國立中正大學紫荊不分系學士學位學程課程教學大綱

開課學年度/學期	114 學年度第 2 學期		
課程名稱 (中文)	人工智慧導論與應用		
課程名稱 (英文)	Introduction to Artificial Intelligence and Its Applications		
課　　碼	(由通識教育中心填寫)	學分數	2
向度別	□中英文能力課程　□基礎概論　■資訊能力 (computation ability) □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)： ■課堂講授 (lectures)　□網路教學　■ 分 組 討 論 (group discussion) □校外教學　□其他_____		
教學目標及範圍	Introduction to the course: This course introduces the basics of Artificial Intelligence (AI) and its applications. Students use an AI-based approach along with programming and tools to learning the potential of AI applications. With the participation in a team project, the students will learn how to systemically implement the abstract concepts. Through the semester, the students are encouraged to think about the issues in social responsibility and practices. This course is an EMI (English as a Medium of Instruction) course. Goals: • Knowing AI concept and practices • Learning AI-based problem-solving ability • Organizing interdisciplinary knowledge through applications • Practicing project execution and social responsibility Characteristics of the course: This is the core requirement course for the second semester students, and the purpose of the course is to let students understand AI techniques and associated social impacts. This course does not only introduce the AI concept and applications, but also prepare students for AI-oriented problem-solving, which include problem understanding, analysis, design, and implementation using AI techniques. The course contents include presenting the concept with examples and leading the students to think how to transform the conceptual ideas into practical solutions. The teaching methods include a traditional lecture-style teaching, problem-based design challenges, and small group projects. Activities like “Lean Coffee” will be conducted to enhance the discussion sessions and “Panel Discussion” will be organized to involve students in exploring issues regarding AI ethics and social responsibilities.		

授課大綱 (週次表及每週課程詳細內容說明)	

Week	Topics
1	Introduction to AI (1)
2	Introduction to AI (2)
3	Practice in knowledge elicitation
4	Search-based problem solving (1)
5	Search-based problem solving (2)
6	Introduction to Machine Learning (1)
7	Introduction to Machine Learning (2)
8	Introduction to Machine Learning (3)
9	Midterm Examination
10	AI and Social Responsibility (1)
11	Project proposal
12	Sharing of practical skills
13	AI Techniques
14	Interdisciplinary issues
15	AI and Social Responsibility (2)
16	Final Examinations
17	Project demonstration (1)
18	Project demonstration (2)

Week 1: Introduction to AI (1)
- Contents: History, current status, and applications of AI
- Teaching method: Lecturing and tools demonstration
- Activity: Pretest to see how the students know about the subject
- Assignment: Reading Textbook Chapter 1

Week 2: Introduction to AI (2)
- Contents: Problem solving with intelligent systems
- Teaching method: Lecturing
- Activity: Evaluation sheet
- Assignment: Reading Textbook Chapter 2

Week 3: Practice in knowledge elicitation
- Contents: Discovering knowledge with discussion
- Teaching method: Lean Coffee
- Discussion topic: Smart Farming
- Activity: Group brainstorming and discussion

Week 4: Search-based problem solving (1)
- Contents: Defining problems with states and applying searching techniques
- Teaching method: Lecturing and applying tools
- Activity: Evaluation sheet
- Assignment: Reading Textbook Chapter 3

Week 5: Search-based problem solving (2)
- Contents: More searching techniques
- Teaching method: Lecturing and applying tools
- Activity: Evaluation sheet
- Assignment: Reading Textbook Chapter 4

Week 6: Introduction to Machine Learning (1)
- Contents: Learning ML with examples
- Teaching method: Lecturing and applying tools
- Activity: Evaluation sheet
- Assignment: Reading Textbook Chapter 19

Week 7: Introduction to Machine Learning (2)
- Contents: Applications with ML tools
- Teaching method: Lecturing and applying tools
- Activity: Evaluation sheet
- Assignment: Reading Textbook Chapter 19

Week 8: Introduction to Machine Learning (3)
- Contents: Different ML approaches
- Teaching method: Lecturing and applying tools
- Activity: Evaluation sheet
- Assignment: Reading Textbook Chapter 19

