



Syllabus: Fundamentals of Python (Python 基础)¹

PROFESSOR CHEN EDUCATION PALACE (陈教授教育学院)

OBJECTIVES (教学目标)

We expect students to achieve the following goals after taking this course:

(学生通过我们的课程培训可以实现以下目标)

1. Master how to program in Python.
(掌握Python编程语言。)
2. Understand Python code written by other people.
(读懂其他人写的Python程序。)
3. Learn how to use Python to do some projects.
(学习使用Python做一些项目。)
4. Build a solid foundation for doing projects or taking advanced courses that require Python, such as artificial intelligence, data science, robotics.
(为后续需要使用Python做背景提升的项目和课程，例如人工智能，数据科学，机器人，打下坚实基础。)
5. Build a solid foundation for studying other coding languages, such as C++, Java.
(为学习其他编程语言，例如C++, Java，打下坚实基础。)

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6. Develop a sense of algorithmic thinking and use it to prepare for informatics competitions, such as USACO.

(掌握算法的思想，为准备计算机竞赛，例如USACO，做准备。)

HOW OUR COURSE IS DISTINGUIHSED FROM Python COURSES

TAUGHT IN OTHER PLACES (我们的课程跟其他地方的Python课程相比有什么不同)

Our course has been designed with the following salient features:

(我们的课程设计有以下特色)

1. Our course has been developed by people from top-tier universities, such as MIT, Harvard, Stanford, Carnegie Mellon, UC Berkeley, UCLA. We have solid foundations in Python, broad horizons on a wide range of cutting-edge applications of Python, and rich teaching experiences.

(我们的课程，由来自顶尖大学的团队研发，包括MIT，哈佛，斯坦福，卡耐基·梅隆，加州大学伯克利分校，加州大学洛杉矶分校。我们拥有扎实的Python基础，各种Python应用领域的前沿视角，和丰富的教学经验。)

2. Our course is practice oriented. For example, we teach students how to use preliminary Python coding skills to do cutting-edge work, such as doing sentiment analysis in natural language processing, building a prototype artificial intelligence/machine learning estimator machine adopted in college admissions.

(我们的课程实践导向。例如，我们教学生如何用基本的Python编程技能去做前沿工作，例如在语言识别里做情感分析，构建大学招生录取里使用的人工智能/机器学习的识别机器。)

3. Our course does not sacrifice theoretical rigor. For example, when we teach students new classes/libraries/modules, we teach students principles behind them. This helps students



develop abilities to use principles and methods learned in this course to creatively do something new.

(我们的课程不会失去理论上的严格。例如，我们给学生讲授新的类/库/模块，会讲解背后的原理。这可以帮助学生发展能力，去使用这些原理和方法创新的做新的东西。)

4. This course is seamlessly connected with advanced courses in a wide range of directions, such as data science courses and competitive programming courses.

(这门课程跟其他高阶的课程无缝衔接，例如数据科学课程，计算机竞赛课程。)

5. We have taught this course to a wide range of students, from primary school kids to high school students to event adults (such as MBA students who need to gain coding skills).

(我们给很多学生讲过这个课程，从小学生到高中生，甚至成人，例如需要掌握编程技能的MBA学生。)

WHO MAY CONSIDER TAKING THIS COURSE (谁可以考虑这个课程)

This course is designed for those who have never learned Python before, but plan to do something (such as taking AP Computer Science A, doing a project that requires processing and analyzing data) that require coding skills.

(这个课程的设计，是给以前没有接触过Python，但是以后可能会需要使用Python技能的同学，比如以后打算学习AP计算机课，打算做跟数据处理和分析有关的项目。)

APPROPRIATE AGES TO TAKE THIS COURSE (参加这个课程的合适年龄)

Age should NOT be a factor of whether taking this course. Even a primary school student who wants to study Python can easily follow us in this course.

(是否适合上这个课程，跟年龄完全无关。甚至一个想学习Python的小学生，也可以跟得上这个课程。)



Duration (总课时)

This is a 15-hour course.

(全课程总计 15 小时。)

TEXTBOOKS (教材)

We use our own course packet (我们用我们自己编写的教材).

COURSE CONTENTS (教学内容)

1. Python Integrated Development Environments (IDE), Google Colab, Anaconda, IDLE (Python 集成开发环境, Google Colab, Anaconda, IDLE)
2. Basics of Python (Python 基本)
3. Data types (数据类型)
4. Variables (变量)
5. Arithmetic operations of numeric data (数值的代数运算)
6. String operations (字符串操作)
7. File inputs and outputs (文件输入和输出)
8. Data structure: Lists (数据结构: Lists)
9. Data structure: Tuples (数据结构: Tuples)
10. Data structure: Sets (数据结构: Sets)
11. Data structure: Dictionaries (数据结构: Dictionaries)
12. `if`, `elif`, `else` statements (`if`, `elif`, `else` 语句)
13. Loops (循环)
 - (a) `while` loops (`while` 循环)
 - (b) `for` loops (`for` 循环)



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14. Functions (函数)

15. Classes and objects (类和对象)

16. Packages and modules (软件包和模块)

17. Preliminaries of data science (数据科学基础)

18. Preliminaries of natural languages process (自然语言处理基础)

