Compilers & Tools:

1. SW500005 - HI-TECH C® Compiler for PIC10/12/16 MCUs (Standard)
2. SW500008 - HI-TECH C® Compiler for PIC18 MCUs (Standard)
3. SW006012 - MPLAB® C Compiler for PIC24 MCUs and disPIC® DSCs
4. SW006015 - MPLAB® C Compiler for PIC32 MCUs
5. MPLAB-X IDE Beta - MPLAB X IDE Download Tool
6. MPLAB 8.60 - MPLAB® Integrated Development Environment (IDE) Software
7. MAL - Microchip Application Libraries
8. MAPS - MAPS with MPS - Offline Version 2.3.7
9. Treelink - Analog and Interface Treelink products presentation
10. Development Tools Selector - DTS - Offline Version 10.05.15
11. Battery Life Estimator - nanoWatt XLP Battery Life Estimator
12. Graphics Display Designer- Graphics Display Designer
13. EEPROM Endurance Test - EEPROM Total Endurance
14. MiWi™ - Microchip Wireless Development Environment

Class Code	Class Description	Class Material	Lab Material
1402 GSS	**Getting Started with 16-bit Devices - Standard 16-bit Peripheral Configuration and MPLAB® C Compiler for PIC24 MCUs and dsPIC® DSCs (C30) Programming Techniques** This hands-on class covers the standard peripheral set of Microchip's PIC24 microcontroller and dsPIC® digital signal controller families and the MPLAB® C Compiler for PIC24 MCUs and dsPIC DSCs (C30). Using hands-on exercises and the MPLAB C Compiler for PIC24 MCUs and dsPIC DSCs, students become familiar programming the I/O ports, interrupts, ADC, timers and UART modules. Although based on the PIC24 microcontrollers, these principles are directly applicable to Microchip's entire 16-bit family including the PIC24F, PIC24H, dsPIC30F and dsPIC33F devices. Attendees will leave the class with a detailed knowledge of Microchip's 16-bit architecture and device peripherals.		
1405 MXH	**Getting Started with PIC32 - Hands On** This class introduces the attendee to the basic operation of the PIC32MX microcontroller. Attendees are led through several hands-on exercises using the PIC32MX Starter Kit to demonstrate key concepts of the PIC32MX architecture. By the end of this class, attendees will have created and debugged several PIC32 projects.		

1412 RTC

Introduction to Microchip RTCC (Real-Time Clock) Devices

This class introduces the new I2C™ Real-Time Clock from Microchip Technology. In this two hour lecture/demo class, you will learn the features of the new device and understand how to implement a reliable “right first time” design. This is a feature rich device and time will be spent discussing and understanding how to use the advanced features and how they will help make your next project successful. Advanced features including unique ID location and how they are protected, onboard calibration and trimming, timestamp functions, alarms, and using the EEPROM and SRAM. You will also understand some of the design requirements when working with Real-Time Clock devices, such as Vbat conditions and how board layout and crystal selection can affect accuracy.

1415 IDE

Introduction to MPLAB® IDE v10

This class will introduce the new cross platform MPLAB® IDE v10 to existing and new customers. The class will detail the differences between the current MPLAB IDE v8.xx and the new MPLAB IDE v10. The class will also cover how to get started using MPLAB IDE v10.

1416 MAT

Getting Started with MATLAB®, Simulink®, RTW and Microchip Device Blocksets

This class introduces the attendee to the basics of MATLAB®, Simulink®, Real Time Workshop and Microchip device blocksets. It covers the basics of Microchip blocksets and the MATLAB plug-in of MPLAB® IDE. Attendees leave with a basic knowledge of Microchip tools related to MATLAB, and how code generation is done using MATLAB/ Simulink models.

