Course unit English denomination	**Object-Oriented Programming for Engineers**
SS	
Teacher in charge (if defined)	Mazzucco Gianluca Janna Carlo Pomaro Beatrice
Teaching Hours	24
Number of ECTS credits allocated	4
Course period	January February 2026
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	Italian / English
Mandatory attendance	☐ Yes (…% minimum of presence) ☒ No
Course unit contents	The doctoral course aims to develop the student's ability to solve engineering problems through writing appropriate algorithms within the scope of object-oriented programming. The course will be divided into theoretical lessons, where the main aspects of object-oriented programming will be explained, and practical lessons conducted in the computer lab, where students will be guided in developing applications of engineering interest. Python will be used as the reference language. The course includes 24 hours of lectures. The main topics covered will be: - Using Python from the command line - Creating virtual environments from the command line - Using Integrated Development Environments (IDEs) such as Visual Studio Code and PyCharm - Introduction to the Python language: definition of basic structures (integers, floats, strings, lists, tuples, dictionaries, etc.) - Flow control: if, elif, else, etc. - Iterations with loops: for, while, etc. - Function definition - Object-oriented programming: class definition, properties, and methods. Concepts of inheritance, polymorphism, and overloading - Using common Python libraries such as NumPy, pandas, matplotlib, etc. - Development of practical examples in the computer lab.

Learning goals	The objectives of the course are to provide doctoral students with basic knowledge of programming in the scientific field, with particular emphasis on object-oriented programming and its advantages over a procedural approach.
Teaching methods	Lecture and hands-on sessions in the computer lab.
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	
Examination methods (if applicable)	Project to be developed on the topics covered during the course.
Suggested readings	Lecture notes; educational materials provided on the course's Moodle platform; some texts available from the university's online catalog, Galileo Discovery.
Additional information	