INTRODUCTION TO LINUX

COURSE DESCRIPTION

Introduction to Linux provides engineers with a fast, cost-effective way to acquire the skills necessary to develop real-time applications with embedded Linux.

After this course, participants will be able to perform the following:

- Describe the role of Linux in embedded and real-time systems
- Take a requirement specification to a working application
- Design, develop, debug, build, and test real-time applications with Linux
- Use the Linux memory model effectively
- Design an application to make optimal use of inter-process communication, synchronization, timers, and file systems
- Describe features and protocol support for networking in Linux
- Deploy and manage an embedded Linux system

PRODUCTS SUPPORTED

- Wind River® Workbench 3.0 for Linux

COURSE FORMAT

- This four-day expert-led course consists of lectures and lab sessions.
- Attendees use Wind River Linux 3.0 and Wind River Workbench 3.0 for Linux to gain experience with the topics presented.
- Participants examine and exercise simulated network topologies in hands-on labs.
- Participants receive individual guidance from an expert engineer who has extensive experience with Wind River technologies.

AUDIENCE

- Developers who work with Linux; Wind River Workbench; Wind River General Purpose Platform, Linux Edition; or Wind River Platform for Network Equipment, Linux Edition

Course title:	**Introduction to Linux**
Duration:	Four days
Format:	Instructor-led lectures and hands-on lab sessions; instructor-led Live Remote delivery available
Content:	**Day 1:** Linux in Embedded Systems; Developing Embedded Linux Applications; The Role of the Root File System, File System Hierarchy, Busybox, Building or Acquiring a RootFS
	Day 2: Understanding the Linux Memory Model
	Day 3: Understanding the Linux Memory Model (cont'd); Using Linux in Your Application
	Day 4: Using Linux in Your Application (cont'd); Networking in Linux; Fielding and Managing an Embedded Linux System

- New project members on teams already using Linux
- Managers who want to get a quick understanding of Linux
- Senior engineers who want to evaluate Linux and/or Wind River Linux technology

PREREQUISITE SKILLS

- Basic understanding of operating systems and debugging techniques
- Functional knowledge of Linux
- One year of C or C++ programming experience on Linux/UNIX

PREREQUISITE COURSES

- None

WHEN IT MATTERS, IT RUNS ON **WIND RIVER**

SYLLABUS

Day 1

LINUX IN EMBEDDED SYSTEMS

- Linux introduction
- Leveraging open source
- The GPL and your IP

DEVELOPING EMBEDDED LINUX APPLICATIONS

- Top considerations before starting Linux projects (Linux distributions; Linux development environment and tools)
- Root file system (introduction of Linux file systems)

THE ROLE OF THE ROOT FILE SYSTEM, FILE SYSTEM HIERARCHY, BUSYBOX, BUILDING OR ACQUIRING A ROOTFS

- Linux kernel (Linux architecture; understanding the kernel version; kernel configuration tools; configuring the kernel)
- Booting your target (host preparation; Linux boot sequence; the role of the boot loader)

Day 2

UNDERSTANDING THE LINUX MEMORY MODEL

- Memory management in Linux (virtual memory model; how Linux uses the memory management unit (MMU))
- Kernel space review (kernel and scheduling policies, kernel modules; overview of device drivers; exception handling; interrupt handling; deferred functions—softirq, tasklet, bottom half)
- User space (Linux processes and threads)

Day 3

UNDERSTANDING THE LINUX MEMORY MODEL (CONT'D)

- User space (daemons and servers; static libraries; shared libraries; dynamic linking library)
- Kernel to user space interface (I/O system; network interfaces; /proc and /sys file systems)

USING LINUX IN YOUR APPLICATION

- Inter-process communication (IPC) and synchronization (shared memory; semaphores; message queues; pipes; UNIX-domain sockets; signals)

- Linux timers (absolute time; user space timers and alarms; kernel space timers)

Day 4

USING LINUX IN YOUR APPLICATION (CONT'D)

- File systems (file system buffers; journaling file systems; disk-oriented file systems; flash file systems; network-based file systems)
- 2.4 vs. 2.6 kernel features

NETWORKING IN LINUX

- Linux network stack and data flow
- Linux protocol support
- Getting connected options (web servers; web browsers; etc.)

FIELDING AND MANAGING AN EMBEDDED LINUX SYSTEM

- System initialization and maintenance
- Configuration and network setup
- Fielding a Linux system
- Securing your target

RELATED COURSES

- Workbench for Wind River Linux
- Wind River Linux and Workbench Essentials
- Wind River Linux Application Development
- Linux Device Drivers
- RTOS to Linux Migration Essentials

GLOBAL REACH OF WIND RIVER EDUCATION SERVICES

With more than 30 years of device software experience, Wind River provides education services in every region of the world. Our private classes can be tailored to your needs by adding or removing topics from multiple courses. If you have more specific project challenges, Wind River Mentoring provides coaching by experienced engineers to help you integrate Wind River solutions into your environment. And when you're too busy to attend a whole class, our On-Demand Learning options provide around-the-clock access to advanced and specialized topics. All of our education services are led by expert engineers who are closely connected to the Wind River technical community for access to specific expertise.

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CONTACT US

For more information about Wind River Education Services, visit www.windriver.com/education/.

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