The Hong Kong University of Science and Technology (Guangzhou)

UG Course Syllabus Template

[Course Title] Python Programming for Artificial Intelligence

[Course Code] AIAA3102

[No. of Credits] 3

[Any pre-/co-requisites] No

Name: Chengwei Qin

Email: chengweiqin@hkust-gz.edu.cn

Office Hours: Thursday, 4 pm - 5:30 pm; W3 310

Course Description

This course aims to teach the students to program with Python and use Python to develop fundamental Artificial Intelligence (AI) applications. AI-oriented as well as generic programming concepts and skills will be taught in Python language. Key topics include fundamental Python features, principles, and syntax; programming in Python for numerical computation with efficient arrays and matrix classes; programming in Python for scientific analysis with widely adopted scientific libraries; data processing and analysis with Python; machine learning model building and evaluation in Python; fundamental usage of deep learning frameworks. Students will practice programming skills for AI and get familiar with the overall workflow on building AI systems as a team through the course project. Through the course, students will be able to understand programming principles for AI research and development and master the skills to build simple AI applications to solve practical problems.

Intended Learning Outcomes (ILOs)

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

1. Apply fundamental programming principles, including data structures, control flow, and Object-Oriented Programming (OOP), to write clean and modular Python code.

2. Utilize key scientific computing libraries (e.g., NumPy, Matplotlib) for efficient numerical computation, data analysis, and visualization.

3. Build, train, and evaluate fundamental machine learning models for classification and regression tasks using the Scikit-learn library.

4. Construct simple neural networks and understand the basic workflow of deep learning projects using a major framework (e.g., PyTorch).

5. Design and implement a complete AI application as part of a team, demonstrating an understanding of the end-to-end AI system development workflow.

Assessment and Grading

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. Detailed rubrics for each assignment and the project will be provided on Canvas, outlining the specific criteria used for evaluation.

Assessments:

[List specific assessed tasks, exams, quizzes, their weightage, and due dates; perhaps, add a summary table as below, to precede the details for each assessment.]

Assessment Task	Contribution to Overall Course grade (%)	Due date
Attendance and In-class Practices	30%	Ongoing *
Assignments (x3)	30% (10% each)	TBD *
Final Group Project	40%	Week 13 *
Total	100%	

* Assessment marks for individual assessed tasks will be released within two weeks of the due date.

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
Attendance and In-class Practices	ILO1, ILO2, ILO3, ILO4	In-class practices provide immediate, hands-on reinforcement of the specific ILOs being taught in that week's lecture, from basic Python syntax to advanced model building. Attendance ensures engagement with these learning opportunities.
Assignment 1: Python Fundamentals	ILO1, ILO2	This assignment directly assesses students' ability to write clean, modular, object-oriented Python code and use basic scientific computing tools.
Assignment 2: Machine Learning	ILO3	This assignment focuses on assessing the ability to implement, train, and evaluate fundamental machine learning models using industry-standard libraries.
Assignment 3: Deep Learning	ILO4	This assignment assesses students' understanding of the basic deep learning workflow and their ability to construct simple neural networks.
Final Group Project	ILO1, ILO2, ILO3, ILO4, ILO5	The project is a comprehensive, summative assessment that requires students to integrate all learned skills (ILOs 1-4) to design and execute a full AI project as a team, demonstrating mastery of the overall development workflow (ILO5).

Grading Rubrics

Detailed rubrics for each assignment will be provided on Canvas. These rubrics clearly outline the criteria used for evaluation. Students can refer to these rubrics to understand how their work will be assessed.

Final Grade Descriptors:

[As appropriate to the course and aligned with university standards]

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Demonstrates a comprehensive grasp of subject matter, expertise in problem-solving, and significant creativity in thinking. Exhibits a high capacity for scholarship and collaboration, going beyond core requirements to achieve learning goals.
B	Good Performance	Shows good knowledge and understanding of the main subject matter, competence in problem-solving, and the ability to analyze and evaluate issues. Displays high motivation to learn and the ability to work effectively with others.
C	Satisfactory Performance	Possesses adequate knowledge of core subject matter, competence in dealing with familiar problems, and some capacity for analysis and critical thinking. Shows persistence and effort to achieve broadly defined learning goals.
D	Marginal Pass	Has threshold knowledge of core subject matter, potential to achieve key professional skills, and the ability to make basic judgments. Benefits from the course and has the potential to develop in the discipline.
F	Fail	Demonstrates insufficient understanding of the subject matter and lacks the necessary problem-solving skills. Shows limited ability to think critically or analytically and exhibits minimal effort towards achieving learning goals. Does not meet the threshold requirements for professional practice or development in the discipline.

Course AI Policy

The use of generative AI tools (e.g., ChatGPT) to write your code for any assignment or project in this course is strictly prohibited. This is a fundamental programming course, and its primary purpose is for you to develop your own coding skills. All work must be completed independently to ensure you are building the necessary programming proficiency. Submitting code generated by AI will be treated as plagiarism, and any copied work will result in serious consequences. Consequences include, but are not limited to, receiving zero marks for the assignment.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Feedback on assignments will include comments on code correctness, style, efficiency, and clarity, etc. Students who have further questions about the feedback including marks should consult the instructor within five working days after the feedback is received.

Resubmission Policy

Late submissions for assignments and the project will not be accepted. Deadlines are firm to ensure fairness to all students.

Required Texts and Materials

There is no required textbook for this course. All lecture slides, code examples, and supplementary materials will be provided on Canvas.

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST(GZ)'s Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Regulations for Academic Integrity and Student Conduct for the University's definition of plagiarism and ways to avoid cheating and plagiarism.

[Optional] Additional Resources

Google Colab: A free, cloud-based Jupyter notebook environment with GPU access, useful for deep learning tasks.