

國立中正大學通識教育課程教學大綱

開課學年度/學期	115 學年度第 1 學期		
課程名稱(中文)	生成式人工智慧應用實務		
課程名稱(英文)	Generative AI Applications		
課 碼		學分數	2
向度別	☐ 中英文能力課程 ☐ 基礎概論 ☒ 資訊能力 ☐ 藝術與美學 ☐ 能源、環境與生態 ☐ 人文思維與生命探索 ☐ 公民與社會參與 ☐ 經濟與國際脈動 ☐ 自然科學與技術		
授 課 方 式	請勾選(可複選)： ☒ 課堂授課 ☐ 網路教學 ☒ 分組討論 ☐ 校外教學 ☒ 其他 <u>電腦教室授課與實作</u>		
教學目標及範圍	Today, artificial intelligence (AI) technologies are widely adopted across industries, ushering in a new era of AI. To prepare students for the emerging age of Pervasive AI, this course aims to develop contemporary AI literacy, practical skills for applying AI in everyday life, and interdisciplinary thinking for future digital transformation. Unlike conventional AI courses that emphasize theory and programming skills, this course requires no prior knowledge of computer science. Students from non-computer science and non-electrical engineering backgrounds are especially encouraged to enroll. This course will serve as your starting point for exploring interdisciplinary AI applications. The course aims to cultivate students' understanding and competencies in AI perception, representation and reasoning, natural HCI, and societal impact. Students will also apply these concepts to their own disciplines, laying a solid foundation for conceptualizing interdisciplinary AI applications in the future. In addition to developing core AI literacy and acquiring the foundational knowledge required for AI applications across various fields, students will use Generative AI (GenAI) tools as the core technology integrated throughout the course. Ultimately, the course aims to prepare students not only to become pioneers in promoting AI within their respective professional fields, but also to extend its use to a wider range of applications. Learning Objectives : 1. Develop a foundation in practical AI and its applications across various fields. 2. Understand the fundamental principles of machine learning algorithms. 3. Develop Generative AI literacy and application-oriented thinking. 4. Apply Design Thinking and value proposition design. 5. Gain experience in project management and information collaboration. 6. Inspire students' interest in interdisciplinary AI applications and enable them to apply AI within their respective fields of study.		

授 課 大 綱
(須含週次表及每
週課程進度說明)

週次	課程進度
1	An Overview of Curriculum & Assessment
2	AI Ethics and Bias
3	Surveillance, Privacy & Security
4	Introduction to Problem-Solving Models
5	Fundamentals of Programming Logic (I)
6	Fundamentals of Programming Logic (II)
7	A Brief Introduction to Machine Learning (I)
8	A Brief Introduction to Machine Learning (II)
9	Fundamentals of Generative AI
10	Introduction to Prompt Engineering for GenAI Tools
11	Hands-on Practice: Generating a Project Proposal Using Prompts
12	Case Study: Using GenAI Tool for Data Analysis
13	Hands-on Practical Applications of Gemini NotebookLM
14	Hands-on Practice: Generating Images Using Prompts
15	Hands-on Practice: Generating Music and Videos Using Prompts
16	Introduction to AI Agents & Agentic AI
17	Case Study: Building AI Agents with n8n
18	Case Study: Practical Applications of Google AI Studio (Vibe Coding)

第一週：An Overview of Curriculum & Assessment

教學內容： This unit provides an overview of its content and expected learning outcomes. It introduces the history of AI development, easy-to-understand definitions, and essential terminology while explaining the underlying technical principles, physical significance, and key concepts in an accessible manner. It also encourages students to envision future opportunities for applying AI within organizations and to develop a clear learning roadmap.

第二週：AI Ethics and Bias

教學內容： This unit uses real-world cases to illustrate biases in AI systems caused by datasets and machine learning algorithms. It also explains the causes of these biases and strategies for preventing them. In addition, the unit introduces increasingly important ethical issues in AI, helping students develop the fundamental attitudes and critical thinking needed for the responsible development of future AI systems.

第三週：Surveillance, Privacy & Security

教學內容： As companies and governments collect and analyze vast amounts of data, personal information is exposed to greater risks than ever before, making privacy a far

more complex issue than commonly perceived. Through real-world cases and discussions of current events, this unit helps students understand the importance of surveillance, privacy, and security issues in the age of AI, such as intrusive surveillance and unauthorized data collection.

