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# Course : C programming, advanced

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

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This course enables you to deepen and broaden your knowledge of the C language. Through a wide range of exercises, you'll learn about the advanced aspects of pointers, recursion, the major changes brought about by the C11 standard and object-oriented programming.

## Teaching objectives

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

- Handling pointers, function pointers and language-integrated libraries
- Master recursive data structures and their intrinsic algorithms
- Use development tools associated with the C language
- Master object-oriented developments and major additions to the C11 standard

## Intended audience

Designers, developers.

## Prerequisites

Good knowledge of the C language or knowledge equivalent to that acquired in the course "Programming in C" (ref. LGC).

## Course schedule

### 1 Pointers and arrays

- Reminders about pointers and arrays, and the differences and similarities between the two.
- The three arguments to the main() function, environment variables.
- Multi-index tables.
- Function pointer, array of function pointers.
- Dynamic allocation identified by pointers.

**Hands-on work**

Development of pointer-intensive programs.

**PARTICIPANTS**

Designers, developers.

**PREREQUISITES**

Good knowledge of the C language or knowledge equivalent to that acquired in the course "Programming in C" (ref. LGC).

**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.

## 2 Function libraries

- Standard language libraries: ctype.h, math.h, stdlib.h, time.h... and others.
- Advanced mathematics libraries: Linpack, Lapack.
- Dynamic allocation management: calloc(), realloc() functions.
- Functions with a variable number of arguments, both existing and created by the programmer.

### Hands-on work

Use of several function libraries.

## 3 Recursivity

- Defining recursion.
- Recursive functions.
- Recursive data structures: lists, trees.
- Intrinsic algorithms for recursive data structures (insertion, removal, etc.).

### Hands-on work

Creation of a library for handling recursive data.

## 4 Development tools for the C language

- Troubleshooting programs: the debugger.
- Dependency management tools: make and touch.
- Dynamic program analysis: the profiler.
- Testing tools: CUnit.

### Hands-on work

Use of development tools for the C language.

## 5 From C to object-oriented programming

- Definitions of object-oriented concepts: object, encapsulation, class, inheritance, polymorphism.
- Object-oriented domains handled with the C language.
- From C to C++.
- From C to Java.

### Hands-on work

Object-oriented design using the C language.

## 6 Advanced aspects of the C11 standard

- Multi-threading.
- Anonymous structures and unions.
- Generic functions.
- Unicode encoding management.
- Rewrite certain functions, check data sizes.

### Hands-on work

Use of concepts added by the C11 standard.

**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.

## Dates and locations

**REMOTE CLASS**
2026 : 10 June, 7 Sep.

**PARIS LA DÉFENSE**
2026 : 10 June, 7 Sep.