1417 HTC

Getting to Know the Enhanced Mid-Range PIC® MCU Family Using the HI-TECH C® PRO Compiler

This class will introduce programmers to the new enhanced mid-range family of PIC® MCU devices through HI-TECH Software’s ANSI C cross compiler. Comparisons of compiler output will be shown, highlighting the improvements offered by the new architecture. By way of theory and practical demonstration, the class will also look at more fundamental compiler topics such as: memory allocation, data types, Interrupt Service Routines, in-line assembly, and C-assembly interaction. In addition, integration with Microchip’s MPLAB® IDE will be detailed, as well as the use of debug files to help with code development. This class does not cover programming in C; rather, it looks at the features and operation of the “HI-TECH C® PRO for the 10/12/16 MCU Family” compiler. However, the material will have some relevance for all HI-TECH compilers supporting PIC® MCUs and dsPIC® DSCs.

1422 GSM

Designing and Implementing Generic Software Modules in C

When developing software for embedded systems, we often see opportunities to create generic software modules which could be reused on other projects. The C programming language lends itself very well to this task by allowing the development of controller independant code. Typical situations include mathematical algorithms, DSP filters and memory handling functions. This short lecture takes a look at the important points to consider when designing and developing such modules with respect to portability across controllers and hardware independance, as well as how coding guidelines can help to ensure a consistent and clear coding style when working in a team. This class uses the development of two generic software modules to demonstrate the principles discussed in the class: a RAM-based circular buffer and an LCD driver for the HD44780U alphanumeric LCD display, which can both be used across all of Microchip's controller families. The specification of these software modules will be discussed, along with the process used to develop the modules. This will include the "during development" creation of a test bench to test the module as well as its documentation, continuing to a recommendation on how to release the modules for use by others. The class will also include a demonstration of the modules and an opportunity to review the code.

1428 RTF

RTOS Fundamentals

With the development of sophisticated application solutions on advanced 16- and 32-bit microcontrollers, users are looking to Real-Time Operating Systems (RTOSs) as a method for managing software complexity. This class provides attendees with a background in the fundamentals of RTOSs, covering the basic terminology, how time is shared between tasks on a single processor, and how a scheduler can control the system operation. The class then goes on to cover more advanced topics such as inter-task communication and synchronization between tasks. Presented without focusing on any particular RTOS, this class serves as a useful grounding in the subject matter and will provide attendees with information allowing them to make informed decisions when selecting an RTOS for their next application.

1433 BTL

Implementing Bootloaders on Microchip PIC® MCUs

Interested in being able to provide updates to your application without the need for servicing? This class will demonstrate the basics of a bootloader and how it can help you provide new feature updates, bugfixes, etc., without the need to ship or even open the product. The class will cover an overview of a bootloader, different bootloader options that Microchip offers, the required hardware, along with guidelines for structuring your code and firmware development tips using bootloaders.

1435 EMC

Tips and Tricks for Electromagnetic Compliance (EMC)

This class will provide tips and tricks for the embedded application engineers to design their robust system. The class will define the components of noise, discuss the effect of noise on a microcontroller circuit and how a microcontroller circuit behaves in the presence of noise. Information on component selection, PCB layout and microcontroller circuit tips and tricks will be discussed.

1436 XLP

eXtreme Low Power Design - XLP Tools, Design Techniques and Implementation

This class will introduce concepts for eXtreme Low Power design, using Microchip's XLP MCUs, development tools, and hardware and software design techniques. The attendee will have the option to select their preference of 8-bit or 16-bit XLP devices for the lab portion of the class. The class will take the attendee from start to finish of an XLP design, starting with the XLP concept, MCU selection, battery selection, hardware design, software implementation and ending with tweeking of code while viewing the current profile to achieve XLP improvements.

1437 CTI

Introduction to Microchip's mTouch™ Capacitive Sensing

This class will give an introduction to the theory behind touch sensing, and it will showcase the methods Microchip provides for its mTouch™ capacitive touch sensing. Demos and tools will be presented to highlight Microchip's key touch sensing methods including CSM, CTMU, and a newer method, CVD. This class will build a foundation for other touch sensor classes, and is a prerequisite for the hands-on class.

