



MICROSOFT TRAINING

Comprehensive Rust Embedded Systems Course

Master Rust for embedded systems development. Create efficient, reliable, and secure hardware applications.

DURATION

2 hours

LEVEL

Intermediate

FORMAT

Instructor-Led

-
- Globally Recognized Certification
 - Expert-Led Hands-On Training
 - Flexible Scheduling

Computer Pride | 1st Floor, ICEA Building, Kenyatta Avenue, Nairobi | www.computer-pride.co.ke

COURSE OVERVIEW

Unlock the power of Rust for embedded systems development with Computer Pride's Comprehensive Rust Embedded Systems Course, designed for intermediate-level professionals. This intensive 2-hour program, leveraging Microsoft's expertise, dives deep into the Rust programming language's unique features that make it ideal for resource-constrained environments: memory safety without a garbage collector, fearless concurrency, and bare-metal programming capabilities. You'll gain hands-on experience with foundational embedded concepts, understanding how to interact directly with hardware, manage low-level resources, and build robust, high-performance applications critical for modern IoT devices, industrial control systems, and specialized hardware.

This course is meticulously crafted to equip you with practical skills in setting up Rust development environments for embedded targets, writing efficient and safe firmware, and debugging embedded Rust applications. By mastering Rust for embedded systems, you will not only enhance your technical proficiency but also position yourself at the forefront of a rapidly evolving technological landscape. The benefits extend beyond just coding; you'll learn to architect more reliable systems, reduce common errors found in traditional embedded languages, and contribute to projects demanding high integrity and performance, ultimately boosting your career prospects in specialized hardware and IoT domains.

Duration	2 hours
Level	Intermediate
Vendor	Microsoft

COURSE CURRICULUM

01 Module 1: Introduction to Rust for Embedded Systems

- Why Rust for Embedded: Safety, Performance, Concurrency
- Rust Fundamentals Review: Ownership, Borrowing, Lifetimes
- Setting up the Embedded Rust Toolchain (rustup, target triples, cross-compilation)
- Introduction to ``no_std`` and Bare-Metal Programming

02 Module 2: Hardware Interaction and Memory Management

- Understanding Microcontroller Peripherals (GPIO, UART, SPI, I2C)
- Register-Level Programming with ``svd2rust``
- Memory-Mapped I/O and Volatile Access
- Safe Memory Abstractions: Arrays, Slices, and Fixed-Size Buffers

03 Module 3: Concurrency and Asynchronous Programming

- Interrupts and Exception Handling in Embedded Rust
- Real-Time Operating Systems (RTOS) Concepts and Integration (e.g., ``RTIC`` or ``embassy``)
- Building Asynchronous Embedded Applications
- Shared State Management and Mutexes in ``no_std``

04 Module 4: Embedded Rust Project Development

- Using Cargo for Embedded Projects: Dependencies and Features
- Debugging Embedded Rust Applications (OpenOCD, GDB, VS Code Integration)
- Unit Testing and Integration Testing for Embedded Code
- Project Structure and Best Practices for Maintainable Embedded Rust Firmware

CAREER PATHWAYS

Graduates of this program are prepared for the following roles:

- > **Embedded Systems Engineer (Rust Specialist)**
- > **IoT Firmware Developer**
- > **Hardware Abstraction Layer (HAL) Software Engineer**

FREQUENTLY ASKED QUESTIONS

Q: What specific skills will I gain that are directly applicable to embedded systems development using Rust?

This course will equip you with the ability to set up a complete Rust embedded development environment, write ``no_std`` compliant code for bare-metal microcontrollers, safely interact with hardware peripherals at a low level using register access and HALs, implement robust concurrency patterns with interrupts and RTOS features, and effectively debug and test embedded Rust applications, all while leveraging Rust's memory safety guarantees.

Q: What are the prerequisites for enrolling in the Comprehensive Rust Embedded Systems Course?

Participants should have an intermediate understanding of the Rust programming language, including concepts like ownership, borrowing, traits, and generics. Prior basic experience with microcontrollers or embedded systems concepts (e.g., C programming for Arduino, understanding GPIO) would be beneficial but is not strictly mandatory, as the course will cover essential embedded fundamentals.

Q: How does this course enhance my career prospects in the competitive field of IoT and specialized hardware development?

By completing this course, you will become proficient in a highly sought-after skill set: developing secure, performant, and reliable embedded software with Rust. This expertise is critical for roles in cutting-edge IoT product development, automotive electronics, aerospace systems, and industrial automation, distinguishing you as a professional capable of tackling complex, high-integrity embedded challenges with a modern, memory-safe language.

ABOUT COMPUTER PRIDE



East Africa's Premier IT Training Center

With over 15 years of excellence, Computer Pride delivers globally recognized certification programs from leading technology vendors. Located on Kenyatta Avenue in Nairobi's CBD, our state-of-the-art facilities and expert instructors have empowered thousands of professionals across East Africa.

15+

Years of Excellence

10,000+

Professionals Trained

50+

Vendor Certifications

READY TO ENROL?

Take the next step in your technology career.

Location

1st Flr, ICEA Building
Kenyatta Ave, Nairobi

Email

info@computer-pride.co.ke

Phone

+254 705 900 900

www.computer-pride.co.ke