MICROLINK PERIPHERAL CONTROLS (P) Ltd.,
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▼ Engineering Projects
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Training Schedule for ECE

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.

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 – Comparision 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, RTC (DS1302), Serial EEPROM, Temperature processor (DS1620) etc, Advanced micro controller families (16 and 32 bit), ARM architecture, family and cores, ARM7, ARM9 and Cortex.

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, 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.
- ✓ Interfacing circuits for GSM and GPRS modems.
- ✓ IR transceiver designing concepts. IR modulator (transmitter) and Demodulator (Receiver) techniques.

4th MONTH: IMPLEMENTATION

Data transferring protocols and techniques implementation in both wired and wireless networks. Wired (Parallel, UART, USART and I2C) and Wireless protocols (IR,RF-FSK& ASK).

- ➢ Initialization and data dumping techniques of LCD display.
- ➢ I/O Protocol implementation between Micro controller and LED, Seven Segment and Dot Matrix displays for data display,
- ➢ USART Protocol implementation between Micro controller and RTC,
- ➢ Parallel Protocol implementation between Micro controller and ADC,
- ➢ I2C Protocol implementation between Micro controller and Temperature Processor,
- ➢ I2C Protocol implementation between Micro controller and EEPROM,
- ➢ Secured Read/Write technique of an intelligent Smart card,
- ➢ SPI Protocol implementation between µC and PC (RS232),
- ➢ Data reading techniques from both active and passive RF tags (TK5530),
- ➢ GSM/GPRS modem interfacing with micro controller.

5th 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).

Essentials
Development of concept from paper to circuit.
Analysis and selection of components.
Reading and understanding of technical documents.
Analysis of timing diagrams and level graphs.
Circuit designing techniques (Do`s and Don't Do`s).
Printed circuit board, layers and types of PCB`s.
Drawing the circuits.
Different levels of PCB manufacturing.

6th MONTH: 3 common projects with all kinds of sensor networks and interfacing modules.