課程資訊 (Course Information)					
科號 Course Number	10810CS 452000	學分 Credit	3	人數限制 Size of Limit	40
中文名稱 Course Title	影像處理簡介				
英文名稱 Course English Title	Introduction to Image Processing				
任課教師 Instructor	陳朝欽(CHEN, CHAUR-CHIN)				
上課時間 Time	T7T8R7	上課教室 Room	EECS資電 128		

提醒您：請遵守智慧財產權，勿使用非法影印教科書
Please respect the intellectual property rights, do not use illegal copies of textbooks.

此科目對應之系所課程規畫所欲培養之核心能力 Core capability to be cultivated by this course	■ 具有設計與操作實驗以及分析、解釋數據的能力。 (10%) To be able to design and perform experimentation as well as analyze and explain the experiment data. (10%) ■ 具有發現問題、定義問題、並設計程式以解決問題的能力。 (10%) To have the ability to discover problems, define them, and design computer programs to solve problems. (10%) ■ 具有資訊、數學及科學的基礎知識。 (10%) To have fundamental knowledge of computer science, mathematics, and science. (10%) ■ 具有分析、設計、開發、整合、測試、與評估資訊系統、元件、或演算法的能力。 (10%) To be able to analyze, design, develop, integrate, test, and evaluate systems, components, and algorithms of computer science. (10%) ■ 具有良好的溝通技巧與跨領域團隊合作的能力。 (10%) To have good communication skills and be able to cooperate with others in interdisciplinary teams. (10%) ■ 瞭解與資訊相關之產業脈動與最新的資訊科技進展。 (10%) To understand the most recent technological and industrial advancements regarding computer science. (10%) ■ 瞭解資訊科技對於全球性社會、經濟、文化等層面的影響與責任。 (10%) To understand the social, economical, cultural effects of computer science and related technologies on the global level. (10%) ■ 瞭解國際視野及終身學習的重要性。 (20%) To understand the importance of international view as well as lifelong education. (20%) ■ 尊重學術、工程倫理、及智慧財產權。 (10%) To respect academics, engineering ethics, and intellectual property. (10%)

課程簡述 (Brief course description)

This course will introduce fundamental techniques for digital image representation, processing, and analysis. Students will learn the knowledge of image processing algorithms and practical implementation of various digital image applications. The content of this course will consist of the following topics: 1. Digital Image Fundamentals, 2. Image Transform, 3. Image Filtering & Enhancement, 4. Image Segmentation and Edge Detection, 5. Image Data Compression, 6. Color Image Processing, 7. Image Pattern Recognition, 9. Watermarking and Steganography, 9. Image Sharing and Recovering.

課程大綱 (Syllabus)

Course keywords:
Image Processing and Analysis, Segmentation, Steganography, Image Transform, Image Sharing, Color Image Processing

一、課程說明(Course Description)
1. Fundamentals of Digital Image Processing
2. Image Transform
3. Image Filtering and Enhancement
4. Image Segmentation and Edge Detection
5. Image Data Compression
6. Color Image Processing
7. Image Pattern Recognition
8. Steganography and Watermarking
9. Image Sharing and Recovering

二、指定用書(Text Books)

1. R.C. Gonzalez and R.E. Woods, Digital Image Processing, 4th Edition, Global Edition, Pearson (2018)

三、參考書籍(References)

1. K. Sayood, Introduction to Data Compression (2000)
2. D. Hanselman and B. Littlefield, Mastering Matlab 8 (2012)
3. W.B. Pennebaker and J.L. Mitchell, JPEG Still Image Compression Standard 1993
4. Pitas, Digital Image Processing Algorithms and Applications (2000)
5. D.S. Taubman and M.W. Marcellin, JPEG2000 Image Compression Fundamentals, Standards and Practice (2002)

四、教學方式(Teaching Method)

[1] in-class Lectures and discussion

[2] Students are required to attend 2~4 assigned seminars about Image Processing and Analysis
[3] Oral presentations for each group of (1~3) students are planned
[4] Discussions in class or via e-mail are encouraged
** More details will be announced in class

五、教學進度(Syllabus)

[1] 3-5 hours in average for each of 9 sections.
[2] the remainder is reserved for Seminars and Oral Presentations.

六、成績考核(Evaluation)

Assignments (50%), Exam (20%), Oral Presentations + a Report (30%)

七、可連結之網頁位址

http://www.cs.nthu.edu.tw/~cchen/CS4520/cs4520.html