

# Advanced C++ programming

A 5 day **Hands on** training course



## Description

The course will give a broad overview of the C++ Programming language, focusing on modern C++, up to C++17. This course will cover the use of the Standard Library, including containers, iterator, function objects and algorithms. From the perspective of application development, a number of design patterns will be considered.



## Key outcomes

By the end of the course delegates will be able to:

- ✓ Write C++ programs using the more esoteric language features.
- ✓ Utilise OO techniques to design C++ programs.
- ✓ Use the standard C++ library.
- ✓ Exploit advanced C++ techniques.



## Training Approach

This structured course uses Instructor Led Training to provide the best possible learning experience. Small class sizes ensure students benefit from our engaging and interactive style of teaching with delegates encouraged to ask questions throughout the course. Quizzes follow each major section allowing checking of learning. Hands on sessions are used throughout to allow delegates to consolidate their new skills.



## Details

### Who will benefit?

Programmers needing to write C++ code.  
Programmers needing to maintain C++ code.

### Prerequisites

C++ programming foundation

**Duration:** 5 days

**Overall rating:**



### Generic Training



Generic training complements product specific courses covering the complete picture of all relevant devices including the protocols "on the wire".

*"Friendly environment with expert teaching that teaches the why before the how."*

G.C. Fasthosts

### Small Class Sizes



We limit our maximum class size to 8 delegates; often we have less than this. This ensures optimal interactivity between delegates and instructor.

*"Excellent course. The small class size was a great benefit..."*

M.B. IBM

### Hands On Training



The majority of our courses use hands on sessions to reinforce the theory.

*"Not many courses have practice added to it. Normally just the theoretical stuff is covered."*

J.W. Vodafone

### Our Courseware



We write our own courses; courseware does not just consist of slides and our slides are diagrams not bullet point text.

*"Comprehensive materials that made the course easy to follow and will be used as a reference point."*

V.B. Rockwell Collins

### Customise Your Course



Please contact us if you would like a course to be customised to meet your specific requirements. Have the course your way.

*"I was very impressed by the combination of practical and theory. Very informative. Friendly approachable environment, lots of hands on."*

S.R. Qinetiq

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## Course Content

### Study of a string class

Create a string class as a means to investigate many issues, involving the use of operator overloading and including overloading new and delete. Creation of the class will also require consideration of 'const correctness'.

### Exception handling

Consider the issues involved in exception handling including the concept of exception safety.

### Templates

Review definition of template functions, including template parameter type deduction. Introduction to template metaprogramming. Newer features including template template parameters and variadic templates. Creation of template classes.

### Design patterns

Introduction to Design Patterns and consideration of a number of patterns, such as, factory method, builder, singleton and adapter.

### The standard C++ library (STL)

Standard Library features, such as, Containers, Iterator, Function Objects and Algorithms. Introduction to Lambda expressions.

### C++ and performance

The writing of code throughout the course will be oriented towards performant code, including use of R Value references and 'move' semantics.

### Pointers

The use of pointers will be considered throughout the course. Smart pointers will be considered to improve program safety and help avoid the use of 'raw' pointers.

### Threading

This section will consider the creation of threads and synchronisation issues. A number of synchronisation primitives will be considered. Async and the use of Atomic will also be considered.

### New ANSI C++ features

Summarising some of the newer features to be considered are:  
Auto, Lambdas expression, smart pointers, variadic templates and folds, R Value references and tuple together with structured binding.

## What our customers say

*"Absolutely brilliant, very knowledgeable and helpful trainer would recommend to teach anyone. Kept me interested 100% of the time which is very impressive as this does not happen often, if at all!"*

O. B. Network Rail

*"The best technical course I've been on!"*

L. W. Fujitsu Telecoms Europe

*"Very well thought out and structured course. Would recommend 100%. Lots of equipment, good quality."*

A.R. Unipart

*"Course content is interesting. Relevant to current systems and presented well."*

S.S-T. Arqiva

