



Real Time College

**Course: Real-Time & Embedded Linux
Complete Track**

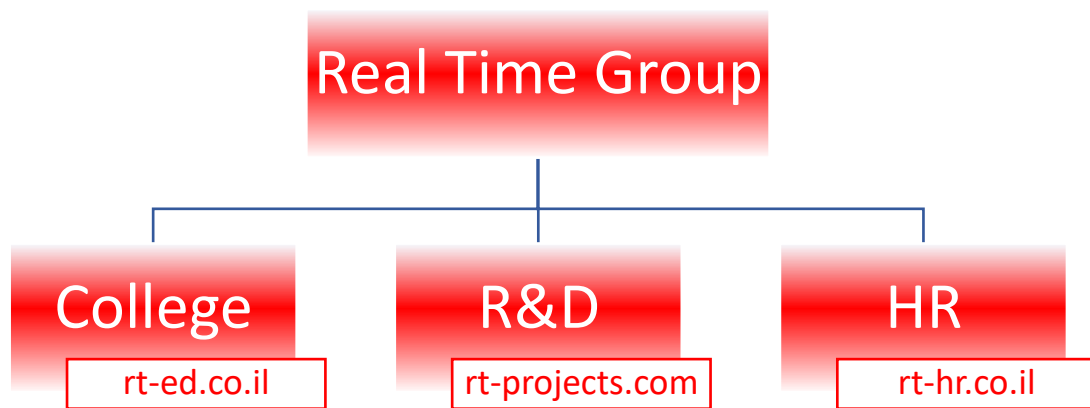
Duration: 745 Hours
Hands-On-Training: 90%



Real Time Group is a multi-disciplinary dynamic and innovative Real-Time O.S. and Embedded Software Solutions Center, established in 2007.

Providing Bare-Metal and Embedded Linux solutions, professional services and consulting, end-to-end flexible system infrastructure, outsourcing, integration and training services for Hardware, Software and RT-OS \ Embedded Systems.

The company is divided into the following three Divisions:



Training Division:

Professional Training Services for Hardware, Software, RT-OS and Embedded systems industries.

We provide the knowledge and experience needed to enable professional engineers to Develop, Integrate and QA Hardware, Software and Networking Projects.

In order to ensure experience, all courses are practical – hands-on-training. The latest Development, QA and Automation equipment which are adopted by the industry are used.

All students are supplied with Development-Boards for home-work and course projects.



Course Overview:

Being a leading provider of RT-Embedded Linux Solutions for the last decade, We have gained experience solving hundreds of complex projects. That's why we know exactly what it takes to make you one of us.

This RT-Group's flag-ship course, provides a complete and comprehensive hand-on-training for Real-Time & Embedded Linux Engineering.

It's designed to provide the knowledge, development tools, the experience needed in order to place you as a RT-Embedded System's Developer, More than 2000 students have participated in this Track since 2007 and successfully integrated in our Company's Development Division and the Israeli \ word-wide Hi-Tech industry.

The track is composed out of 12 courses and includes all the development stages starting from system boot-loader through Loading the Linux Kernel and up to running Linux O.S. Applications.

Throughout the track we'll go through Designing and Implementing Embedded Programs, implementing Drivers for Peripheral Devices (GPIO \ I2C \ SPI \ UART \ Timers \ PWM...), usage of RTOS system resources, Linux User-Space programming, Multi-Threading and Synchronization, Inter-Process Communication (IPC), Linux Kernel Modules (LKM's), Board Support Package (BSP), Device Drivers, Using Debug Tools and much more.

The Track is divided into 2 parts:

1. **Embedded Systems \ Bare Metal Courses** (on the right side)
A step-by-step training to the most complete ARM Cortex-M platform using Cortex-M4 Development boards for practical exercises.
2. **Linux Programming \ Embedded Linux** (on the left side)
A complete guide to Programming Linux User-Space Applications \ Kernel Device Drivers for Desktops \ Embedded Systems, it focuses on giving you real world coding experience by using ARM Cotex-A8 Development Boards.



Who should attend:

- Anyone who wants a career in RT-Embedded Engineering.
- Hardware, Practical and software engineers who need to speed up with RT Embedded Linux as a development platform.
- Embedded system developers.
- Linux Developers.
- FAE's & Support engineers who will be integrating code and managing applications hosted on Embedded & Linux systems.

Prerequisite:

- High level understating of the English Language.
- Experience with Scripting or Programming.
- A high level of computer literacy is expected.
- No previous experience of C programming or Linux\UNIX is necessary.



The following table concludes the list of courses in the Track, with a short description and course length.

