

Ameya Center for Robotics and Embedded Technology

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Syllabus for Study of 8051 microcontroller

1. Definition of embedded systems, Processor Technology, IC Technology, Design Technology and tradeoffs. Examples of embedded systems.
2. Fundamental of 8051 microcontroller Block diagram, Architecture, Pin function, register set, flags, Internal memory, Familiarization with the kit
3. **Addressing modes:** Register addressing, direct addressing, Indirect addressing, Immediate addressing, Relative addressing, Absolute addressing, Long Addressing & Index addressing mode. Accessing internal memory & SFRs, external data memory & External code memory using DPTR.
4. **Instruction Set:**
 - a) Arithmetic & logic group
 - b) Data Transfer group
 - c) Call & Jump instructions
 - d) Peripheral & other Instructions
5. **Hardware Interfacing:** Study of Ports P_0 to P_3 , alternate functions of the ports
6. **Timers:** Configuration & Initialization of timers, Timer modes, timer as an event counter,
7. **Interrupts:** External interrupts INTO & INT1, microcontroller generated interrupts timer overflow & serial communication Interrupts.
8. **Serial Communication:** Introduction to RS-232, study of 8051 serial port, TTL/CMOS & RS-232 voltage levels, use of MAX232 IC for generating RS-232 voltage levels, configuring the serial port, baud rate & other settings. Transmitting & Receiving data.
9. **LCD:** Study of features of 16 x 8 LCD. Block diagram, pin functions, Configuring the LCD, Sending instructions & data, study of various functions.
10. **ADC & DAC:** Study of ADC & DAC with serial data input & serial data output, Real Time Clock, EEPROM.

List of Programs:

1. Discrete LEDs: Blinking LEDs, Running Lights, Binary counter
2. Displaying numbers on Seven segment LEDs, using these LEDs for a 4 digit decimal counter 0000 to 9999.
3. Use of Timer to generate a delay.
4. Generating square wave on port pins.
5. Display message on LCD screen.
6. **Interfacing RS 232 (Serial Communication)** display characters pressed by keyboard on hyper terminal, counter 0000 to 9999t to display on hyper terminal using serial port.
7. Interfacing ADC / DAC with 8051 microcontroller.
8. Interfacing RTC with 8051 microcontroller
9. Temperature controller using 8051 microcontroller & LM35 temperature sensor.
10. DC motor speed control. & Stepper motor control.
11. To toggle the port using external interrupt.