第四週：Introduction to Problem-Solving Models

教學內容： This unit introduces the six-step Problem-Solving Model and guides students in applying computational thinking to translate real-world problems into models represented by mathematical symbols. Through this process, students develop the logical reasoning skills needed to define, analyze, and explain problems mathematically.

第五週：Fundamentals of Programming Logic (I)

教學內容： This unit introduces the Kaggle environment as a platform for hands-on Python programming. It covers variable types and naming conventions, as well as differences in input and output behavior when performing operations on variables of different data types.

第六週：Fundamentals of Programming Logic (II)

教學內容： This unit introduces the principles, syntax, and usage of logical and control structures in Python. Topics include Boolean expressions (True/False), conditional statements (if...else), logical operators (AND, OR, NOT, and XOR), and hands-on practice with related functions.

The unit also covers the principles, syntax, and usage of loops in Python, including conditional loops (while), iterative loops (for), and loop-control statements such as break, continue, and pass, with practical exercises.

第七週：A Brief Introduction to Machine Learning (I)

教學內容： Through real-world cases, this unit explains the role of data in AI applications and provides a broad overview of how data science is currently applied across various fields. It helps students develop a data-oriented mindset and introduces the role and current development of data science in contemporary Business Analytics (BA) and Business Intelligence (BI).

第八週：A Brief Introduction to Machine Learning (II)

教學內容： This unit introduces the fundamental principles of machine learning and related algorithms, including supervised learning, unsupervised learning, and reinforcement learning. Through demonstrations using machine learning tools, students will experience how algorithms process data and observe the resulting outcomes.

第九週：Fundamentals of Generative AI

教學內容： This unit introduces the fundamental concepts and principles underlying Generative AI models, including Tokenization, Embeddings, Large Language Models (LLMs), Reinforcement Learning from Human Feedback (RLHF), and Retrieval-Augmented Generation (RAG).

第十週：Introduction to Prompt Engineering for GenAI Tools

教學內容： This unit uses text generation works as the foundation for introducing prompt engineering techniques. It also covers appropriate practices and ethical guidelines for using GenAI tools, helping students use these tools responsibly to produce high-quality content.

第十一週：Hands-on Practice: Generating a Project Proposal Using Prompts

教學內容： Building on the previous unit, this unit requires students to complete an assigned in-class project by creating a project proposal draft.

第十二週：Case Study: Using GenAI Tool for Data Analysis

教學內容： Through real-world cases and hands-on prompting activities, this unit teaches students how to use Generative AI tools to formulate analytical questions, generate charts, and verify the accuracy of analytical results. It also addresses issues such as AI hallucinations and bias, helping students develop responsible and critical data analysis skills.

第十三週：Hands-on Practical Applications of Gemini NotebookLM

教學內容： This unit reviews and summarizes the content covered in previous learning units. Gemini NotebookLM will serve as the hands-on exploration tool for the capstone project, enabling students to apply the GenAI knowledge and skills they have acquired throughout the course.

第十四週：Hands-on Practice: Generating Images Using Prompts

教學內容： This unit introduces the operating environment and basic features of AI image-generation tools. Through hands-on experience with these platforms, students will gain a deeper understanding of the concepts covered in subsequent units and develop greater interest in learning.

第十五週：Hands-on Practice: Generating Music and Videos Using Prompts

教學內容： This unit introduces the operating environment and basic features of AI music-generation tools (Lyria). Through hands-on experience with these platforms, students will gain a deeper understanding of the concepts covered in subsequent units and develop greater interest in learning.

第十六週：Introduction to AI Agents & Agentic AI

教學內容： This unit introduces the definitions and fundamental technologies related to AI agents and Agentic AI models, including workflows, the Model Context Protocol (MCP), metacognition, and the Agent2Agent (A2A) Protocol, along with their underlying principles and practical applications.

第十七週：Case Study: Building AI Agents with n8n

教學內容： This unit uses n8n, a visual workflow automation platform, as the hands-on tool for the capstone project, enabling students to develop and apply AI agents and Agentic AI solutions in practice.