1438 CTH

mTouch™ Capacitive Solutions

This class will give the knowledge of the methods Microchip offers for touch sensing to attendees. Demonstrations during class will involve each of our 3 key touch sensing methods: CSM, CVD, and CTMU. Microchip tools used will include the Microchip touch evaluation kit and library software, in addition to general purpose Microchip tools.

1440 RTS

Techniques for Robust mTouch™ Touch Sensing Designs

Replacing mechanical buttons in your designs with touch sensors will reduce production costs and increase aesthetics; however, it will also fundamentally change your input device from a digital switch to an analog signal. This class is focused on defining what youneed to know to ensure that your real-world design is a success. We will cover how the physics of noise and hardware design will affect your touch applications, the best design practices for both hardware and software, and provide useful tips and tricks to increase your system's overall reliability. A basic understanding of C is recommended.

Designing a Custom Class, Full-Speed USB Embedded Host Application

1454 USB6

USB is a common and powerful interface for connecting peripheral devices to a host. Microchip provides a framework that facilitates the design and implementation of embedded USB hosts using PIC24 and PIC32 microcontrollers. This class teaches the student how to design an embedded host application using the Microchip USB framework. It guides the attendee through the process of developing a driver and application that acts as a host to a simple USB device, using a series of lectures and hands-on labs. Students will have the choice of using either the PIC24 or PIC32 microcontrollers during the labs.

Wireless Networking with the MiWi™ Development Environment

1459 AWN

This class will provide hands-on experience with the Microchip Wireless (MiWi™) Development Environment. The MiWi Development Environment consists of wireless protocols – MiWi and MiWi P2P, as well as the interfaces associated with the protocols– MiMAC and MiApp. This class includes overviews of networking protocols, detailed descriptions of MiMAC and MiApp interfaces, and hands-on labs to develop applications with the MiWi Development Environment.

Digital Power Conversion Using dsPIC® DSCs: SMPS Basics

1466 PCT3

The SMPS dsPIC® DSCs incorporate several features that make them ideally suited for controlling digital power supplies. Both the digital signal processing capabilities and the Intelligent Power Peripheral are key features to these devices. Hands-on exercises will familiarize attendees with the peripheral and the DSP algorithms. Buck and boost converters are analyzed to understand their basic behavior; voltage and current control modes are introduced and implemented; and PID theoretical basics are explained and used to control the digital loops. Hands-on labs cover all the mentioned topics. The new Buck Boost Board is the hardware platform used in the labs.

Digital Power Conversion Using dsPIC® DSCs: Pure Sine Wave Offline UPS

1469 PCT6

Digital implementation of power conversion is the latest trend in UPS applications to offer design flexibility, higher performance and better reliability. The dsPIC® DSC SMPS family supports all power conversion technologies used in the power industry. This class covers the design and implementation of a digital offline UPS reference design. Topics will cover the power architecture, MATLAB® modeling, digital implementation of control systems, software integration and power management. A demonstration of the offline UPS reference design is included in the class.

1475 MC2

Cheap and Easy Control of Brushless DC and Stepper Motors

This class provides an overview of the peripherals for the PIC16F1XXX enhanced Mid-Range core that simplifies the control of electronically commutated motors. These motors include brushless DC motors and stepper motors. The class will include a demonstration of several different motors operating under control of the F1 Starter Kit with brushless DC and stepper motor add-on boards. Brushless DC motors require mechanical position feedback sensors for proper control of the motor. A PIC16 application will be demonstrated that controls a brushless DC motor without techanical sensors. The brushless DC control application will be optimized for specific motors using a PC connected to the F1 Starter Kit through the kit's serial interface.

