**The Hong Kong University of Science and Technology (Guangzhou)**

**UG Course Syllabus Template**

Introduction to Artificial Intelligence

AIAA2205

3 Credits

Prerequisites: UFUG 2601 (C ++ Programming) OR UFUG 2602 (Data Structure and Algorithm Design)

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**Office Hours:** After course, E4 405

**Course Description**

The objective of this course is to present an overview of the principles and practices of AI and to address complex real-world problems. The course is designed to develop a basic understanding of problem solving, search, theorem proving, knowledge representation, reasoning and planning methods of AI; to develop practical applications in vision, language, and so on. This course will introduce AI tools and techniques. Topics include foundations (search, knowledge representation, machine learning and natural language understanding) and applications (data mining, decision support systems, adaptive web sites, web log analysis).

**Intended Learning Outcomes (ILOs)**

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

1. Demonstrate a comprehension of advanced knowledge of Artificial Intelligence.

2. Demonstrate a comprehension of applications of Artificial Intelligence.

3. Recognize the limitations of current methods of Artificial Intelligence.

4. Apply programming and Artificial Intelligence skills.

5. Develop a broad interest in the Artificial Intelligence and connect the knowledge to their major study.

6. Communicate effectively in written format to convey scientific knowledge and the application of modern technologies.

**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 are provided below, outlining the 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 |
|---|---|---|
| Final Project | 40% | dd/mm/yyyy * |
| Written assignment | 60% | dd/mm/yyyy * |

* 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 |
|---|---|---|
| Final Project | ILO-1, ILO-2, ILO-3, ILO-4, ILO-5, ILO-6 | Students will select a recent, peer-reviewed AI paper, prepare a PPT and in-class presentation, and submit a concise written report. This task assesses: accurate explanation of advanced concepts (ILO-1); articulation of real-world applications and use-cases (ILO-2); critical analysis of assumptions, limitations, and failure modes (ILO-3); a small implementation/replication, code sketch, or methodological walkthrough demonstrating applied skills (ILO-4); reflection on relevance to their own major or domain (ILO-5); and clear, well-structured scientific writing with proper figures and citations (ILO-6). |
| Written assignment | ILO-1, ILO-2, ILO-3, ILO-4, ILO-5, ILO-6 | A structured report where students investigate an AI topic or mini-project: demonstrate understanding of key concepts and applications (ILO-1, ILO-2), analyze limitations and ethical/technical constraints (ILO-3), implement or prototype a method and interpret results (ILO-4), relate the topic to their own major/discipline and broader impacts (ILO-5), and communicate clearly with well-organized, evidence-based writing (ILO-6). |

**Grading Rubrics**

Final Project – Paper Presentation & Report (40%)

Total: 100 points

A. In-class Presentation (incl. PPT) – 60 pts

- Understanding & Key Contributions (ILO-1)– 15 pts

Correctly identifies problem, motivation, main ideas, and results.

- Methodology Explanation (ILO-1/2) – 10 pts

Clear, accurate description of models/algorithms, assumptions, and pipeline.

- Critical Analysis (ILO-3)– 10 pts

Discusses limitations, failure modes, trade-offs, and evaluation soundness.

- Slide Design & Visual Communication (ILO-6) – 10 pts

Well-structured slides; figures/tables readable; cites sources on slides.

- Delivery & Time Management – 8 pts

Engaging, well-paced, within time; appropriate technical depth for peers.

- Q&A Handling – 7 pts

Answers questions clearly; demonstrates command of details and context.

B. Written Report – 40 pts

- Accurate Summary & Context (ILO-1)– 10 pts

Situates the paper in the literature; states problem, approach, and findings.

- Critical Evaluation & Comparison (ILO-3) – 10 pts

Compares with at least 2 related works; analyzes strengths/weaknesses.

Technical Detail & Reproducibility (ILO-4) – 8 pts

- Key equations, algorithm steps, data/metrics; enough detail to replicate.

