

课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	课程名称 Course Title	Python 编程基础原理 The Fundamentals of Python Programming
2.	授课院系 Originating Department	南方科技大学伦敦国王学院医学院 SUSTech-KCL School of Medicine
3.	课程编号 Course Code	JEIS102
4.	课程学分 Credit Value	3
5.	课程类别 Course Type	通识必修课程 General Education (GE)Required Courses
6.	授课学期 Semester	秋季 Fall
7.	授课语言 Teaching Language	中英双语 English & Chinese
8.	授课教师、所属学系、联系方式 Instructor(s), Affiliation & Contact (For team teaching, please list all instructors)	李喆, 生物医学工程系, 邮箱: liz8@sustech.edu.cn Zhe LI, Department of Biomedical Engineering, E-mail: liz8@sustech.edu.cn
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	待公布 To be announced
10.	选课人数限额(可不填) Maximum Enrolment (Optional)	

11. 授课方式 Delivery Method	讲授 Lectures	习题/辅导/讨论 Tutorials	实验/实习 Lab/Practical	其它(请具体注明) Other (Please specify)	总学时 Total
	学时数 Credit Hours	32		32	
12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	无 None				
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite					
14. 其它要求修读本课程的学系 Cross-listing Dept.					

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

The teaching objective of this course is to introduce students from Southern University of Science and Technology - King's College London School of Medicine to the basic concepts of the Python programming language and to analyze and visualize biomedical data using Python. The course covers an introduction to the Python language, data types, flow control, functions, input/output, object-oriented Python programming, introduction to Matplotlib, introduction to SciPy and NumPy, introduction to Pandas, and analysis of Python application cases. By the end of the course, it is expected that students will be proficient in using the Python language to solve problems in their professional studies and scientific research.

本课程的教学目标是向联合医学院的学生介绍 Python 编程语言的基本概念以及基于 Python 对生物医学数据进行分析 and 可视化。课程内容包括 Python 语言的介绍、数据类型、流程控制、函数、输入输出、面对对象的 Python 编程、Matplotlib 介绍、SciPy 和 NumPy 介绍、Pandas 介绍和 Python 应用案例分析。在课程结束后，期望学生能够熟练使用 Python 语言解决专业学习和科学研究中的问题。

16. 预达学习成果 Learning Outcomes

Upon completion of the course, students are expected to master the following:

1. General principles of programming fundamentals.
2. Basic knowledge and syntax of Python.
3. Handling files and writing simple programs using Python.
4. Data analysis using Python (Numpy, Scipy, Biopython, Pandas, etc.).
5. Data visualization using Python (Matplotlib, Seaborn, etc.).

在课程结束后，期望学生掌握：

1. 通用的编程基础原理
2. Python 的基础知识和语法
3. 用 Python 处理文件和编写简单程序
4. 用 Python 进行数据分析 (Numpy, Scipy, Biopython, Pandas 等)
5. 用 Python 进行数据可视化 (Matplotlib, Seaborn 等)

17. 课程内容及教学日历（如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）

Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

Session 1: Introduction to Python (2 hours, plus 2 lab hours)

Course introduction, Python language overview, setting up development environment.

Session 2: Data Types (4 hours, plus 4 lab hours)

Introduction to string, list, dictionary, set data types and their operations.

Session 3: Flow Control (4 hours, plus 4 lab hours)

Conditional statements and loop statements, including if, elif, for, while, etc.

Session 4: Functions (2 hours, plus 2 lab hours)

Built-in functions, user-defined functions, data passing, and anonymous functions.

Session 5: Input and Output (2 hours, plus 2 lab hours)

Introduction to keyboard and screen input/output, as well as file input/output methods.

Session 6: Object-Oriented Python Programming (4 hours, plus 4 lab hours)

Classes and objects, encapsulation and inheritance.

Session 7: Introduction to Matplotlib (4 hours, plus 4 lab hours)

Introduction to Matplotlib, including techniques for drawing line plots, bar plots, logarithmic plots, multiple axes plots, contour plots, vector plots, and 3D plots.

Session 8: Introduction to SciPy and NumPy (2 hours, plus 2 lab hours)

Introduction to basic functions of SciPy and NumPy.

Session 9: Introduction to Pandas (4 hours, plus 4 lab hours)

Data reading and generation based on Pandas, introduction to DataFrame and data extraction, plotting based on Pandas.

Session 10: Case Analysis and Review (4 hours, plus 4 lab hours)

Case studies of Python applications in medical data analysis and image processing.

第 1 讲: Python 介绍 (2 学时, 加 2 学时上机)

课程介绍, Python 语言介绍, 开发环境设置

第 2 讲: 数据类型 (4 学时, 加 4 学时上机)

字符串、列表、字典、集合数据及操作方法介绍

第 3 讲: 流程控制 (4 学时, 加 4 学时上机)

条件语句和循环语句, 包括 if、elif、for、while 等

第 4 讲: 函数 (2 学时, 加 2 学时上机)

内置函数、用户自定义函数、数据传递和匿名函数等

第 5 讲: 输入输出 (2 学时, 加 2 学时上机)

键盘和屏幕输入输出以及文件输入输出方法介绍

第 6 讲: 面向对象的 Python 编程 (4 学时, 加 4 学时上机)

类和对象, 封装和继承

第 7 讲: Matplotlib 介绍 (4 学时, 加 4 学时上机)

Matplotlib 介绍, 包括线状图、柱状图、对数图、多轴图、等线图、矢量图和三维图件绘制技巧

第 8 讲: SciPy 和 NumPy 介绍 (2 学时, 加 2 学时上机)

SciPy 和 NumPy 基本数学函数介绍等

第 9 讲: Pandas 介绍 (4 学时, 加 4 学时上机)

基于 Pandas 的数据读取和生成, DataFrame 介绍和数据提取, 基于 Pandas 的绘图

第 10 讲: 案例分析和总结 (4 学时, 加 4 学时上机)

Python 用于医学数据分析和图像处理案例

18. 教材及其它参考资料 Textbook and Supplementary Readings

Python Crash Course, 3rd Edition, Matthes, No Starch Press, 2023

Introduction to Python for Science and Engineering, Pine, CRC Press, 2019

课程评估 ASSESSMENT

19. 评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
出勤 Attendance				
课堂表现 Class Performance				
小测验 Quiz		20		
课程项目 Projects				
平时作业 Assignments		40		
期中考试 Mid-Term Test				
期末考试 Final Exam		40		
期末报告 Final Presentation				
其它 (可根据需要 改写以上评估方 式) Others (The above may be modified as necessary)				

20. 记分方式 GRADING SYSTEM

- A. 十三级等级制 Letter Grading
 B. 二级记分制 (通过/不通过) Pass/Fail Grading

课程审批 REVIEW AND APPROVAL

21. 本课程设置已经过以下责任人/委员会审议通过

This Course has been approved by the following person or committee of authority

The course has been reviewed and approved by the JEI New Course Review Panel Meeting (新课程审核小组会议纪要)

It is a fundamental physics course/module required by the BMS curriculum. The instructor is competent and has experience teaching the course/module, and the course content and Syllabus are appropriate for the BMS curriculum. The required teaching facility is available.

The teaching materials were reviewed. Their political, ideological, scientific and applicability meet the requirements of the JEI, and no issues are observed in their political standpoint and value orientation.

Signature of the Executive Dean:

Date: