國立勤益科技大學
National Chin-Yi University of Technology

115 學年度上學期課程大綱
2026 Year of Fall Syllabus

部別 Department	■日間部 Regular Day School □進修部 Office of Continuing and Extension Education	學制 School System	□博士 Doctoral Degree ■碩士 Master's Degree □四技 Bachelor's Degree (4-year College) □二技 Bachelor's Degree (2-year College) □二專 Associate Degree (2-year program)
授課教師 Instructor(s)	簡伯霖 Bo-Lin Jian	開課代碼 Course Code	G705
科目名稱 中文/英文 Course Name	高等人工智慧 Advanced Artificial Intelligence	必/選修 Required/Elective□	□必修 Required ■選修 Elective
開課年級 Grade	碩士班一、二年級 Master's first and second year	開課學期 Semester	■上 Fall □下 Spring
開課單位 Course Department	電機工程系 Electrical Engineering Department	學分/學時數 Credit/Hours	3/3
全程外語授課 Foreign language Teaching entirely	■是 Yes □否 No	主要授課語言 Main language	英語 English
先修課程 Prerequisite course(s)	None		
若符合請勾選(可複選) 進修部課程可免填	□「邏輯思考程式設計」相關課程 □職能專業課程 ■人工智慧相關課程 有關職能專業課程參考如下: 1. 教育部「大專校院就業職能平臺(UCAN)」所公布之專業職能。https://ucan.moe.edu.tw/introduce/introduce.aspx 2. 勞動部「職能發展與應用平臺」(iCAP)所公布之職能資源(包括職能基準及職能單元)。https://icap.wda.gov.tw/Resources/resources_Datum.aspx 3. 經濟部「產業人才能力鑑定學培訓產業推動網(iPAS)」所公布之能力鑑定項目(包括民間能力鑑定採認通過項目)。https://www.ipas.org.tw/		
優質課程類別 Course attributes (可複選)	■一般課程 General Courses、□智慧財產權 Intellectual Property、 □內涵式服務學習課程 Service Learning、□性別平等 Gender Equality、 □綠色課程 Green Technology□創新創意課程 Innovation、 □工作（職場）倫理課程 Career Ethics、 □工具機技術研發 Tool Machine Technology Development 創新、創意課程定義：課程目標為「激發學生獨特的想像與創意思考，透過企劃與執行以創新模式解決實際問題。 Definition of Innovation and Creative courses: the objectives of the course aim to stimulate students' imagination and creative thinking skills, and to solve practical problems with innovative modes through planning and implementing different tasks.		
課程與校核心能力關聯 Core competence (可複選，至多選4項)	□表達溝通能力 Communication and Presentation Skill ■創意創新能力 Innovation Skill □關懷服務能力 Community Care and Service Skill ■思考推理能力 Thinking and Reasoning Skill ■專業實務能力 Professional Practice Skill □宏觀視野能力 Macro Skill		

教科書 Textbook	自編教材 Self-compiled textbook
參考書目 Other References	Kim, P. (2017). *MATLAB Deep Learning: With Machine Learning, Neural Networks and Artificial Intelligence*: Apress.
課程目標 Course objectives	課程目標 知識： 培養學生對人工智慧的理論 技能： 加強學生對數學及應用於程式設計及分析的能力 態度： 培養學生面對實際問題時，可以自己思考解決方法的態度 其他： 實作與課程互相搭配印證 Course Objectives Knowledge: To develop students' knowledge of advanced artificial intelligence theory Skills: To strengthen students' skills in mathematics and its application to programming design and analysis Attitudes: To develop students' attitudes to think of their own solutions to practical problems. Other: Practical work and the course will be matched with each other.
評量方式 Evaluation	出席 Attendance (25 %); 作業 Assignments (10 %); 期中考 Midterm Exam (25 %); 期末考或報告繳交 Final Exam or Project Report (30 %); 上課表現 General performance (10 %)
內容綱要 Course Outline	1. 機器學習概述 2. 類神經網路 3. 訓練多層類神經網路 4. 深度學習概述 5. 卷積神經網路 1. Basic Concepts in Machine Learning 2. Neural Network 3. Training of Multi-Layer Neural Network 4. Basic Concepts in Deep Learning 5. Convolutional Neural Network Remarks This course is not an easy course. You will need to have professional skills in linear algebra and programming language (Matlab or C++) to take the course.
自編教材 Self-compiled textbook (非自編教材請填寫原因)	■是 Yes □否 No,原因 Reason(s):
符合智財規範 Compliance with Intellectual property (不符合智財規範請填寫原因)	■是 Yes □否 No,原因 Reason(s):
備註 Note	None

教學進度 Course schedule		
週次 Week	教學與作業進度 Teaching Schedule/Assignments	備註 Note

1	機器學習- 甚麼是機器學習? 機器學習的困難點 Machine Learning - What Is Machine Learning? Challenges with Machine Learning	
2	機器學習- 機器學習模型的各種類型 Machine Learning - Types of Machine Learning	
3	類神經網路 -類神經網路的節點與層數 Neural Network - Nodes and Layers of a Neural Network	
4	類神經網路 -類神經網路的監督式學習 Neural Network - Supervised Learning of a Neural Network	
5	類神經網路 -單層類神經網路訓練的增量規則 Neural Network - Training of a Single-Layer Neural Network: Delta Rule	
6	類神經網路 – 一般增量規則、小批量規則 Neural Network - Generalized Delta Rule, Batch, and Mini Batch	
7	類神經網路 – 隨機梯度下降 Neural Network - Stochastic Gradient Descent	
8	類神經網路 – 單層類神經網路的限制 Neural Network - Limitations of Single-Layer Neural Networks	
9	期中考 Midterm Exam	
10	訓練多層類神經網路 – 倒傳遞演算法 Training of Multi-Layer Neural Network - Back-Propagation Algorithm	
11	訓練多層類神經網路 – 代價函數與學習規則 Training of Multi-Layer Neural Network - Cost Function and Learning Rule	
12	訓練多層類神經網路 – 交叉熵函數 Training of Multi-Layer Neural Network - Cross Entropy Function	
13	類神經網路及分類 – 兩分類與多類 Neural Network and Classification - Binary Classification and Multiclass Classification	
14	深度學習 – 深度學習的改善 Deep Learning - Improvement of the Deep Neural Network	
15	卷積神經網路 – 卷積神經網路的架構 Convolutional Neural Network - Architecture of ConvNet	
16	卷積神經網路 – 卷積層 Convolutional Neural Network - Convolution Layer	
17	卷積神經網路 –池化層 Convolutional Neural Network - Pooling Layer	
18	期末考或者報告繳交 Final Exam or Project Report)	

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