Application/Implications & Connection to Major (ILO-2/5)– 6 pts

Explains practical relevance, potential impacts, or domain-specific ties.

- Writing Quality & References (ILO-6)– 6 pts

Clear structure, academic tone, correct citations (APA/IEEE), originality.

Written Assignment (60%)

Total: 100 points

Technical Understanding (ILO-1) – 20 pts

Applications & Use-Cases (ILO-2) – 20 pts

Limitations/Ethics & Responsible AI (ILO-3) – 10 pts

Implementation/Experimentation & Interpretation (ILO-4) – 25 pts

Connection to Major/Broader Impact (ILO-5) – 10 pts

Writing & Presentation Quality (ILO-6) – 10 pts

Citations & Academic Integrity – 5 pts

**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 comprehensive mastery of advanced AI concepts **(ILO-1)** and their applications **(ILO-2)**; offers incisive, well-evidenced critique of assumptions, limitations, and ethics **(ILO-3)**; delivers a correct, reproducible implementation/experiment with insightful interpretation **(ILO-4)**; articulates clear links to the student's discipline and broader impact **(ILO-5)**; communicates with exemplary slides, delivery, Q&A, and polished academic writing with proper citations **(ILO-6)** across both the presentation and written work. |
| B | Good Performance | Shows strong understanding of concepts **(ILO-1)** and appropriate application to problems or case studies **(ILO-2)**; provides generally sound analysis of limitations/trade-offs **(ILO-3)**; implementation/experiments are mostly correct and replicable with minor issues **(ILO-4)**; makes a clear but not deeply developed connection to the major **(ILO-5)**; slides, presentation, Q&A, and writing are clear with only small lapses in organization or citation **(ILO-6)**. |
| C | Satisfactory Performance | Meets core expectations for knowledge **(ILO-1)** and routine application **(ILO-2)**; critique of limitations is superficial or incomplete **(ILO-3)**; implementation/experiments are basic, with gaps in documentation or interpretation **(ILO-4)**; connection to the major is generic **(ILO-5)**; communication in slides/presentation/writing is serviceable but uneven, with noticeable structural or citation issues **(ILO-6)**. |
| D | Marginal Pass | Shows threshold understanding with notable misconceptions **(ILO-1)** and difficulty applying methods beyond straightforward tasks **(ILO-2)**; minimal or unsupported critique **(ILO-3)**; implementation/experiments are incomplete or poorly documented **(ILO-4)**; weak or unclear linkage to the discipline **(ILO-5)**; communication is unclear or poorly structured in slides/presentation/Q&A and writing, with frequent citation problems **(ILO-6)**. |
| F | Fail | Insufficient understanding of concepts **(ILO-1)** and inability to apply them **(ILO-2)**; lacks meaningful analysis of limitations or ethics **(ILO-3)**; missing or erroneous implementation/experiments **(ILO-4)**; no coherent connection to the major **(ILO-5)**; |

| | | |
|---|---|---|
| | | communication in slides/presentation/Q&A and writing is ineffective, disorganized, or violates academic integrity **(ILO-6)**. |

**Course AI Policy**

Students are encouraged to use generative AI tools, such as ChatGPT, to assist in solving homework assignments, as proficiency in these tools is likely to become an essential professional skill in the future. However, any use of ChatGPT or other large language models (LLMs) must be explicitly declared in the homework submission. Students should include a brief statement describing how the tool was used, along with the specific prompts employed during the process.

**Communication and Feedback**

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Feedback on assignments will include [specific details, e.g., strengths, areas for improvement]. 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**

[If applicable, explain the policy for resubmitting work or reassessment opportunities, including conditions and deadlines.]

**Required Texts and Materials**

[List required textbooks, readings, and any other materials]

"Deep Learning", Ian Goodfellow, Yoshua Bengio, Aaron Courville

Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow (3rd ed.) — Aurélien Géron

Google Colab

**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**

[List any additional resources, such as online platforms, library resources, etc.]