Embedded Systems Training Module

Duration: 2 months

Module A:

1. Introduction to Basic Electronic Components
2. Introduction to Circuits
- Oscillator
- Timer
3. Introduction to Power Supply & Rectifiers
4. Introduction to PCB Designing / Fabrication

Module B:

1. Introduction to AVR Micro-controller & its family
2. Introduction to C Programming (Functions, Conditions, Loops)
3. Introduction to I/O Programming
4. Interfacing L.E.D. / LCD via ATmega 16
5. Interfacing Keypad via ATmega 16
6. Introduction to RF Module

Module C:

1. Introduction to ADC Programming
2. Introduction to ADC Sensors and their interfacing
- IR
- TSOP
- PIR (Pyro-electric Sensor / Motion)
- DTMF (Dual tone Multiple Frequency)
- Ultrasonic
- MQ Series (Alcohol, LPG gas, Coal Gas)
- Accelerometer
- Temperature
- Humidity

Module D:

1. Introduction to Serial / UART / USART Programming
2. Introduction to USART Sensors
- RFID
- GSM
- GPS
- Fingerprint
- Bluetooth

Module E:

1. Introduction to Embedded Linux
2. Linux Kernel Overview
3. Linux Commands
4. Debugging(GDB Environment)
5. Shell Scripting
6. Libraries (Static, Dynamic),Make files
7. Boot Process
8. Process Management
9. Memory Management
10. Device Drivers and their types
11. POSIX Threads

Module F:

1. Introduction to ARM Series
2. ARM architecture overview
3. Available IDE's in market and Debugging
4. GPIO Programming (Led, Buzzer, Switches Practical's)
5. Interrupt Programming (FIQ, IRQ, Vectored Interrupt, Non-Vectored Interrupts)
6. UART programming (Polling Mode, Interrupt Mode)

Module G:

1. Introduction to Robotics & its Applications
2. Introduction to types of motors

- Gear
- Servo
- Stepper
- Interfacing motors via ATmega 16
- Introduction to Mind Sensing Robot

Embedded Systems Training Module

Duration: 6 months

Module A:

1. Introduction to Basic Electronic Components
2. Introduction to Circuits
- Oscillator
- Timer
3. Introduction to Power Supply & Rectifiers
4. Introduction to PCB Designing / Fabrication

Module B:

1. Introduction to Embedded Systems & its Applications
2. Introduction to 8051 Micro-controller & its family
3. Introduction to Assembly Language Programming
4. Introduction to I/O Programming
5. Interfacing 7-segments & L.E.D. via 8051 Micro-controller
6. Introduction to UART/ USART Programming
7. Interfacing Laptop via 8051 Micro-controller

Module C:

1. Introduction to AVR Micro-controller & its family
2. Introduction to C Programming (Functions, Conditions, Loops)
3. Introduction to I/O Programming
4. Interfacing L.E.D. / LCD via ATmega 16
5. Interfacing Keypad via ATmega 16
6. Introduction to RF Module
7. Interfacing Graphical LCD
8. Interfacing Touch Display
9. Interfacing RGB L.E.D

Module D:

1. Introduction to ADC Programming
2. Introduction to ADC Sensors and their interfacing
- IR
- TSOP
- PIR (Pyro-electric Sensor / Motion)
- DTMF (Dual tone Multiple Frequency)
- Color
- Flexi
- Force-Point

- Ultrasonic
- MQ Series (Alcohol, LPG gas, Coal Gas)
- Accelerometer
- Gyro
- Temperature
- Humidity

Module E:

1. Introduction to Serial / UART / USART Programming
2. Introduction to USART Sensors

- RFID
- GSM
- GPS
- Fingerprint
- Bluetooth
- WiFi
- X'Bee

Module F:

1. Introduction to Embedded Linux
2. Linux Kernel Overview
3. Linux Commands
4. Debugging(GDB Environment)
5. Shell Scripting
6. Libraries (Static, Dynamic),Make files
7. Boot Process
8. Process Management
9. Memory Management
10. Multi Thread Programming
11. IPCs (Inter Process Communication): Pipes, FIFO, Signals, Shared Memory,
12. Semaphores
13. Virtual File system's
14. Network Programming(TCP,UDP)
15. Introduction to Sockets
16. Basic Socket Programming
17. Network Applications

Module G:

1. What is Linux Porting
2. What is Board Bringup
3. What is tool chain
4. Boot loaders (u-boot/barebox)
5. Application Development and Cross Compilation
6. Downloading pre-compiled Linux kernel images on Target board.
   > Booting from SD-Card
   > Booting from NAND/NOR
   > Booting from NTFS
7. Boards: -Mini2440 or Raspberry Pi etc.....

Module H:

1. Introduction to device drivers
2. Linux Kernel Architecture
3. Accessing Hardware
4. Kernel Programming
5. Character Drivers
6. Block Drivers

Module I:

1. Introduction to POSIX
2. What are threads?
3. Threads Programming
4. Locking Mechanisms
5. Programs implementation on Raspberry Pi
6. Introduction to Yocto Project

Module J:

1. ARM Introduction, ARM Architecture, Introduction of Cortex M0/M3/M4
2. Available IDE's in market and Debugging
3. GPIO Programming (Led, Buzzer, Switches Practical's)
4. Interrupt Programming (FIQ, IRQ, Vectored Interrupt, Non-Vectored Interrupts)
5. UART programming (Polling Mode, Interrupt Mode)
6. TIMERS, PWM, RTC Programming
7. RTC, ADC, LCD Programming
8. SPI Programming
9. I2C Programming (EEPROM Interfacing)
10. How to interface different modules like ZigBee, RFID, and Sensors etc…

Module K:

1. Introduction to Robotics & its Applications
2. Introduction to types of motors
- Gear
- Servo
- Stepper
3. Introduction to PWM Programming
4. Interfacing motors via ATmega 16
5. Introduction to Mind Sensing Robot