1481 PCL

Innovative Power Conversion Techniques for LED Lighting Applications

This lecture will discuss the design of intelligent DC/DC converters to be used in various LED lighting applications. Automotive and other battery powered applications will be explored. This class will include demonstrations of the innovative topologies discussed.

1483 GFX1

Designing with Microchip's Graphics Library

Looking to add a Graphical User Interface (GUI) to your embedded system? Then this is the class for you! Attendees will use lecture material and hands-on exercises to learn how to harness the power of Microchip's Graphics Library along with the Graphics Display Designer as they create a sophisticated GUI. Additionally, attendees will get a first look at the new PIC24FJ256DA210 family of 16-bit microcontrollers. These highly integrated devices are the first Microchip devices to fully integrate a Graphics controller. For the hands-on exercises, attendees will have the option to use the new Multimedia Development Board with the PIC32 or the new PIC24FJ256DA210 Development Board. Although it is not required, a strong working knowledge of the C programming language will be extremely helpful.

1486 DSP

Designing a DSP Application Using the dsPIC® DSC

This DSP class brings the architectural features into the practical domain by utilizing powerful software tools available for the dsPIC® DSC's architecture. First, attendees learn the basic of digital filters and utilize the dsPIC DSC Filter Design tool to design FIR and IIR filters based on specified characteristics. Then we cover how to program the dsPIC DSC with the designed filter coefficients and the filtering functions available in the dsPIC DSP library, and run it on real-time signals. The usage of the MPLAB® IDE plug-in for dsPIC DSC Filter Design tool is introduced. Finally, we review how to use the dsPICworks™ tool to generate and analyze data, including observing the frequency spectrum of generated signals using the 32b Fourier transform functions available in the dsPIC DSC DSP library.

Getting Started with PIC16 Architecture, Instruction Set and Assembly Programming

1490 GS3

This class covers the fundamentals of the PIC16 family's architecture and instruction set. Basic concepts will be reinforced through the demo of two simple assembly language programs. The first program will turn on an LED connected to one of the I/O pins and the second program will add software loops and delay routines to make the LED blink at a specific rate. This process will involve the use of MPLAB® SIM to simulate and debug the programs. Ultimately, a PIC16F877A will be programmed using the MPLAB ICD 3 on a PICDEM™ 2 Plus demonstration board. The knowledge gained from this class will form a solid base from which the attendee can learn more advanced concepts with the PIC16, PIC18, PIC24 or dsPIC® families.

PIC18 Architecture, Peripheral Configuration and MPLAB® C18 Programming Techniques

1491 PC1

This class will provide you with an introduction to the PIC18 family of devices. The class will start with the basic architecture and instruction set. Discussion of interrupts, resets, oscillators and other special features of the PIC18 architecture will describe the core feature set of these microcontrollers. Through the class, you will become familiar with the instruction set, I/O ports, A/D converter, timers, PWM, USART and MSSP modules.

Designing Embedded TCP/IP Monitor and Control and Wi-Fi solutions

1492 TWF

This class delivers a complete design example of a TCP/IP control and status monitoring application using Microchip's Ethernet and Wi-Fi solutions. The information presented can be applied to designs using:
1) Microchip's MAC/PHY transceiver devices (Ethernet and Wi-Fi)
2) Microchip's PIC18 microcontrollers with a built-in transceiver
3) Microchip's PIC32 Integrated MAC Ethernet controllers
Communication concepts are introduced from the interfaces of the foundation (ARP, IP, DHCP, DNS, etc.) and application layers (SMTP, SNMP, etc). Details of the API commands for TCP, HTTP and file system protocols are explained. This course will demonstrate how to develop an embedded Wi-Fi solution using the Microchip Explorer 16 development platform and TCP/IP stack. The student upon completion of the class should know how to modify the Microchip stack fi rmware with their application requirements. This class highlights the cross-platform compatibility of Microchip's TCP/IP stack by allowing attendees to implement the example Ethernet applications during class.


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