Feel free to click on the required course name for an elaborated Syllabus per course.

Embedded Systems \ Bare Metal Courses:

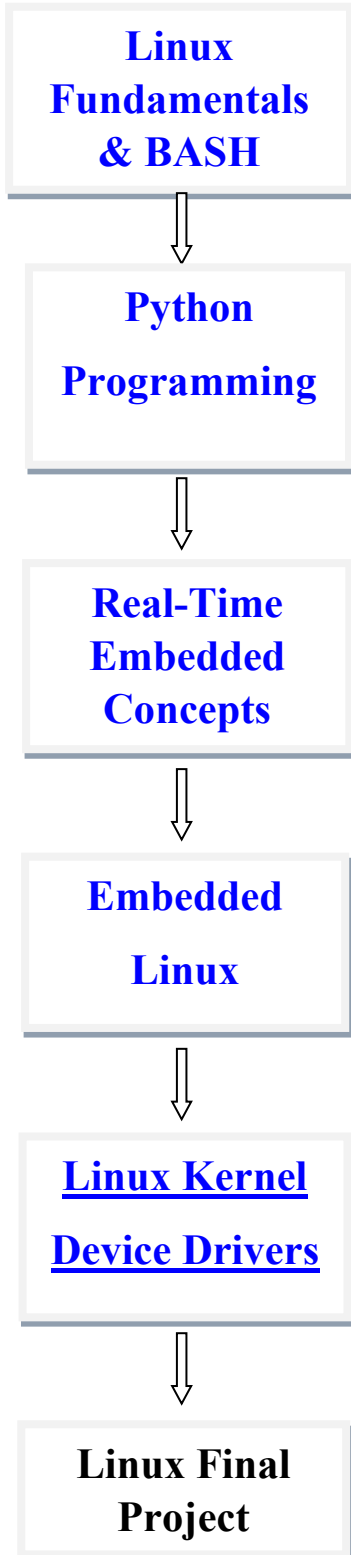
Course Name	Course Description	Length [AH]
C for Embedded (Basics)	The Basics of C programming, for those without any C programming background.	45
C for Embedded (Advanced)	Advanced C Topics, for those with Basic C programming experience	45
Embedded Systems Programming	A complete guide to Hand-on software development for Embedded Systems, focuses on giving you real world coding experience Bare Metal Development, discuss the techniques, development tools, working environment and debugging tools. Implement Peripherals using Embedded C, Drivers for GPIO, I2C, SPI, UART, Timers, handling Interrupt and much more.	90
C++ & OOD	Covering Object Oriented Programming through the C++ language, highlighting Polymorphism, Multiple Inheritance, Exceptions, RTTI, Templates, Abstract Data Types, Basic Design Patterns and Embedded \ Real Time Considerations.	90
Practical Networking Engineering	Starting with Fundamentals of Networking, going through the bits and bytes of the TCP\IP Protocol, Vlan and MPLS. Using Networking tools such as Sniffers, Traffic generators for performance and diagnostics. Networking Equipment (Repeaters \ Switches \ Routers \ Gateways). use C\C++ to implement Layers 2,3 4.	90
Final Project		
	Sum	360

Linux Programming \ Embedded Linux Courses:

Course Name	Course Description	Length [AH]
<u>Linux Fundamentals & BASH Scripting</u>	Provides a comprehensive guide to Linux™, learn how to manage files and directories, Linux security mechanisms, design and write shell programs of high complexity, manage multiple concurrent processes and more.	75
<u>Python Programming</u>	Focusing on Python 3, aiming to provide you with the knowledge and experience needed in order to program Object Oriented real industry applications.	90
<u>Real-Time Embedded Concepts</u>	Fundamentals of Real-Time O.S. – Kernel Objects, Services, Development tools and programming considerations. Building blocks of Embedded Systems, Embedded peripherals, debugging etc.	40
<u>User Space Programming \ Embedded Linux</u>	Developing secure and optimized Linux Applications. Covers all major areas of Linux programming - Development tools, environment, processes, Makefiles, building Libraries, using system calls, accessing Hardware, Processes, Threads, IO, networking, synchronization and more.	90
<u>Linux Kernel & Device Drivers</u>	Detailed guide for Developing Linux based Kernel modules and Device Drivers. Contains dozens of real-world exercises practiced on Evaluation Boards. device driver types starting from Character and Block devices and ending	90
Final Project		
	Sum	385

The following Block Diagram concludes the order of the courses in the Track.
 Feel free to click on the required course name for a detailed description.

Embedded Linux



Embedded Bare -Board

