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.

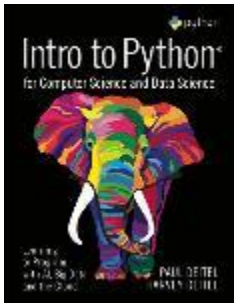
Calendar

- 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)

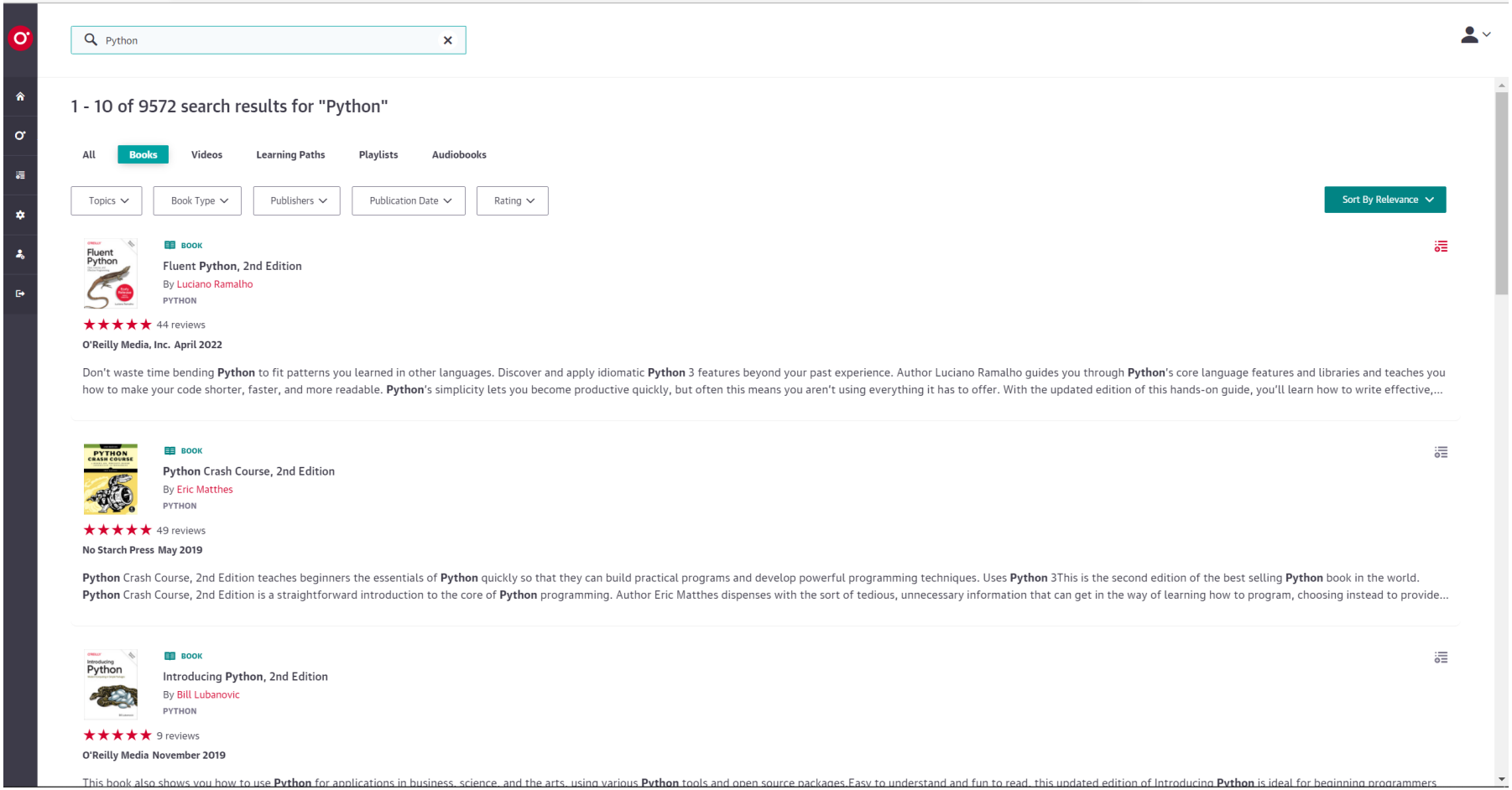


- José Braga de Vasconcelos, PYTHON - ALGORITMIA E PROGRAMAÇÃO WEB, FCA, 2015
  - Python - Informática - Tecnologias & Programação Web - FCA

- Kazarinoff, Problem Solving with Python, Winter, 2019
  - Problem Solving with Python
- Think Python - http://thinkpython.com/

Many books by O'Reilly

- Home (oreilly.com)



Other sources

- Official documentation for Python
  - https://docs.python.org/3/

- Python Package Index
  - https://pypi.org/