Week 9: Midterm Examination

Week 10: AI and Social Responsibility (1)
- Contents: Ethics and social responsibility in AI
- Teaching method: Lecturing and group discussion
- Activity: Evaluation sheet
- Assignment: Reading Textbook Chapter 28

Week 11: Project proposal
- Contents: Exploring project topics and contents
- Teaching method: Group presentation with response from instructor
- Activity: Evaluation sheet
- Assignment: Project proposal

Week 12: Sharing of practical skills
- Contents: Demonstration with AI tools
- Teaching method: Group presentation
- Activity: Evaluation sheet
- Assignment: Instruction documents for tool usage

Week 13: AI Techniques
- Contents: AI in practice
- Teaching method: Lecturing and discussion
- Activity: Review and applications of Chapters 3 & 4
- Assignment: Project progress report (1)

Week 14: Interdisciplinary issues
- Contents: Web3 related topics: semantic web, blockchains, quantum computing
- Teaching method: Lecturing
- Activity: Evaluation sheet
- Assignment: Project progress report (2)

Week 15: AI and Social Responsibility (2)
- Contents: Various topics related to social responsibility with AI
- Teaching method: Panel discussion
- Activity: Evaluation sheet
- Assignment: Project progress report (3)

	Week 16: Final Examination Week 17*: Project demonstration (1) • Contents: Project demonstration • Teaching method: Group presentation and response from instructor • Assignment: Project documents Week 18*: Project demonstration (2) • Contents: Project demonstration • Teaching method: Group presentation and response from instructor • Assignment: Project documents * This course is in a 16+2 week semester format. The 17th and 18th work will be conducted online.
教科書及 延伸閱讀	Textbook: Stuart Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach*, 4th Edition, Pearson, 2021 Additional reading: Reading list in weekly review slides
評 量 方 式	請勾選(可複選)，並填寫類別： ☐課堂參與____類 ☑期 中 考 A 類 ☑期 末 考 B 類 ☐小組報告____類 ☐小組討論____類 ☑書面報告 C 類 ☑課後作業 D 類 ☐平時測驗____類 ☐心得分享____類 ☐學習紀錄____類 ☑專題創作 E 類 ☐其他_____類 A 類佔 20 %；B 類佔 20 %；C 類佔 10 %；D 類佔 20 %；E 類佔 30 % Midterm exam 20% Final exam 20% Written Report 10% Assignments 20% Project 30% Notes: Except for the group project, all assignments are individual work.
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: 4 細項： 4.3, 4.4 (至多三個目標，每個目標至多三個細項)

<table>
<tr><td rowspan="10">核心能力指標設定</td><td>通識課程
核心能力指標
（請勾選主要的 3-5 項）</td><td>說明</td><td>課程能培養學生此項核心能力者請打✓</td></tr>
<tr><td>(1)思考與創新</td><td>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。</td><td>✓</td></tr>
<tr><td>(2)道德思辨與實踐</td><td>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。</td><td></td></tr>
<tr><td>(3)生命探索與生涯規劃</td><td>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。</td><td></td></tr>
<tr><td>(4)公民素養與社會參與</td><td>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。</td><td></td></tr>
<tr><td>(5)人文關懷與環境保育</td><td>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。</td><td></td></tr>
<tr><td>(6)溝通表達與團隊合作</td><td>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。</td><td></td></tr>
<tr><td>(7)國際視野與多元文化</td><td>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。</td><td></td></tr>
<tr><td>(8)美感與藝術欣賞</td><td>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。</td><td></td></tr>
<tr><td>(9)問題分析與解決</td><td>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。</td><td>✓</td></tr>
<tr><td></td></tr>
<tr><td>授課教師資料</td><td colspan="3">姓名：Alan Liu (劉立頌)
☑專任教師　學系(所，中心)： Electrical Engineering　職稱： Professor
□兼任教師　服務單位：　職稱：
學經歷：
Ph.D. Department of Electrical Engineering and Computer Science, University of Illinois at Chicago, U.S.A.

專業領域：
Artificial Intelligence, Software Engineering,</td></tr>
<tr><td>備　　註</td><td colspan="3"></td></tr>
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