課程資訊 (Course Information)					
科號 Course Number	10910CS 333000	學分 Credit	3	人數限制 Class Size	70
中文名稱 Course Title	科學計算				
英文名稱 Course English Title	Scientific Computing				
任課教師 Instructor	陳朝欽(CHEN, CHAUR-CHIN) *more information*				
上課時間 Time	W6W7W8	上課教室 Room	DELTA台達104		

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。 (20%) To have the ability to discover problems, define them, and design computer programs to solve problems. (20%) ■ 具有資訊、數學及科學的基礎知識。 (30%) To have fundamental knowledge of computer science, mathematics, and science. (30%) □ 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。 To be able to analyze, design, develop, integrate, test, and evaluate systems, components, and algorithms of computer science. ■ 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。 To understand the most recent technological and industrial advancements regarding computer science. □ 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。 To understand the social, economical, cultural effects of computer science and related technologies on the global level. ■ 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)

Numerical Analysis is concerned with the design and analysis of algorithms for solving mathematical problems that arise in many fields, especially science and engineering. Scientific Computing could be regarded as a combination of modeling, visualization, and numerical analysis. In particular, Numerical Methods, the foundation of scientific computing deals with quantities that are continuous, as opposed to discrete which occurred in most other parts of computer science. This course aims to provide algorithmic approaches to review and study (1) Numerical Analysis, (2) Statistical Computations, (3) Data Visualization, (4) Clustering and Classification. Five homework assignments, two tiny projects including Principal Component Analysis (PCA), Linear Discrimination Analysis (LDA), LBG algorithm for Vector Quantification (VQ); two in-class tests, and/or an oral presentation are used to evaluate your performance.

課程大綱 (Syllabus)

Course keywords:
科學計算、數值分析、統計計算、資料視覺化、分群與分類、主成份分析、LBG演算

一、課程說明(Course Description)

Numerical Analysis is concerned with the design and analysis of algorithms for solving mathematical problems that arise in many fields, especially science and engineering. Scientific Computing could be regarded as a combination of modeling, visualization, and numerical analysis. In particular, Numerical Methods, the foundation of scientific computing deals with quantities that are continuous, as opposed to discrete which occurred in most other parts of computer science. This course aims to provide algorithmic approaches to review and study (1) Numerical Analysis, (2) Statistical Computations, (3) Data Visualization, (4) Clustering and Classification. Five homework assignments, two tiny projects including Principal Component Analysis (PCA), Linear Discrimination Analysis (LDA), LBG algorithm for Vector Quantification (VQ); two in-class tests, and/or an oral presentation are used to evaluate your performance.

二、指定用書(Text Books)

[1] To be announced as Class Begins.

[2] On the Website: https://www.cs.nthu.edu.tw/~cchen/CS3330/cs3330.html

三、參考書籍(References)

See https://www.cs.nthu.edu.tw/~cchen/CS3330/cs3330.html

四、教學方式(Teaching Method)

Presentation and Discussion in classes.
A couple of selected video lectures

五、教學進度(Syllabus)

See https://www.cs.nthu.edu.tw/~cchen/CS3330/cs3330.html

六、成績考核(Evaluation)

Assignments (40%), Two Projects (30%), 2 Exam and/or Oral presentation.

七、可連結之網頁位址

See https://www.cs.nthu.edu.tw/~cchen/CS3330/cs3330.html.html