MICRO CONSULT

Stand 09.02.2026

Embedded C Training: Programming Methods and Tools for Embedded Applications - Live Online Training

This training focuses on the hardware-near C-programming of 8, 16 or 32 bit microcontroller architectures. It shows you how to identify and avoid the pitfalls of C programming .You learn how to program a HW abstraction layer according to an architecture model. Operating system mechanisms and services are explained by programming a scheduler. You get an overview of the whole lifecycle of a product - from the idea to project planning, software development process, test planning, quality planning, acceptance, commissioning, operation and decommissioning.

Ziele -
Ihr Nutzen

This training focuses on the hardware-near C-programming of 8, 16 or 32 bit microcontroller architectures.

You learn how to program a HW abstraction layer according to an architecture model. OS mechanisms and services are explained by programming a scheduler.

You get an overview of the entire lifecycle of a product - from the idea to project planning, SW development process, test planning, quality planning, acceptance, commissioning, operation and decommissioning.

You are able to efficiently develop programs for an embedded system in "C" according to the guidelines of modernsoftware engineering.

You are familiar with using pointers, function pointers and structures.

Based on your knowledge of programming/coding guidelines and software quality features, functional and non-functional requirements as well as internal quality and generate software that is reusable, extendable and easily tested.

In addition, you know all stages of a software development process, from the idea to system acceptance.

Teilnehmer

Software developers, software architects

Voraussetzungen

A good understanding of ANSI-C and microcontroller architectures.

Live Online Training

16.03. – 19.03.2026	2.400,00 €	4 Tage
20.07. – 23.07.2026	2.400,00 €	4 Tage

* Preis je Teilnehmer, in Euro zzgl. USt.

Anmeldecode: LE-EMB-C

Präsenz-Training - Englisch

Dauer
4 Tage

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Live-Online - Deutsch

Termin	Dauer
16.03. – 19.03.2026	4 Tage
20.07. – 23.07.2026	4 Tage

Präsenz-Training - Deutsch

Termin	Dauer
12.10. – 15.10.2026	4 Tage

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Inhalt

Introduction

- ANSI-C
- Embedded systems and their specifics
- Software toolchain
- Software architecture
- Debug features and bugs

Programming Language C for Embedded

- Hardware-near programming
- Data types
- Pointers, function pointers
- Structures, linked lists
- Circular buffer, queue, FIFO, LIFO
- Programming rules and guidelines
- Pitfalls and stumbling blocks in C

Driver Programming

- Selecting a suitable SW architecture
- HW abstraction, object-based programming
- Access to HW registers from "C"
- Interfaces, callback interfaces, queues
- Interrupt handling /service routines, callback function
- Exercises: Timer hardware abstraction plus callback

Using Pointers, Function Pointers and Linked Lists

- Programming example - scheduler
- Task management with linked lists
- Exercises: Programming a task management

Real-Time Operating Systems (RTOS) - Overview

- Types, services, selection criteria
- Function and programming of a scheduler
- Exercises: Task switch

Library Management

- Adapting standard library functions to hardware
- Generating and managing user libraries
- Exercise: Generating and integrating a library

Locating Code and Files in the (µC) Memory (Flash, RAM Address Space)

- Logical sections (.text, .data, .bss) in the build process
- Load and run addresses
- Controlling the linker through command files

Finite State Machines, FSM

- Descriptions and representation variants
- Philosophy and implementation of an FSM in C

- Exercises: Programming a traffic light control

Aspects of Embedded Software Engineering

- Software quality criteria
- Software development process models (Waterfall, V, agile)
- Functional safety
- Requirements engineering
- Verification and test
- Capability maturity models

Outlook: OOP Techniques

- Advantages and challenges of object oriented programming
- UML diagrams

Coding Guidelines

- Purpose
- MISRA-C directives and rules

MicroConsult Plus: Extensive Exercises on a Target Hardware

- The hands-on exercises are performed and tested using the Keil µVision IDE and Arm compiler on an M0-based 32-bit hardware platform.