

Training Schedule for EEE

1st MONTH: ELECTRONICS BASICS

DATA Fundamentals- Data representation, number systems: Decimal, Binary, and Hexadecimal Number System, Binary Coded Decimal (BCD), Binary to Decimal, and Decimal to Binary Conversion, Hex to Binary and Binary to Hex Conversion, Hex to Decimal, and Decimal to Hex Conversion, ASCII Code, Binary Arithmetic Operations.

Electronic Fundamentals- Voltage, Current, Resistance, Power, Division of Materials- Conductors, Insulators, Semi-Conductors, Direct Current (DC), Alternating Current (AC), Positive and Negative Voltages, Power Distribution, Earthing and its Importance. soldering, desoldering, PCB`s- designs, types (single sided, double sided, multi layer and PTH). Testing, Faultfinding and troubleshooting equipment- DMM (Digital Multi Meter, Logic Probe and CRO).

Components – Applications – selection of components during designing. **Resistors**, types of resistors: fixed, Tapped, variable, linear and non-linear resistors (Thermistor, LDR, MOV etc.,). 3,4 band colour coding of resistors etc. **Capacitors** and their types: Polar and Non-Polar. **Inductors** and their applications: line filters, Electro-mechanical Relays and Transformers. Types of transformers: Step-up, step-down, Isolation, Voltage and Current transformers. **Semi conductors:** P-type and N-type materials, P-N junction Diode, Types & principle of Diodes, Rectifier Circuits, Zener Diode As Regulator, Transistor principle and Working, Amplification, Gain. FET, MOSFET, SCR, TRIAC.

2nd MONTH: DIGITAL LOGICS, SEMICONDUCTORS, MICRO CONTROLLERS AND MICRO PROCESSORS

Digital Electronics – Boolean algebra, logic gates, buffer, controlled buffer, decoders, Multiplexers, flip-flops, Timers, Counters, Memories, RAM, ROM, UVEPROM, EEPROM, Flash ROM, Microprocessors, Micro controllers.

Microcontrollers – Comparison between micro processor based design and micro controller based designs. Advantages in micro controller designs. Types and families of micro controllers, MCS51 series micro controllers, architecture, supporting chips and their functions. Architecture of the other supporting chips needed for the design of an application: Op-amps, comparators, timers, ADC, Serial EEPROM, Temperature processor (DS1620) etc.,.

3rd MONTH: DESIGNING CONCEPTS

- ✓ Power supply and its types. Design and implementation of linear mode and switching mode power supplies. Regulation techniques and regulators.
- ✓ Micro controller architecture, basic requirements and its surrounding circuitry.
- ✓ Architecture and interfacing of various sensors.
- ✓ Mechanical, Electro-Mechanical, magnetic, thermal, light, opto-coupler, optical encoder, smoke, ultrasonic, gyroscopic, acceleration PIR (Passive Infra Red) and Peizo-electric sensors interfacing with micro controllers.

- ✓ Scanning techniques of input devices like keys, Matrix keypad, sensors etc.
- ✓ Designing of drivers circuits for buzzers, relay etc.,
- ✓ Driving modes of linear and stepper motors in Uni and Bi directional ways.
- ✓ Designing and programming of PWM technique for motor speed control.
- ✓ Measuring techniques of voltage (AC and DC using voltage and current transformers).
- ✓ DTMF encoders, decoders and interfacing with Telephone lines.
- ✓ IR transceiver designing concepts. IR modulator (transmitter) and Demodulator (Receiver) techniques.

4th MONTH: IMPLEMENTATION

- Wiring Plans of Multi-Storied Buildings & Different types of Industries.
- Designing of Power Transformers based on requirements (Bobbin, Core & Wire Gauge Selection) for Step-Up, Step-Down & Isolation Transformers.
- Winding Techniques of Single Phaze & 3 Phaze Motors
- Basic Winding Concepts of DC Motors
- Bi-Directional Rotation of Reversible Synchronous Motors using Triacs & Pulse Transformers, Triac & Opto Couplers
- AC Voltage Stabilizers (Relay Based & Triac Based)
- Designing of Servo Stabilizer using Variac & Reversible Synchronous Motor (Along with Comparators, Voltage & Current Transformers.
- Speed Measurement & Control of DC Motors using PWM techniques

5th MONTH:

- Implementation of Drives using Solid State Devices like MOSFET, IGBT, SCR, Triac
- Bi-Directional Speed Control of Motors using full bridge.
- Over Voltage, Under Voltage, Over Load, High Frequency, Low Frequency detection using PLC / Micro-Controllers
- Regulation of AC Voltage, Load Current, Frequency using PLC / Micro-Controllers.
- PLC Based Closed Loop Control System for Temperature, Pressure control of Boilers.
- Remote Electrical ON / OFF Controls of Industries, Commercial Segments using IR or GSM Networks
- Designing of Digital Inverter using PLC with Over Load Protection
- Line Fault Analyzer using PLC
- Designing & Implementation of Pre-Paid Power Systems.

6th MONTH: PROGRAMMING

Programming Concepts

Addressing Modes

Memory management (Program memory and data memory)

Instruction Set and Assembly Language (ALP)

Developing, Building, and Debugging ALP's

Cross Compilers

Implementation, prog. & debugging

Memory Models

Library reference

Generation of HEX and BIN codes.

Conversion of HEX to BIN and vice-versa.

Program dumping procedures (ISP and EP).

3 Common Projects With All Kind of Sensor Networks And Interfacing Modules.