中正大學課程大綱

課程名稱(中文)：	視訊處理	開課單位：	電機工程研究所(Graduate Institute of Electrical Engineering)
課程名稱(英文)	Video Processing	課程代碼	4156200_01
授課教師：	江瑞秋	學分數	3
必/選修	選修	開課年級	碩博
先修科目或先備能力：	non		
課程概述：	This course introduces the video coding system. First, it will give a broad overview of video technology, from analog color TV system to digital video. Then it will delineate several important sub-topics in digital video technology, including motion estimation methods, quantization, transform coding, and predictive coding. Students will be familiar with the fundamental theories and techniques of video processing.		
學習目標：	1. Understand the history of video technology 2. Learn the digital video technology 3. Learn the technology in video processing and coding 4.		
教科書：	"Video Processing and Communications," Yao Wang, Jörn Ostermann and Ya-Qin Zhang, Prentice Hall, 2002.		

課程大綱		分配時數				核心能力	備註
單元主題	內容綱要	講授	示範	隨堂作業	其他		
Basics of Video	1. Color Perception and Specification 2. Analog Color Television Systems 3. Digital Video 4. Digital Color Television Systems	9				☑1.1 ☑1.2 ☐1.3 ☑2.1 ☐2.2 ☐3.1 ☐3.2 ☐4.1 ☐4.2 ☐4.3 ☐4.4	
Video Modeling	1. Camera model 2. Illumination model 3. Object model 4. Scene model 5. Two-dimensional motion model	6				☑1.1 ☑1.2 ☐1.3 ☑2.1 ☐2.2 ☐3.1 ☐3.2 ☐4.1 ☐4.2 ☐4.3 ☐4.4	
Foundation of Video Coding	1. Motion Estimation 2. Transform Coding 3. Quantization 4. Entropy Coding	12				☑1.1 ☑1.2 ☐1.3 ☑2.1 ☐2.2 ☐3.1 ☐3.2 ☐4.1 ☐4.2 ☐4.3 ☐4.4	
Deep Video Coding	1. Learning-based image coding 2. Learned-based video coding	12				☑1.1 ☑1.2 ☐1.3 ☑2.1 ☐2.2 ☐3.1 ☐3.2 ☐4.1 ☐4.2 ☐4.3 ☐4.4	
Related Paper Study and Presentation		15				☑1.1 ☑1.2 ☑1.3 ☑2.1 ☑2.2 ☑3.1 ☑3.2 ☐4.1 ☐4.2 ☐4.3 ☑4.4	

教育目標

1.傳授學生電機工程專業領域知識，並能進一步結合理論與實務進行研究。

2.訓練學生發掘與分析解決問題的能力。

3.訓練學生良好的溝通技巧，並培養團隊合作的能力。

4.培養學生瞭解國內外學術與產業之發展與需求，並理解工程倫理及社會責任。

核心能力

1.1.學習電機工程相關領域之理論基礎。

1.2.瞭解電機工程相關領域之實務技術。

1.3.訓練專業論文寫作與簡報的能力。
2.1.培養發掘與分析電機工程特定領域專題研究之能力。
2.2.培養規劃與執行電機工程特定領域專題研究之能力。
3.1.學習溝通與表達的能力。
3.2.運用個人專長，與團隊成員合作達成計畫目標。
4.1.瞭解國內外電機工程特定領域產業現況。
4.2.理解工程倫理及社會責任。
4.3.培養良好的國際觀。
4.4.培養科技英文能力。

教學要點概述：
1. 教材編選(可複選)： ☑ 自編簡報(ppt) ☑ 教科書作者提供
2. 教學方法(可複選)： ☑ 講述 ☑ 板書講述
3. 評量工具(可複選)： ☐ 上課點名 0%, ☐ 隨堂測驗0%, ☑ 隨堂作業20.00%, ☐ 程式實作0%, ☐ 實習報告 0%, ☑ 專案報告25.00%, ☐ 期中考0%, ☑ 期末考25.00%, ☐ 期末報告0%, ☑ 其他30.00%,
4. 教學資源： ☑ 課程網站 ☑ 教材電子檔供下載 ☐ 實習網站
5. 教學相關配合事項：

課程目標與教育核心能力相關性	
請勾選： ☑ 1.1 ☑ 1.2 ☑ 1.3 ☑ 2.1 ☑ 2.2 ☑ 3.1 ☑ 3.2 ☐ 4.1 ☐ 4.2 ☐ 4.3 ☑ 4.4	
1.1	**學習電機工程相關領域之理論基礎。()**
	為何有關： The course introduces what a video coding system is; how to sample a video signal and how to process the original video signal in order to achieve efficient compression after exploiting the temporal and spatial relationship between the frames in a video sequence.
	達成指標： Be familiar with the fundamental theories and techniques of video processing.
	評量工具(可複選)： Homework and examination
1.2	**瞭解電機工程相關領域之實務技術。()**
	為何有關： Students will implement some important video technology by programming. They will learn realizing the related theory into a practical implementation
	達成指標： Realizing the related theory into a practical implementation.
	評量工具(可複選)： Homework and examination
1.3	**訓練專業論文寫作與簡報的能力。()**
	為何有關： Students have presentations for paper study and project. Then, they have to prepare the project report in the end of the semester.
	達成指標： Improved skill in paper presentation
	評量工具(可複選)： Homework, paper presentation and final project report
2.1	**培養發掘與分析電機工程特定領域專題研究之能力。()**
	為何有關： This course guides students to understand how to construct a video coding system based on a trade-off between the implementation complexity and compression efficiency. Thus, they will be able to develop, analyze and implement some specified applications.
	達成指標： The ability to develop, analyze and implement some specified applications
	評量工具(可複選)：

	Homework, paper presentation and final project report
2.2	**培養規劃與執行電機工程特定領域專題研究之能力。()**
	為何有關： This course guides students to understand how to construct a video coding system by combining many function blocks. Then students are able to build a system by integrating many suitable function blocks
	達成指標： Ability to construct a video coding system by combining many function blocks
	評量工具(可複選)： Homework, paper presentation and final project report
3.1	**學習溝通與表達的能力。()**
	為何有關： The course demands students to finish a project by team work. Students in the same team learn coordinating, communicating and cooperating. They present their final project in the class and practice communicating and self-expression
	達成指標： Ability to coordinate, communicate and cooperate in team work.
	評量工具(可複選)： Paper presentation and final project report
3.2	**運用個人專長，與團隊成員合作達成計畫目標。()**
	為何有關： The course demands students to finish a project by team work. Students in the same team learn coordinating, communicating and cooperating to make the team work successful
	達成指標： Ability to cooperate and make the team work successful
	評量工具(可複選)： Final project report
4.4	**培養科技英文能力。()**
	為何有關： Students have presentations for paper study and project. Then, they have to prepare the project report in the end of the semester.
	達成指標： Improved ability in English reading, understanding and presenting
	評量工具(可複選)： Paper presentation