

 國立東華大學
教學計劃表 Syllabus

課程名稱(中文) Course Name in Chinese	高等電腦視覺			學年/學期 Academic Year/Semester	114/1
課程名稱(英文) Course Name in English	Advanced Computer Vision				
科目代碼 Course Code	AIIA50160	系級 Department & Year	碩士	開課單位 Course-Offering Department	資訊工程學系
修別 Type	選修 Elective	學分數/時間 Credit(s)/Hour(s)		3.0/3.0	
授課教師 Instructor	/楊茂村				
先修課程 Prerequisite					
課程描述 Course Description					
學習如何從2D影像中取得有用之資訊與重新建構其3D模型，並討論目前電腦視覺之實際應用討論目前電腦視覺這個領域之理論，演算法與各種應用的最新發展與趨勢。學生應以程式作業與專題研究的方式實際進行電腦視覺系統的設計與實作					
課程目標 Course Objectives					
1. To understand the underlying principles of Computer Vision (CV). 2. To design CV algorithms on various applications. 3. To solve practical problems using CV methods.					
系專業能力 Basic Learning Outcomes					課程目標與系專業能力相關性 Correlation between Course Objectives and Dept.' s Education Objectives
A	統合資工知識技術之能力Ability to integrate knowledge and technologies of computer science and information engineering.				●
B	設計技術理論驗證實驗之能力Ability to design and conduct science experiments and to validate hypotheses.				●
C	資訊軟硬體設計開發之能力Ability to design and develop computer software and hardware.				●
D	團隊專案開發之能力Ability to design and develop team projects.				●
E	批判性思考與創新研發之能力Ability of analytical thinking, creative research planning, and innovative development.				○
圖示說明Illustration：● 高度相關 Highly correlated ○ 中度相關 Moderately correlated					
授課進度表 Teaching Schedule & Content					
週次Week	內容 Subject/Topics				備註Remarks
1	Introduction				Chapter 1
2	Image Formation, Light				Chapter 2
3	Image Projection, Camera				Chapter 2
4	Image Processing, Convolution, Filter				Chapter 3
5	Edge, Feature, Invariant, Matching				Chapter 7
6	Segmentation				Chapter 7

7	Face Detection	Chapter 8
8	Tracking, Motion Estimation	Chapter 9
9	期中考試週 Midterm Exam	
10	Machine Learning	Chapter 4
11	Deep Learning, Convolutional Neural Network (CNN)	Chapter 5
12	Detection, You Only Look Once (YOLO)	Chapter 6
13	Recognition, Transformer	Chapter 6
14	Image Synthesis, Diffusion Model	
15	Matting, Quilting	
16	Augmented Reality (AR)	
17	Image-based Rendering (IBR)	Chapter 14
18	期末考試週 Final Exam	

教學策略 Teaching Strategies

- ☒ 課堂講授 Lecture
 ☐ 分組討論 Group Discussion
 ☐ 參觀實習 Field Trip
- ☒ 其他 Miscellaneous: Project & Homework Implemented using OpenCV and Python

教學創新自評 Teaching Self-Evaluation

創新教學 (Innovative Teaching)

- ☐ 問題導向學習 (PBL)
 ☐ 團體合作學習 (TBL)
 ☐ 解決導向學習 (SBL)
- ☐ 翻轉教室 Flipped Classroom
 ☐ 磨課師 Moocs

社會責任 (Social Responsibility)

- ☐ 在地實踐 Community Practice
 ☐ 產學合作 Industry-Academia Cooperation

跨域合作 (Transdisciplinary Projects)

- ☐ 跨界教學 Transdisciplinary Teaching
 ☐ 跨院系教學 Inter-collegiate Teaching
- ☐ 業師合授 Courses Co-taught with Industry Practitioners

其它 other:

學期成績計算及多元評量方式 Grading & Assessments									
配分項目 Items	配分比例 Percentage	多元評量方式 Assessments							
		測驗 會考	實作 觀察	口頭 發表	專題 研究	創作 展演	卷宗 評量	證照 檢定	其他
平時成績(含出缺席) General Performance (Attendance Record)	30%		✓						Hands-On Practice
期中考成績 Midterm Exam	15%		✓		✓				Project/Implement ation
期末考成績 Final Exam	15%		✓		✓				Project/Implement ation
作業成績 Homework and/or Assignments	40%		✓						Implementation
其他 Miscellaneous (_____)									
評量方式補充說明 Grading & Assessments Supplemental instructions Coding is important because of programming homework and projects throughout the course.									
教科書與參考書目(書名、作者、書局、代理商、說明) Textbook & Other References (Title, Author, Publisher, Agents, Remarks, etc.) Richard Szeliski. Computer Vision: Algorithms and Applications. Springer, 2nd Edition, 2023. (available online at https://szeliski.org/Book/)									
課程教材網址(含線上教學資訊,教師個人網址請列位於本校內之網址) Teaching Aids & Teacher's Website(Including online teaching information. Personal website can be listed here.) https://elearn4.ndhu.edu.tw/moodle/									
其他補充說明 (Supplemental instructions)									