MICROCHIP Academic Partner

EFY TECHCenter

OVERVIEW: Hands-On Training on PIC18F Microcontrollers

PIC18F

- Introduction to microcontrollers and embedded systems
- Brief on PIC series of microcontroller architecture, pin description
- Memory organization, Special Function Registers (SFRs)
- Embedded C programming using MPLAB IDE
- Demonstration of hands-on practice on a development board and software tool MPLAB IDE.

Peripherals include

1. **Input/output ports** - Configuration of ports.
2. **Interrupts** – Interfacing with Push buttons.
3. **Timers** - Using timers for various applications.
4. **UART** - Serial interface to the desktop PC.
5. **Analog to digital converters** - Interfacing with temperature sensors, etc
6. **Keyboard -** Getting input data into the microcontroller.
7. **7-segment display -** Display of output.
8. **16x2 LCD display** - Display of output.
9. **PWM** - Dimming of led.
10. **RTC** - Real Time Clock.
11. **I2C** - Read and Write to EEPROM.

Note:

1. Course fee is Rs 8,000 + 10.3% service tax = Rs 8,824 (including registration, training and reference CD).
2. Timings for week days are 10:30 AM to 5:30 PM.
3. Timings for weekend classes are: Saturday 1.30 PM - 5:30 PM; Sunday 10 AM - 5 PM
4. Students will receive certificates from Microchip Inc. on successful completion of the course on PIC18F.
5. A CD, which contains the course content, reference manual, data manual, library of programs, codes in C language plus a lot of information on microcontrollers, and materials related to below given projects will be provided at the end of the course
6. Development boards can be provided at an extra economical cost.

PIC 18F Industrial Projects Ideas -

1. **Microcontroller Based Call Indicator** - In large establishments, such as hotels and hospitals, intercoms and call bell systems are essential for communication between the inmates and the assisting staff. Intercom being costlier option, in many the relatively inexpensive call indication systems is preferred. The call indication system gives an audio- visual indication of the call point.

2. **Digital Water level Indicator cum pump Controller** - It shows the level of water far away from the location of the over head tank. Features of this project are - Up to five levels of water are indicated on LED display along with beep sound. DTMF Receiver section controls the on/off function of the motor. The water - level scanning section scans the water level with beep sound after power resumes. When the water reaches the full level the motor turns off and provides a beep sound for about a minute. When the water goes below the empty level, the motor starts with beep sound.

3. **Load Protector with remote switching facility -** For inverters and UPS systems, the load should not be much below or above the rated power since it can cause excess heating of the output transformer windings and the active driving device and thereby damage them. Some Domestic appliances also need to be protected against under/over voltage. Here's an under/over voltage protector to protect devices from fluctuations in the mains. It also allows you to turn on/off the load through remote hand set.

4. **Voice Recording and playback using APR9600 Chip** - APR9600 single chip voice recorder and play back device makes use of a proprietary analogue storage technique implemented using flash non-volatile memory process in which each cell is capable of storing up to 256 voltage levels. This technology enables the APR9600 to reproduce voice signals in their natural form. The APR9600 is a good standalone voice recorder or play back IC with non volatile storage and play back capability for 32 to 60seconds.

5. **Moving message over dot matrix display** - Controlling electronics devices from a PC is a real fun. Here is a moving message display that makes use of PC's parallel port. The message typed from the keyboard of the PC is displayed on the 5*7 dot matrix display in moving format. Moving message employing dot matrix displays are used in many public places including railway stations and general stores for announcements. These can display any symbol of any language. In cheaper type of moving message displays, the message is stored in ROM/EEPROM and the same can't be changed easily.

6. **Gas Leakage Alarm** - LPG gas is supplied in pressurized steel cylinders. As this gas is heavier than air, when it leaks from a cylinder it flows along floor and tends to settle in low spots such as a basement. This can cause fire or suffocation if not dealt with. This project detects the leakage of LPG gas and alerts the user through audio-visual indications. You can find the details of this project in the following Link – **Gas Leakage Alarm** .

7. **Four Stage FM Transmitter** - This FM transmitter circuit uses four radio frequency stages: a VHF oscillator built around transistor BF494 (T1), a preamplifier the pre-

driver stage. You can find the details of this project in the following Link – **Four Stage FM Transmitter** .

8. **5 Band Graphic Equalizer** - This equalizer uses low-cost op-amps. Good-quality op-amps powered by single voltage supply are readily available in the market. Equalizer circuits typically divide the audio spectrum into separate frequency bands and have independent gain control for each band. You can find the details of this project in the following Link – **5 Band Graphic Equalizer.**

9. **Two channel PC Based Oscilloscope** - Since portable PCs are today common and a USB link is a better solution than an old ISA bus, here we present an oscilloscope using USB port of the PC that operates at up to 10 kHz with ±16V input voltage. The oscilloscope uses IC PIC18F2550 from Microchip as the main controller, which makes the oscilloscope compact as there is no need of additional power supply for the entire circuit board. You can find the details of this project in the following Link – **Two channels PC Based Oscilloscope**.

10. **Remote Controlled Digital Audio Processor** - The Remote Controlled Digital Audio Processor is based on the PIC18 microcontroller and can be used with any NEC-compatible full-function IR remote control. Full remote control using any NEC-compatible IR remote control handset Provision for four stereo input channels and one stereo output Individual gain control for each input channel to handle different sources 80-step control for volume and 15-step control for bass, midrange and treble. You can find the details of this project in the following Link – Remote **Controlled Digital Audio Processor**.

11. **POV Display** - We don't realize but we see POV every day when we watch TV. They take advantage of this phenomenon. What we see on TV is not continuous but series of pictures changing quickly before a human eye could know. This POV display is built on similar technique. You tube Link – **POV Display .**