Professional Development Course in Embedded System Design (Full-time)

Sandeepani offers the **16-week full time (Monday – Friday, 8 hours a day)** Professional Development Course for recent graduates and post-graduates in Electronics / Electrical / Telecommunication / Computer Science engineering. This program is specifically designed with an objective to provide a sound platform for the students and prepare them for a successful career in the field of Embedded System Design.

The PDC offers the right blend of classroom teaching, quality hands-on training from 'concept-to-project', covering design methodology using industry standard tools and practices. The course includes a project work as well.

Placement assistance is provided to those who complete all modules of this course and a pre-placement test.

Course Duration: 16 Weeks		Course Structure and Outline
Mod.	Module Title	What You Learn
P1 (3 Days)	Engineering primer	• Number systems • Logic gates • Boolean expressions • Introduction to registers and counters • Introduction to Embedded systems
P2 (10 Days)	C Primer	• Introduction to C Programming - Structure of a C program, The C compilation process • Types and Operators - C base types, Precedence & Associativity, - Arithmetic operation, Promotion & Typecasting • Control Flow - Logical expressions and operations, Decision Making, Loops • Definitions and declarations, Header files, Scope and lifetime - Storage Classes • Introduction to pointers - Using pointers to access single dimensional arrays • Bit Manipulation, Bit level manipulation • Standard C I/O functions • Functions - The Function as a logical program unit, Parameter passing by copy and reference
C1 (18 Days)	Designing with ARM7	• Introduction to MCU / MPU • Introduction to ARM • ARM7-TDMI Architecture & Programmer's model • ARM & THUMB Instruction Set Architecture's • ARM7 Assembly programming using Keil MDK tool-chain • LPC2378 - ARM7 based MCU Architecture & Programming using Embedded C • Interfacing and Programming with LPC2378(GPIO - LED, Switches, Matrix Keypad & LCD, Timer, RTC, ADC, UART)

		• In-Circuit debugging using Keil Ulink2 JTAG debugger • Boot sequence & System initialization • Exception handling • Advanced simulation, Code profiling & Optimization techniques • Overview of Serial protocols (SPI, I2C and CAN) Overview of ARM Cortex Cores
C2 (18 Days)	Advanced C	• Advanced Pointers – Pointer array, array of pointers, pointer to arrays, function pointers • C string handling • Advanced Data types - Structures, Unions and Enums, Bit-fields • Dynamic Memory allocation techniques • Data Structures - Linked lists, Stacks, Queues, Binary Search trees, applications • Search and Sort algorithms • Conditional compilation • File operations
C3 (8 Days)	GPOS and Shell Scripting	• Introduction to operating system • Process Management • File Management • Memory management • Shell scripting
C4 (12 Days)	System Programming using Linux	• Linux kernel architecture – Kernel subsystem, system call interface, scheduler, virtual memory management, file system management • Linux System Programming: File I/O, Signals, Timer and Sleeping, Memory Allocation • Process Management: Process, Process Descriptor, Process States, Threads, Process Creation, Execution, Termination • Inter-Process Communication: Kernel IPC Facilities, Pipes, POSIX Message Queue, POSIX Semaphore, Shared Memory
Integrated in the course	Module Projects	C/8051/ARM/RTOS
Elective 1 (10 Days)	Linux Device Drivers	• Essentials of kernel programming • Dynamically loadable kernel module • Memory Allocation schemes in kernel • Interrupt handling – top and bottom halves, deferring work • Developing and running char drivers • Developing and running Block drivers • Debugging techniques • Proc file system • Linux device model , device tree • Memory mapping and DMA

		• Overview of network, tty and other advance drivers
Elective 2 (10 days)	Real Time Operating system µCOS	• Introduction to µC/OS-II RTOS • RTOS Fundamentals: Real Time Scheduling and Timing, Clock Ticks, Priority Scheduling, Application development using µC/OSII RTOS • RTOS Task Management: Task Creation, Multi-Tasking, Task Scheduling, Task Query, Task Deletion, Task Change Priority, Task Suspend/Resume • RTOS Time Management: Timer and Timer Services, Timer Delay, Get/Set Timer RTOS Inter-Process Communication: Hardware Synchronization, Binary Semaphore, Counting Semaphore, Mutual Exclusion, Message Queue Management, Shared Memory, The Critical Section Problem, Priority Inheritance
Elective 3 (10 Days)	C++	• Introduction to object oriented programming • Classes and objects • Constructors and Destructors • Dynamic memory allocation techniques • Exception handling • Polymorphism – Function overloading • Polymorphism – Operator overloading • Inheritance • Run time polymorphism • Generic programming
Elective 4 (10 Days)	Embedded System Design Using Zynq	• Overview of Embedded Software Development • Zynq-7000 All Programmable SoC Architecture Overview • Introduction to FPGA • Driving the Vivado Tool • Driving the SDK tool • Standalone Software Platform Development • Interrupts – software consideration • AXI - Introduction, Transaction • AXI: Connecting AXI IP • Integration of software and hardware design

Note:

1) The contents listed above is a representative outline and is subject to change at short notice in compliance with the current industry demands
2) Legend: P# - Primer Module, C# - Core Module