



Course unit English denomination	Object-Oriented Programming for Engineers
Teacher in charge (if defined)	Gianluca Mazzucco Carlo Janna Beatrice Pomaro Andrea Franceschini
Teaching Hours	24
Number of ECTS credits allocated	4
Course period	January – February
Course delivery method	<input checked="" type="checkbox"/> In presence <input type="checkbox"/> Remotely <input type="checkbox"/> Blended
Language of instruction	Italian / English
Mandatory attendance	<input checked="" type="checkbox"/> Yes (60 % minimum of presence) <input type="checkbox"/> No
Course unit contents	<p>The doctoral course aims to develop the student's ability to solve certain engineering problems through the writing of appropriate algorithms within the context of object-oriented programming.</p> <p>The course will be divided into theoretical lessons, where the main aspects of object-oriented programming will be explained, and practical lessons held in a computer lab, where students will be guided in developing some applications of engineering interest.</p> <p>Python will be used as the reference language.</p> <p>The course consists of 24 hours of face-to-face lessons.</p> <p>The main topics covered will be:</p> <ul style="list-style-type: none">- Using Python from the command line (Windows OS)- Creating virtual environments from the command line (Windows OS)- Using Integrated Development Environments (IDEs) such as Visual Studio Code and PyCharm- Introduction to Python language; definition of basic structures: integers, floats, strings, lists, tuples, dictionaries, etc.- Flow control: if, elif, else, etc.- Loops: for, while, etc.- Function definitions- Object-oriented programming: definition of classes, properties, and methods. Concepts of inheritance, polymorphism, and overloading.- Use of common libraries in Python 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 a scientific context, with particular emphasis on object-oriented programming and its advantages over a procedural approach.



Teaching methods	Classroom lecture and lessons in the computer lab.
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Course on transversal, interdisciplinary, transdisciplinary skills	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
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Available for PhD students from other courses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
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Prerequisites (not mandatory)	No.
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Examination methods (in applicable)	The project to be developed is related to the topics covered during the course.
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Suggested readings	Lecture notes; educational material provided on the course's Moodle platform; some texts available from the University's online catalog, Galileo Discovery.
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Additional information	
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