第十八週：Case Study: Practical Applications of Google AI Studio (Vibe Coding)

教學內容： This unit introduces how Generative AI tools can be combined with Vibe

	Coding techniques to rapidly develop system prototypes and reduce development costs. Google AI Studio is used as the hands-on platform to enhance students' practical experience and learning outcomes. °
教科書及 延伸閱讀	1. 延伸閱讀：運算思維與程式設計。 ISBN: 9869698921 ISBN-13: 9789869698924 2. 延伸閱讀：Data Science. Author：John D. Kelleher & Brendan Tierney. Publisher：The MIT Press. ISBN-13：978-0262535434 3. 延伸閱讀：Understanding Artificial Intelligence: Fundamentals and Applications. Author：Albert Chun Chen Liu, Oscar Ming Kin Law & Iain Law. Publisher：Wiley-IEEE Press. ISBN-13：978-1119858331 4. 實習工具： Kaggle：https://www.kaggle.com/ Gemini NotebookLM：https://notebooklm.google/ Google AI Studio：https://aistudio.google.com/ n8n：https://n8n.io/ Lyria：https://deepmind.google/models/lyria/ 5. 自編講義。
評 量 方 式	請勾選(可複選)，並填寫類別： ☒ 課堂參與，<u>A</u>類 ☐ 期 中 考，__類 ☐ 期 末 考，__類 ☐ 小組報告，__類 ☐ 小組討論，__類 ☒ 書面報告，<u>B</u>類 ☐ 課後作業，__類 ☐ 平時測驗，__類 ☐ 心得分享，__類 ☐ 學習紀錄，__類 ☒ 專題創作，<u>C</u>類 ☐ 其他__，__類 A 類佔 <u>20</u>%；B 類佔 <u>40</u>%；C 類佔 <u>40</u>% (類別可自行增加)
與聯合國永續發展 目標(SDGs)及 細項之對應 (請參閱 SDGs 對照表)	目標:<u>4</u> 細項：<u>4.3</u> <u>4.7</u> 目標:____ 細項：_____ 目標:____ 細項：_____ (至多三個目標，每個目標至多三個細項) 範例： 目標:<u>4</u> 細項：<u>4.3</u> <u>4.5</u> <u>4.7</u>

核心能力指標設定	通識課程 核心能力指標	說明	本課程能 培養學生 此項核心 能力者請 打✓(請複 選 3~5 項)
	(1)思考與創新	經由課程的訓練與引導設計，使學生能夠進行獨立性、批判性、系統性或整合性等面向的思考，或能以創意的角度來思考新事物。	✓
	(2)道德思辨與實踐	能夠對於社會、文化中相關的倫理或道德議題，進行明辨、慎思與反省，或能實踐在日常生活中。	
	(3)生命探索與生涯規劃	能夠主動探索自我的價值或生命的真諦，或能具體實踐在自我生涯的規劃或發展。	✓
	(4)公民素養與社會參與	能夠尊重民主與法治的精神、關心公共事務及議題，或能參與社會事務及議題的討論與決策。	
	(5)人文關懷與環境保育	能夠具備同理、關懷、尊重、惜福等人文素養，或能擴及到更為廣泛的環境及生態議題。	
	(6)溝通表達與團隊合作	能夠善用各種不同的表達方式進行有效的人際溝通，或能理解組織運作，與他人完成共同的事物或目標。	✓
	(7)國際視野與多元文化	能夠了解國際的情勢與脈動，具備廣博的世界觀，或能尊重或包容不同文化間的差異。	
	(8)美感與藝術欣賞	能夠領略各種知識、事物或領域中的美感內涵，或能據此促成具美感內涵之實踐力。	
	(9)問題分析與解決	能夠透過各種不同的方式發現問題，解析問題，或能進一步透過思考以有效解決問題。	✓
說明：課程符合指標內涵之部份內容，即可勾選。請依據課程內涵判定其符合程度，勾選項數以主要的 3~5 項為度。			

授課教師資料	姓名：鍾峰宜 ☒專任 學系(所，中心)：通識教育中心 職稱：助理研究員 ☐兼任 學系(所，中心)： 職稱： 學歷： 中正大學資訊管理研究所，資訊管理學博士 逢甲大學資訊工程研究所，工學碩士 經歷： 中正大學通識教育中心專任助研究員（現職） 中正大學圖書館服務與藝文推廣組組長（現職） 中正大學運動競技學系兼任助理教授 研究領域： 圖書與資訊科學（Library & Information Science） 機器學習（Machine Learning）與商業智能（Business Intelligence） 大數據資料分析（Big Data Analytics）與資料科學（Data Science）
備註	請尊重智慧財產權，不得非法影印教師指定之科書籍！