[Course Title] Large Language Models

[Course Code] COMP4901B

[No. of Credits] 3 credits

Pre-requisite: COMP 3211 AND (ELEC 2600 OR ELEC 2600H OR IEDA 2520 OR IEDA 2540 OR MATH 2411 OR MATH 2421 OR MATH 2431)

Co-requisite: COMP4211

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Course Description

The field of Natural Language Processing (NLP) has undergone a transformative shift with the advent of massive pre-trained language models. These models serve as the foundation for state-of-the-art systems such as ChatGPT. However, alongside their impressive performance, these models pose significant challenges related to interpretability, ethics, and scalability. This course is designed to provide students with a comprehensive understanding of the modeling, theoretical foundations, ethical considerations, and systems aspects of large language models, while also offering hands-on experience in working with them.

Intended Learning Outcomes (ILOs)

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

1. Know the basics and the latest technology about large language models

2. Prompt the state-of-the-art language models to help various tasks

3. Train language models for dedicated tasks

4. Understand the limitations and potential concerns of language model development

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 Exam	30%	14/12/2025 * (TBC)
Assignment 1	10%	02/10/2025 * (TBC)
Assignment 2	10%	31/10/2025 * (TBC)
Assignment 3	10%	21/11/2025 * (TBC)
Project	30%	08/12/2025 * (TBC)
In-class quiz	10%	--

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

Mapping of Course ILOs to Assessment Tasks

[add to/delete table as appropriate]

Assessed Task	Mapped ILOs	Explanation
Final Exam	ILO1, ILO2, ILO3. ILO4	This task assesses students' understanding of language model basics (ILO1) and limitations (ILO4), and knowledge on using (ILO2) language models and training (ILO3) language models.
Assignment 1	ILO1, ILO2, ILO3	This task mainly evaluates students' understanding of language model basics (ILO1) and practices on using language models (ILO2 and 3)
Assignment 2	ILO1, ILO2, ILO3	This task mainly evaluates students' understanding of language model basics (ILO1) and practices on using language models (ILO2 and 3)
Assignment 3	ILO1, ILO2, ILO3	This task mainly evaluates students' understanding of language model basics (ILO1) and practices on using language models (ILO2 and 3)
Project	ILO2, ILO3	This task mainly assesses students' practical usage and development with language models (ILO2 and 3).
In-class quiz	ILO1, ILO4	This task mainly assesses students' theoretical understanding of the language model knowledge (ILO1 and 2).

Grading Rubrics

Final Exam: All questions in the final exam will have ground-truth answers to compare with and mark the scores.

Assignment 1, 2, 3: All three assignments will contain both objective, written questions, as well as subjective coding problems. For the written questions, they have ground-truth answers to compare to. For the coding problems, we will assess code execution outcomes, the code correctness, as well as the report.

Project: The project is a programming assignment that will ask the students to implement something with a list of requests. Grading will depend on the code execution outcomes, the code correctness, and the comprehensiveness of the report. The coding part will account for 70% of the grade and the report will account for 30%.

In-class quiz: in-class quiz will be multi-choice question answering problems that will be graded based on ground-truth answers.

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 using and developing language models, 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 course allows students to use generative AI tools to assist in the assignments and projects, but prohibits the students from exactly copying the AI generated answers. The students are required to write everything on their own.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Feedback on assignments will include strengths. 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

NA

Required Texts and Materials

NA

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Academic Integrity | HKUST – Academic Registry 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.]