

Programação e Algoritmia

The course

❖ 41932

❖ Links:

– <https://www.ua.pt/pt/uc/15178>

❖ Objectives

The objectives are to introduce the **object-oriented** programming paradigm, using the Python language, and **data and file structures** used in typical problems in science and engineering and to be able **to develop programs** to solve these problems.

❖ Learning outcomes

1. Understand the object-oriented programming paradigm as well as its implementation in Python language.
2. Choose the appropriate file types and data structures for a given problem.
3. Develop programs to solve real-world problems using an object-oriented solution decomposition.
4. Use and combine suitable software modules to solve typical problems in science and engineering.

Teaching Team

- ❖ António Joaquim da Silva Teixeira (ajst@ua.pt)
 - Regent
 - TP01
 - Practical
- ❖ Joaquim Arnaldo Martins
 - TP02
 - Practical
- ❖ João Manuel Rodrigues
 - Practical

Students

Curso	Ciclo	Obrigatoriedade	Ano
8314 - Licenciatura em Engenharia e Gestão Industrial	1º	Obrigatória	1º
8307 - Mestrado Integrado em Engenharia e Gestão Industrial	1º	Obrigatória	1º
8220 - Licenciatura em Matemática	1º	Obrigatória	1º
8225 - Licenciatura em Novas Tecnologias da Comunicação	1º	Opcional	2º
8258 - Licenciatura em Física	1º	Opcional	2º

Contents

- ❖ Part 1: Object-Oriented Programming
 - Classes and objects, inheritance, polymorphism
- ❖ Part 2: Data Representation
 - Data structures
 - File formats (Tabular formats, JSON and XML)
 - Modules for import/export of data
- ❖ Part 3: Problem solving
 - Object-oriented analysis and design
 - Use of engineering modules (eg numpy, pyplot, pandas, SciPy, opencv, scikit-learn)
- ❖ Part 4: Application examples

Assessment

❖ Discrete evaluation with 2 components

1. Theoretical-Practical Component (CTP) / Teórico-Prática (CTP)

- 1 exam (ETP) with TP exercises
- 30% of the final grade

2. Practical Component (CP) / Componente Prática (CP)

- 70% of the final grade (minimum of 7).
- Composed by:
 - 1 practical Exam (EP) [40 %]
 - Continuous Evaluation (AC) [10 %]
 - Practical Work (in groups) and its presentation (T) [20 %]

❖ EP is an exam with practical programming exercises.

- The evaluation tests will be carried out on a face-to-face regime, preferably on the students' computers.

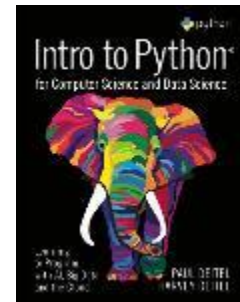
❖ The CA element results from the evaluation of several indicators, including performance, interest, attitude, and attendance.

Calendar

- ❖ ETP - TP Exam
 - Friday afternoon (tentative date 22 April)
- ❖ EP - Practical Exam
 - Exams period (“época normal”)

Recommend reading - Books

- Paul Deitel & Harvey Deitel, Intro to Python for Computer Science and Data Science, 2020
 - [Intro to Python for Computer Science and Data Science: Learning to Program with AI, Big Data and The Cloud \(oreilly.com\)](https://oreilly.com/catalog/errata.csp?id=51769600&isbn=9781492056504)
- José Braga de Vasconcelos, PYTHON - ALGORITMIA E PROGRAMAÇÃO WEB, FCA, 2015
 - [Python - Informática - Tecnologias & Programação Web - FCA](#)
- Kazarinoff, Problem Solving with Python, Winter, 2019
 - [Problem Solving with Python](#)
- Think Python - <http://thinkpython.com/>



Many books by O'Reilly

❖ [Home \(oreilly.com\)](https://oreilly.com)

The screenshot shows the O'Reilly website's search results for the term "Python". The search bar at the top left contains the text "Python". Below the search bar, it indicates "1 - 10 of 9572 search results for 'Python'". The results are filtered by "Books" and sorted by "Relevance". The first three results are displayed:

- Fluent Python, 2nd Edition** by Luciano Ramalho. 44 reviews. O'Reilly Media, Inc. April 2022. Description: "Don't waste time bending Python to fit patterns you learned in other languages. Discover and apply idiomatic Python 3 features beyond your past experience. Author Luciano Ramalho guides you through Python's core language features and libraries and teaches you how to make your code shorter, faster, and more readable. Python's simplicity lets you become productive quickly, but often this means you aren't using everything it has to offer. With the updated edition of this hands-on guide, you'll learn how to write effective,..."
- Python Crash Course, 2nd Edition** by Eric Matthes. 49 reviews. No Starch Press May 2019. Description: "Python Crash Course, 2nd Edition teaches beginners the essentials of Python quickly so that they can build practical programs and develop powerful programming techniques. Uses Python 3. This is the second edition of the best selling Python book in the world. Python Crash Course, 2nd Edition is a straightforward introduction to the core of Python programming. Author Eric Matthes dispenses with the sort of tedious, unnecessary information that can get in the way of learning how to program, choosing instead to provide..."
- Introducing Python, 2nd Edition** by Bill Lubanovic. 9 reviews. O'Reilly Media November 2019. Description: "This book also shows you how to use Python for applications in business, science, and the arts, using various Python tools and open source packages. Easy to understand and fun to read, this updated edition of Introducing Python is ideal for beginning programmers."

Other sources

- Official documentation for Python
 - <https://docs.python.org/3/>
- Python Package Index
 - <https://pypi.org/>