



iMobile Computing Technology

Incubated by Science and Technology Park, University of Pune, DST.www.imct.in

Real Time Operating System (RTOS) with ARM 7

- Course** : Real Time Operating System (RTOS) with ARM 7
- Duration** : 3 days (5-7hrs/day)
- Dates** : As per mutual agreement.
- Time** : 5 Hr/Day (Minimum)
- Eligibility** : BE/BTech/ME/MTech (CSE / E&TC / Electronics), Third year, Final year students.

Objectives :

- Learn key principles of Micro-controller and RTOS.
- Learn how to built embedded system.
- Learn open source Micro-controller(ARM-7) tool-chain.
- Learn Linux based systems.

Results:

- At the end of training session student will be able to built RTOS based embedded system.

Skills developed:

- RTOS
- Open Source Software and tool-chain
- ARM architecture introduction.

Training Details

Background

- Importance Of Real Time OS
- Introduction To Open Source S/W
- Introduction To Real Time OS

Operating System Fundamentals

- Process and Threads
- Signal Handling
- Interrupt Management
- Memory Management
- File System and Implementation
- System Call Interface
- Inter Process Communication
- I/O Subsystem
- Network And Security

Discuss the Concept of porting

- Components for porting Open Source RTOS on ARM7

Structure and implementation of open source RTOS

- RTOS Source Organization
- File System in RTOS
- Configuration Of RTOS
- Implementation Of RTOS

Introduction to ARM-GCC Cross Compilation Tool chain and Environment

- ARM-GCC Cross Compiler
- Linker
- Loader
- Makefile
- Cygwin Environment
- Flash Magic Download Utility

LAB- Installation of ARM-GCC Cross Compilation Tool chain

LAB- Install Cygwin Environment

LAB- Install Flash download Utility

Introduction to the target platform, ARM7 Architecture

- Architecture Of ARM7 Processor
- Pipelining in ARM7
- Thumb Mode of ARM7
- Instruction Set for ARM7
- Memory mapping in ARM7

Port RTOS on ARM Board

- Steps For porting RTOS On ARM7

LAB- Port Open Source RTOS On ARM Board

Real Time Operating Fundamentals

- Task Management
- LAB-** How to create Tasks?
- LAB-** How to assign priorities to Tasks?
- Interrupt/Event Management
- Memory Management
- Multitasking
- Context Switching

LAB- How handle multitasking in RTOS?

- Inter Process/Task Communication (IPC)

LAB- Semaphore Implementation

LAB- Message Queue Implementation

- Co-routines

LAB- How to create co-routine in RTOS?

- Real Time Scheduling Algorithms
- Priority Inversion
- Interrupt and Dispatch Latency

References and Guideline for RTOS

Advantages of training to college students, and Industry people.

1. It is necessary for all engineers to have knowledge about open source environment, iMCT will insist students to work on open source S/W (RTOS) and compilation tools and utilities.
2. This will be a common training activity for CSE and electronics students. It will be added advantage for their curriculum and they could get good opportunities in the best organizations to work with. Though this activity will be added advantage, it is not out of syllabus and scope for students.
3. Students can develop software applications for advanced microcontrollers whereas ETC students can implement more hardware specific software in the training program.
4. iMCT is the 1st organization who is delivering such training programs based on industry projects and not available in the educational system till the date in such a low cost solutions.
5. iMCT will help in setting up lab for RTOS and this will help students to do experiments in house rather then going out for some institute.
6. Training will be given by iMCT's highly experience engineering resource.

Prerequisite:

- ✚ Machines installed with Window OS for students.
- ✚ We will provide entire tool chain along with embedded Linux platform.
- ✚ LPC21* ARM Boards (This is depending on availability in collage/university)

NOTE:

- ✚ The training will be conducted by iMCT's expertise and delivered to only college students and staff.
- ✚ Time for training can be extended if required.
- ✚ Training will be conducted in the premises of collage/University, it is expected that collage will provide required logistics like classroom, lab room with all prerequisite like computer, software, LCD projector.
- ✚ If students want to take training in iMCT/STP premises need to intimate 15 days before the training schedule.
- ✚ *We have other courses Verilog HDL for design and Verification. Mobile Computing Technology and mini OS, Advance topics like System-Verilog for chip Verification, Open Source Verification Technology for IC design. Please contact us for more details on support@imct.in and sales@imct.in*

Mrs. Prajakta Pathak

Head, iMCT, Pune

Mobile: (+91) 9922441095

Mail-id: prajakta@imct.in

Website : www.imct.in