



MICROSOFT TRAINING

Software Engineering Basics Embedded Systems Lfs116

Learn core software engineering principles for embedded systems with LFS116. Build a strong foundation in developing efficient, reliable embedded solutions.

DURATION

8 Hours

LEVEL

Intermediate

FORMAT

Instructor-Led

- Globally Recognized Certification

- Expert-Led Hands-On Training

- Flexible Scheduling

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COURSE OVERVIEW

The "Software Engineering Basics Embedded Systems Lfs116" course is designed to equip intermediate-level learners with the fundamental principles and practical skills necessary for developing robust and efficient software for embedded systems. This comprehensive program delves into the unique challenges of programming hardware-constrained environments, focusing on the core software engineering methodologies essential for creating reliable embedded applications. Participants will learn how to bridge the gap between hardware and software, understanding the intricacies of real-time operation, memory management, and power optimization critical in modern embedded device development. This course empowers you to build the foundational expertise required to contribute to the rapidly expanding world of connected devices, IoT, and specialized industrial applications.

Throughout the course, you will engage with critical technologies and concepts, including microcontroller architectures, low-level programming (often in C/C++), hardware-software interfacing (GPIO, SPI, I2C), and the fundamentals of Real-Time Operating Systems (RTOS). While the course focuses on foundational basics, it subtly integrates a perspective aligned with industry best practices, preparing you for more advanced topics in the Microsoft embedded ecosystem. Mastering these skills provides significant professional benefits, enabling you to design, develop, and debug software for a diverse range of embedded products, enhancing your value in a competitive tech landscape.

Duration	8 Hours
Level	Intermediate
Vendor	Microsoft

COURSE CURRICULUM

01 Module 1: Introduction to Embedded Systems and Software Engineering

- Defining Embedded Systems: Characteristics and Applications
- Challenges of Embedded Software Development (Resource Constraints, Real-time)
- Software Engineering Lifecycle for Embedded Systems
- Overview of Microcontroller Architectures (ARM Cortex-M)
- Introduction to C/C++ for Embedded Programming

02 Module 2: Hardware-Software Interface and Peripherals

- Memory Map and Organization (Flash, RAM, Registers)
- General Purpose Input/Output (GPIO) Control
- Interrupts and Exception Handling
- Timers, Counters, and Pulse Width Modulation (PWM)
- Serial Communication Protocols (UART, SPI, I2C)

03 Module 3: Real-Time Operating Systems (RTOS) Fundamentals

- Concepts of Concurrency and Multitasking
- Introduction to RTOS: Tasks, Scheduling, and Priorities
- Synchronization Mechanisms: Semaphores, Mutexes, Events
- Inter-Task Communication: Queues, Mailboxes, Pipes
- Basic RTOS Porting and Configuration (Conceptual Overview)

04 Module 4: Debugging, Testing, and Optimization Techniques

- Embedded Debugging Tools and Methodologies (JTAG/SWD)

- In-Circuit Debugging and Emulation
- Unit Testing and Integration Testing for Embedded Software
- Code Optimization for Performance and Memory Footprint
- Power Management and Low-Power Design Strategies

05 Module 5: Embedded Networking and System Integration

- Introduction to Network Stacks for Embedded Devices
- Basic IoT Connectivity Protocols (e.g., MQTT, HTTP basics)
- Sensor and Actuator Interfacing Best Practices
- Error Handling and Robust Software Design
- Firmware Updates Over-the-Air (FOTA) Concepts

CAREER PATHWAYS

Graduates of this program are prepared for the following roles:

- > **Junior Embedded Software Engineer**
- > **IoT Device Firmware Developer**
- > **Hardware-Software Integration Specialist**

FREQUENTLY ASKED QUESTIONS

Q: What foundational programming skills are recommended before enrolling in the Software Engineering Basics Embedded Systems Lfs116 course?

This intermediate-level course assumes a solid grasp of fundamental programming concepts, particularly in C or C++. Familiarity with data structures, algorithms, and basic understanding of computer architecture will significantly benefit your learning experience, as the course quickly moves into hardware-software interaction and low-level development paradigms.

Q: Will this course cover practical hands-on projects, and what kind of embedded hardware will be utilized to demonstrate concepts?

Yes, the Software Engineering Basics Embedded Systems Lfs116 curriculum is heavily focused on practical application. Participants will engage in hands-on labs and projects, typically utilizing popular microcontroller development boards (e.g., ARM Cortex-M based boards). These practical exercises are designed to solidify your understanding of hardware interfacing, RTOS implementation, and debugging techniques in a real-world embedded context.

Q: How does the 'Lfs116' curriculum specifically address real-time constraints and resource optimization critical for embedded systems development?

The 'Lfs116' curriculum dedicates significant attention to real-time constraints and resource optimization. Modules cover Real-Time Operating Systems (RTOS) fundamentals, including task scheduling, inter-task communication, and synchronization to manage time-critical operations. Additionally, dedicated sections on debugging, profiling, and code optimization techniques are included to teach participants how to write efficient code, manage memory, and minimize power consumption in resource-constrained embedded environments.

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+

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READY TO ENROL?

Take the next step in your technology career.

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