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②图玄東華大學

教學計劃表 Syllabus

課程名稱(中文) Course Name in Chinese	初等分析				學年/學期 Academic Year/Se	114/1		
課程名稱(英文) Course Name in English	Elements of Analysis							
科目代碼 Course Code	DS10070	系級 Department 學二 & Year		開課單位 Course-Offering Department	大數據科學國際學士班			
修別 Type	學程 Program	學分數/時間 Credit(s)/Hour(s)			4.0/4.0			
授課教師 Instructor	/周君彦							
先修課程 Prerequisite	/#微積分(一)/#微積分(二)							

課程描述 Course Description

This course is an introduction to analysis focus on building a solid basis for students in data science.

There are two parts of this course.

Part I One-Dimensional Theory (basically it is a review of Calculus but much more solid) We start with the real number system, and then discuss sequences in the real number system, and functions on the real number system.

We then discuss differentiability and integrability on the real number system.

We further go on to the discussion of infinite series of real numbers and infinite series of function.

Part II Multidimensional Theory

We start with n-dimensional Euclidean space Rⁿ and discuss convergence in Rⁿ.

Then the extremely important concepts of metric space and related topics is introduced.

We then discuss differentiability and integrability on Rⁿ.

We will discuss some topics in vector calculus if everything goes well and as time allowed, so is the topic of Fourier series.

課程目標 Course Objectives

為微積分的進一步討論,訓練學生分析的能力和計算的技巧,培養學生抽象思考的能力

This is an advanced yet introductory course to analysis. It aims to train students to have both ability in analysis and technique in computation and to nurture ample mathematical/abstract understanding for articulation. Brief introduction to modern approach to the differential and integral calculus of functions and transformations in several variables.

		課程目標與系專業能 力相關性
	系 專業能力	Correlation between
	Basic Learning Outcomes	Course Objectives and Dept.'s Education Objectives
A	具備基本資料科學知識及邏輯推理能力。have well-founded background in data science and logical reasoning,	•
В	具備機率、統計、資料科學及相關領域的知識與應用能力。have the knowledge of probability, statistics, data science and the related fields, and their applications,	•
С	具備資料科學應用技能與團隊合作,解決問題能力。be able to utilize data scientific skills for problem solving through cooperation and teamworking.	

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	Part I One-Dimensional Theory (1/6) (the real number system)					
2	Part I One-Dimensional Theory (2/6) (sequences in the real number system, and functions on the real number system)					
3	Part I One-Dimensional Theory (3/6) (differentiability on the real number system)					
4	Part I One-Dimensional Theory (4/6) (integrability on the real number system)					
5	Part I One-Dimensional Theory (5/6) (infinite series of real numbers)					
6	Part I One-Dimensional Theory (6/6) (infinite series of function)					
7	Review and Midterm Exam					
8	Part II Multidimensional Theory (1/10) (Euclidean space R^n and discuss convergence in R^n)					
9	Part II Multidimensional Theory (2/10) (continuing the discussion of convergence in R^n)					
10	Part II Multidimensional Theory (3/10) (metric space 1/3)					
11	Part II Multidimensional Theory (4/10) (metric space 2/3)					
12	Part II Multidimensional Theory (5/10) (metric space 3/3)					
13	Part II Multidimensional Theory (6/10) (differentiability on R^n)					
14	Part II Multidimensional Theory (7/10) (integrability on R^n)					
15	Part II Multidimensional Theory (8/10) (fundamental theorems of vector calculus 1/2)					
16	Part II Multidimensional Theory (9/10) (fundamental theorems of vector calculus 2/2)					
17	Part II Multidimensional Theory (10/10) (Fourier series)					
18	Review and Final Exam					

學期成績計算及多元評量方式 Grading & Assessments									
配分項目	配分比例 Percentage	多元評量方式 Assessments							
Items		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 General Performance									see supplemental instructions
期中考成績 Midterm Exam	40%								see supplemental instructions
期末考成績 Final Exam	40%								see supplemental instructions
作業成績 Homework and/or Assignments	20%								see supplemental instructions
其他 Miscellaneous									see supplemental instructions

評量方式補充說明

Grading & Assessments Supplemental instructions

The semester score is the maximum of the following A, B, C. (Only C is involved with bonus points described below.)

- A will be simply be 20% on homework, 40% on midterm, 40% on final exam, without bonus points.
- B will be simply be 40% on midterm and 60% on final exam, without bonus points.
- C will be the square root of 60 times the number N (where N = A + bonus points).

Student are encouraged to earn bonus points (only counted in N when computing C) such as quizzes, showing eagerness in discussion, and other good behaviors.

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.)

An Introduction to Analysis 4th edition, William R. Wade

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.)

We will set up a line group on the first day of the class.

Everyone of this class is required to be in the line group since all materials of this class will and only be in the line group, including homeworks.

其他補充說明(Supplemental instructions)

Homeworks are required to be hand-written on A4 size papers with black or blue pen or pencils. Every question should start with a complete description of the question itself, and followed by proposed solution by the student.

Every homework should be stapled at the upper-left corner.

Name and student ID no must be written clearly on near the upper-left corner of the first page on each homework.

Handwriting must be easily recognizable, otherwise points will be deducted or even no points will be given.