DATA502

Practical Programming for Data Analytics

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Instructor Contact Details

Lecturer-in-charge: Shunli Ma
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Consultation Time: Book appointment by sending email to: wlwyxy_29@zju.edu.cn

Teaching Times, Modes and Locations

Course Duration: 21 Dec 2025 to 09 Jan 2026
Modes: Face-to-face
Location: Huajiachi Campus, Zhejiang University via face-to-face

Academic Level

Undergraduate

Credit Points:

The course is worth 6 units of credit point.

Credit Hours

The number of credit hours of this course equals to the credits of a standard semester- long course.

Contact Hours

The course contains a total of 53 contact hours, which consists of orientation, lectures, seminars, quiz, discussion, research, case study, small tests, assignments, on-site field trip(s), in-class and after-class activities, revision, self-study, and final exam. Students will receive an official transcript which is issued by Zhejiang University when completing this course.

Enrolment Requirements

Eligibility requires enrollment in an overseas university as an undergraduate or postgraduate student, proficiency in English, and pre-approval from the student's home institution.

Course Description:

This practical unit introduces students to the computational tools essential for modern data science. By integrating spreadsheet software and Python programming, students will learn how to automate core data tasks such as data ingestion, format conversion, cleaning, summarization, and simple predictive modelling. The course focuses on building efficient data workflows and emphasizes real-world applications in business, science, and engineering. Students will gain hands-on experience with scripting and decision-oriented data analysis to support data-driven solutions.

Prerequisite:

N/A

Learning Resources

● Grus, J. (2019). Data Science from Scratch (2nd ed.). O'Reilly Media. ISBN: 9781492041139.

● Guttag, J. V. (2016). Introduction to Computation and Programming Using Python: With Application to Understanding Data (2nd ed.). MIT Press. ISBN: 9780262529624

Learning Objectives

By the end of this course, you should be able to:

● Develop practical programming skills to automate core data science tasks using Python, including data ingestion, cleaning, transformation, summarization, and predictive modelling.

● Understand and evaluate data workflows by applying both spreadsheets and Python, with awareness of data representation, metadata, sharing considerations, and tool-specific strengths and limitations.

● Apply principles of statistical learning and data communication, including model evaluation and effective visualization, to support informed, data-driven decision making.

Course Delivery:

● Face-to-face Lecture mode includes lectures, seminars, quiz, discussion, research, case study, small tests, assignments, on-site field trip(s), in-class and after-class activities, revision, and final exam.

The following course will be taught in English. There will also be guest speakers and optional field trips available for students who would like to enhance their learning experience. All courses and other sessions will be run during weekdays.

Topics and Course Schedule:

WK	Topic	Activities
1	Introduction and Orientation	Lecture; Tutorial
1	Introduction to data science workflow and key data concepts Python as a calculator. Exploring basic datasets	Lecture; Tutorial
1	Core Python programming and spreadsheet operations Data cleaning, built-in functions, and simple text processing	Lecture; Tutorial
1	Conditionals, loops, and file handling in Python Text file operations and dataset summarization	Lecture; Tutorial
1	Working with lists and aggregation patterns Advanced text processing and numeric data transformation	Lecture; Tutorial
1	Dictionaries and structured data in Python Data pivoting	Lecture; Tutorial
2	Data formats and metadata Introduction to communication principles and continued project work	Lecture; Tutorial
2	In-class Test	Closed book
2	Using modules and defining functions Creating charts with matplotlib	Lecture; Tutorial
2	Principles of chart design and evaluation Data visualization refinement	Lecture; Tutorial
2	Introduction to machine learning, clustering, and recommendation Using scikit-learn for model creation	Lecture; Tutorial
3	Predictive modelling for classification and regression Python exceptions	Lecture; Tutorial
3	Advanced machine learning topics and natural language	Lecture; Tutorial

	processing	
3	Data management, formats, and long-term storage	Lecture; Tutorial
3	Ethics and fairness in data science	Lecture; Tutorial
3	Revision	Tutorial
	Final exam	Closed book

Assessments:

Class participation	15%
In-class Test	15%
Assignments	20%
Final exam	50%

Grade Descriptors:

HD	High Distinction	85-100
D	Distinction	75-84
Cr	Credit	65-74
P	Pass	50-64
F	Fail	0-49

High Distinction 85-100

• Treatment of material evidences an advanced synthesis of ideas Demonstration of initiative, complex understanding, and analysis.
• Work is well-written and stylistically sophisticated, including appropriate referencing, clarity, and some creativity where appropriate.
• All criteria addressed to a high level.

Distinction 75-84

• Treatment of material evidences an advanced understanding of ideas Demonstration of initiative, complex understanding and analysis Work is well-written and stylistically strong.
• All criteria addressed strongly.

Credit 65-74

• Treatment of material displays a good understanding of ideas
• Work is well-written and stylistically sound, with a minimum of syntactical errors.
• All criteria addressed clearly.

Pass 50-64

• Treatment of material indicates a satisfactory understanding of ideas Work is adequately written, with some syntactical errors.
• Most criteria addressed adequately.

Fail 0-49

• Treatment of ideas indicates an inadequate understanding of ideas Written style inappropriate to task, major problems with expression.
• Most criteria not clearly or adequately addressed.

Academic Integrity

Students are expected to uphold the university's academic honesty principles which are an integral part of the university's core values and principles. If a student fails to observe the acceptable standards of academic honesty, they could attract penalties and even disqualification from the course in more serious circumstances. Students are responsible for knowing and observing accepted principles of research, writing and any other task which they are required to complete.

Academic dishonesty or cheating includes acts of plagiarism, misrepresentation, fabrication, failure to reference materials used properly and forgery. These may include, but are not limited to: claiming the work of others as your own, deliberately applying false and inaccurate information, copying the work of others in part or whole, allowing others in the course to copy your work in part or whole, failing to appropriately acknowledge the work of other scholars/authors through acceptable referencing standards, purchasing papers or writing papers for other students and submitting the same paper twice for the same subject.

This Academic Integrity policy applies to all students of the Zhejiang University in all programs of study, including non-graduating students. It is to reinforce the University's commitment to maintain integrity and honesty in all academic activities of the University community.

Policy

The foundation of good academic work is honesty. Maintaining academic integrity upholds the standards of the University. The responsibility for maintaining integrity in all the activities of the academic community lies with the students as well as the faculty and the University. Everyone in this community must work together to ensure that the values of truth, trust and justice are upheld.

Academic dishonesty affects the University's reputation and devalues the degrees offered. The University will impose serious penalties on students who are found to have violated this policy. The following penalties may be imposed:

- ✓ Expulsion
- ✓ Suspension
- ✓ Zero mark /fail grade
- ✓ Marking down
- ✓ Re-doing/re-submitting of assignments or reports, and
- ✓ Verbal or written warning.