Embedded Systems Course Overview

1. **Basic electronics**

- Static electricity & Earthing
- Voltage & Current
- Resistor, Capacitor, Transistor & Voltage Regulators
- Branches and Nodes, KVL & KCL

2. **Digital electronics**

- Microcontroller
- Difference between Microprocessor and Microcontroller
- Significance of sensors
- LDR, IR sensors, Ultrasonic sensor, Temperature sensor
- Potentiometer and Switches
- Accelerometer and Gyroscope
- GPS
- TRIAC
- LCD
- LED

3. **Introduction to embedded C**

- Difference between C and embedded C
- Data types
- Significance of range
- Identifier
- Operator: Arithmetic, Logical, Shift
- How to make your program
- If else statement
- Loop statement
- Switch statement
- Function
- Pointer
- Difference between pointer and double pointer
- Break, Continue and GOTO statement

4. **Introduction to microcontroller**

- Introduction to 8051 family
- Introduction to controller 89S52
- How to choose your controller

5. **Software of 8051**

- Introduction to software (Kiel)
- Installation of software
- Settings necessary to be done

6. **Software of AVR**

- Introduction to software (WINAVR)
- Installation of software
- Settings necessary to be done

7. **LED (Explanation & programming)**

- Interfacing of LEDs
- Principal and logic of how the LED glow
- Internal structure of LED
- Glowing LEDs in different pattern
- Concept of PWM

8. **Switches (Explanation & programming)**

- Interfacing of Switches
- Principal and logic of how the Switches work
- Different types of Switches
- Using Switches to do some task(for ex-glowing respective LED)

9. **LCD (Explanation & programming)**

- Interfacing of LCDs
- Principal and logic of how the LCD work
- Internal structure of LCD
- Displaying your name on LCD
- Scrolling your display on LCD

10. **Linear Keypad**

- Interfacing of Linear Keypad
- Principal and logic of how the Linear Keypad work
- Internal structure of Linear Keypad
- Glowing different LEDs using Linear Keypad
- Displaying data on LCD using Linear Keypad

11. **Matrix Keypad**

- Interfacing of Matrix Keypad
- Principal and logic of how the Matrix Keypad work
- Internal structure of Matrix Keypad
- Glowing different LEDs using Matrix Keypad

  Displaying data on LCD using Matrix Keypad

12. **Seven segment**

- Types of seven segments
- Interfacing of Seven segment
- Principal and logic of how the Seven segment work
- Internal structure of Seven segment
- Glowing Seven segment in different pattern

13. **Motors**

- Types of Motors(DC, stepper)
- Interfacing of Motors
- Principal and logic of how the Motors work
- Internal structure of Motors
- Rotating Motors in different directions

14. **ADC**

- Introduction to ADC
- ADC ICs
- Principal and logic of how ADC work
- Displaying ADC response on LCD

15. **Timers**

- What are timers
- How to configure the timer
- Principal and logic of how the timer work
- Registers and bits associated with timers
- Using timers to glow LEDs

16. **Interrupts**

- What are Interrupts
- What is polling
- Difference between interrupt and polling
- How many interrupts are there in your microcontroller
- How to configure the Interrupts
- Principal and logic of how the Interrupts work
- Registers and bits associated with Interrupts
- Using Interrupts to glow LEDs

17. Communication protocols

- USART
- What is USART
- How to configure the USART
- Principal and logic of how the USART work
- Registers and bits associated with USART