CERN Offers Free Online Course on Quantum Computing: All You Need to Know

CERN is conducting free online course on quantum computing that can be taken by anyone without previous knowledge of quantum physics

CERN is conducting a free online course on the basics of quantum computing that can be taken by anybody who is interested to learn about the subject. A series of weekly lectures on the subject will be broadcast through webcast starting from 6 November 2020. New lectures delivered by Elias Fernandez-Combarro Alvarez, an associate professor in the Computer Science Department at the University of Oviedo in Spain since 2009 and a cooperation associate at CERN, will be broadcast on every Friday for the next seven weeks.

The talks will focus on the practical aspects of quantum computing and are organised by CERN openlab and the CERN Quantum Technology Initiative. There are no prerequisites to take the course, and even participants with no knowledge of quantum physics can take the course. However, a good command of basic linear algebra is required. While some familiarity with the Python programming language would be helpful, it is not mandatory.

What Will be Taught in the CERN Free Online Course on Quantum Computing?

Participants of the course will get to learn the following aspects during the next seven weeks:

- Basic concepts of the quantum circuit model such as qubits, gates and measures will be introduced.
- Important quantum algorithms and protocols, including those that can be implemented with a few qubits likeBB84, quantum teleportation, and superdense coding, among others will be spoken about.
- Quantum algorithms that require multi-qubit systems such as Deutsch-Jozsa, Grover, Shor, and so on will also be introduced during the course.
- Recent applications of quantum computing in the fields of optimisation and simulation will be addressed. Special emphasis will be paid on the use of quantum annealing, the quantum approximate optimisation algorithm and the variational quantum eigensolver along with quantum machine learning.
- Examples of how these techniques can be used in chemistry simulations and high-energy physics problems will also be provided.