Course Name: Modern C++

Unit code: (filled by Unige administrative office)

Scientific Disciplinary Sector: ING-INF/05 / ING-INF/06

Number of hours: 30

Credits: 10

AIMS AND CONTENT

Learning Outcomes (short)

The students will learn the new syntax and philosophy of Modern C++ (releases C++11, -14, -17, -20) with hands on the code at every lesson.

Learning Outcomes (further info)

The course has been renewed by adding the latest new features, hands-on sessions, and useful tools we daily use for our robots in iCub Tech at IIT. The students will learn the latest modern C++ syntax, its application with modern SW development techniques and finally they will challenge themselves with an online assignment where they will put in practice what learnt.

Syllabus/Content

Each of the following modules will be 3.0 hours each with theory and hands-on

1. Introduction 1: presentation of the course, basics of used tools (CMake, gitpod, git, Markdown, etc).
2. Introduction 2: refresh of C++98.
3. The basics 1: nullptr, auto, type aliases, initializer list, uniform initialization
4. The basics 2: range based loops, constexpr, scoped enums, override and final.
5. Advanced topics 1: lambda functions, STL containers, algorithms
6. Advanced topics 2: move semantics, smart pointers.
7. Advanced topics 3: multithread.
8. Advanced topics 4: new features in C++20
9. Language applied 1: hands on code.
10. Language applied 2: Critic discussion and correction of the code assignment.

WHO

Teacher(s):

Marco Accame (coordinator): +39 010 2898201, marco.accame@iit.it

Valentina Gaggero (valentina.gaggero@iit.it), Nicolo' Genesio (nicolo.genesio@iit.it), Davide Tome' (davide.tome@iit.it).

HOW

Teaching Methods:

Slides with code examples, hand on code using gitpod or other environment (each student needs a laptop), open discussion and questions.

Exam Description:

An online assignment with some questions and development of a simple project using what learned during the course. The goal of the assignment is not to check if a student know by heart some coding syntax, but to learn how to design an present a piece of work.

Assessment Methods:

To be admitted to the online assignment the student must have attended at least 7 lessons. The assessment is passed if the developed code compiles, produces reasonable results and a simple report is presented.

WHERE AND WHEN

Lesson Location

IIT-CRIS (Center for Robotics and Intelligent Systems), Via San Quirico 19D, 16163 Genova, Italy

Or remotely through Teams platform in case of impossibility to attend in person.

Lesson Schedule

1. Introduction 1: on **30 May 2023**, 1400-1700
2. Introduction 2: on **31 May 2023**, 1400-1700
3. The basics 1: on **1 June 2023**, 1400-1700
4. The basics 2: on **13 June 2023**, 1400-1700
5. Advanced topics 1: on **20 June 2023**, 1400-1700
6. Advanced topics 2: on **21 June 2023**, 1400-1700
7. Advanced topics 3: on **22 June 2023**, 1400-1700
8. Advanced topics 4: on **26 June 2023**, 1400-1700
9. Language applied 1: on **27 June 2023**, 1400-1700
10. Language applied 2: on **28 June 2023**, 1400-1700

The assignment will be revealed during the course. The students will have some time to complete it and solutions will be critically discussed during the last day of the course.

Office hours for student

0900-1700 Monday to Friday.

CONTACTS

Place: First floor of IIT-CRIS (Center for Robotics and Intelligent Systems), Via San Quirico 19D, 16163 Genova, Italy.

Preferred interaction modes:

- email with subject beginning with the string "[MODERN-C++]" so that your email can be filtered out and immediately spotted.
- Teams platform after arranged appointment.
- Face to face.