Smoothing and ripple elimination Voltage regulation: Series type regulator and IC Type regulators. Polyphase rectification: Half and Full Wave, advantages of poly phase rectification.</p>
9	DC to AC conversion and SMPS.	6	6	12	2	<p>Principles of DC to AC conversion and square wave type inverters, Principles of SMPS power supply, types of SMPS. Principle of PWM Sine wave generation. Sine wave type Inverter block diagram. Advantages of Sine Wave type Inverter compared with square wave inverter. Comparison of SMPS with Linear power supply. AC to DC converters and their applications.</p>
10	Power semi-conductor devices and Power control systems	6	6	12	2	<p>Construction, principle of operation, characteristics and applications of Diac, UJT, PUJT, Silicon Bilateral switch, SCR, Triac, Power BJT, Power MOSFET, IGBT and solid-state relays. Power control and PWM control methods.</p>
11	Digital Electronics	12	12	24	4	<p>Binary number system, Logic gates, Boolean representation of Logic gates combinational Logic, Flip-Flops, S-R, JK and D types Encoders and decoders TTL and CMOS Logic families, LED-7 Segment displays, Op-to couplers and digital interfacing techniques,</p>

						Memory devices: RAM, ROM, E PROM, EEPROM Basic introduction to Micro-Controllers.
12	Installation of Measuring and control instruments on panel Boards	6	6	12	2	Analogue and Digital types of Volt meters and Ammeters. Direct and CT types. Volt meter selectors, Ammeter selectors kWh meters and power analyzers. Power Factor meters. ELR and EFR installation.
13	Programmable Logic Controllers (PLC)	24	24	48	8	Introduction to industrial automation, Introduction to PLC Architecture, Advantages of PLC Systems. PLC languages, PLC Software and Hardware, Ladder logic fundamentals, PLC Program downloading and uploading. Digital and Analog inputs/outputs, Timers, Counters, Comparison instruction, arithmetic & logical operations, Introduction to Human Machine Inter-face (HMI), Analogue signal processing, Position control with Stepper Motors and Servo motors and HMI. Power supplies for PLC. Extension units, Faults finding PLC based systems.
14	Manual Change Over (C.O.S.) switches AMF/ATS control systems and standby Generators	6	6	12	2	Brushless Generator Principle, Automatic Voltage Regulator (AVR), Alternator Terminal arrangements. Manual change over switches Importance of interlocking. Types of automatic transfer switches. 1. Motorized type 2. Contactor type 3. Solenoid type Automatic mains failure (AMF) systems. Engine auto starting methods.
15	An introduction to Power Factor control	3	-	3	1/2	Power triangle, Advantages of reducing kVA demand. Policy of supply authority relevant to kVA demand. Methods of reducing the kVA and improve the power factor. Local and centralized pf control systems. Power Factor(PF) control system instruments. Switchgears and accessories of a pf control system.
16	Fault finding in Electrical control systems	6	-	6	1	Selection of appropriate instruments for fault finding. Interpretation of schematic diagrams. 6- steps in fault finding approach. Typical fault in electrical control systems.
17	Motor Drives	12	6	18	3	