Publication date : 06/05/2024

Course : C++ expert, language advances (from C++ 11 to 20)

Practical course - 3d - 21h00 - Ref. VEC
Price : 1650 € E.T.

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BEST

This course will enable you to assimilate the new features introduced by the new C++ standards. You'll cover the possibilities of functional programming, master memory management with smart pointers and exploit the other new features of the C++ standard library.

Teaching objectives

At the end of the training, the participant will be able to:

- Understand the new features and improvements of the C++ language
- Using lambda expressions
- Improving performance with displacement semantics
- Mastering object allocation-destruction with smart pointers
- Developing a multithreaded application

Intended audience

C++ developers wishing to learn about the new features defined by the C++11 standard.

Prerequisites

Good knowledge of the C++ language. Practical experience of programming with this language is recommended.

Practical details

Hands-on work

Practical programming exercises will help you grasp the various concepts covered.

Course schedule

PARTICIPANTS

C++ developers wishing to learn about the new features defined by the C++11 standard.

PREREQUISITES

Good knowledge of the C++ language. Practical experience of programming with this language is recommended.

TRAINER QUALIFICATIONS

The experts leading the training are specialists in the covered subjects. They have been approved by our instructional teams for both their professional knowledge and their teaching ability, for each course they teach. They have at least five to ten years of experience in their field and hold (or have held) decision-making positions in companies.

ASSESSMENT TERMS

The trainer evaluates each participant's academic progress throughout the training using multiple choice, scenarios, hands-on work and more.
Participants also complete a placement test before and after the course to measure the skills they've developed.

1 The advent of C++11

- The various standards C++98, C++03, C++11=, C++14, C++17, C++20.
- What's new in C++11 and the objectives of this standard. The future of Boost, STL.
- The question of the compatibility of older codes.
- Availability of development tools (compilers, debuggers, IDEs, etc.).

Hands-on work
Checking tooling with a supplied C++11 code.

2 Language enhancements

- Strongly typed enums.
- The auto keyword and decltype to simplify typing.
- The interval-based loop.
- Constexpr for compile-time evaluation.
- Variadic templates, C++20 saucer concepts...
- Coroutines de C++20.
- C++20 modules.

Hands-on work
Implementation of improvements.

3 Classroom modifications

- Constructor delegation and inheritance constraints.
- The new move semantics and the move constructor.
- The override, final =delete, =default directives.
- Module concept C++20

Hands-on work
Class creation.

4 Functional programming with lambda expressions

- Declaration, typing, implementation and use.
- Auto's interest in lambda-expressions.
- Closure management, with capture by value or by reference of context variables.

Hands-on work
Functional programming exercises.

5 Using threads

- Declaring and executing a thread. Waiting for end of execution with join().
- Managing thread-local data.
- Recover a result with future<> and async().
- Choose from different STL locks.

Hands-on work
Multithread sequential code and measure the gain in execution time.

TEACHING AIDS AND TECHNICAL RESOURCES

• The main teaching aids and instructional methods used in the training are audiovisual aids, documentation and course material, hands-on application exercises and corrected exercises for practical training courses, case studies and coverage of real cases for training seminars.
• At the end of each course or seminar, ORSYS provides participants with a course evaluation questionnaire that is analysed by our instructional teams.
• A check-in sheet for each half-day of attendance is provided at the end of the training, along with a course completion certificate if the trainee attended the entire session.

TERMS AND DEADLINES

Registration must be completed 24 hours before the start of the training.

ACCESSIBILITY FOR PEOPLE WITH DISABILITIES

Do you need special accessibility accommodations? Contact Mrs. Fosse, Disability Manager, at psh-accueil@orsys.fr to review your request and its feasibility.

6 Other new features in the standard library

- Ranges with std::view for on-the-fly evaluation of C++20.
- Time management with the chrono namespace.
- The new tuple container.
- Hash-based unordered_set and unordered_map containers.
- String formatting with C++20.

Hands-on work
Implementing new features.

7 Memory management and containers

- Smart pointers: shared_ptr, weak_ptr, unique_ptr. Joint use with STL.

Hands-on work
Implementation of C++11 memory management.

Dates and locations

REMOTE CLASS
2026 : 17 Feb., 30 Mar., 18 May, 19 May, 29 Sep., 12 Oct., 27 Oct., 9 Dec.

PARIS LA DÉFENSE
2026 : 30 Mar., 18 May, 12 Oct., 9 Dec.