

理學院

108 學年度第一學期模組化課程

實用線性規劃理論與應用

Practical Linear Programming Theory and Applications

授課教師：

許瑞麟

國立成功大學數學系

課程類別	學分數	選必修	開課人數	注意事項
講義+演習	1	選修	30	Lecture in English 本課程英文授課

先修課程或先備能力：

建議修課年級：

大三、大四、碩士班

建議修課學生背景：

理學院、工學院、電資學院、管理學院、社科學院

教學方法：

講授 80%，練習 20%(including in-class exams and computer laboratory recitation)

評量方式：

出席 20%；

作業 40% (to be turned in via e-mail in one week after the course ends)；

考試 40%；

Attendance is required. On Day 2,3,4,5, from 14:00am – 14:40am, there will be in-class quizzes (4 in total) before a new lecture is given.

學習規範：

無

課程概述：

This interdisciplinary course aims to introduce basic ideas in linear programming with the goal to equip the students with the capability of (1) being able to model with linear programming ; (2) being familiar with linear duality theory ; (3) understanding various classical/modern applications.

Linear programming has become an indispensable tool for computer scientists; statisticians; managers; and many others who want to model their problems or applications in a mathematical way. While a comprehensive treatment to the entire theory of linear programming could take up a whole semester having at least three credit hours, in this modular course we intentionally make it relatively concise by focusing more on the modeling aspect with applications. This does not mean that we can completely avoid mathematical theory and proofs. In particular, we feel that it is necessary for students to understand the duality theorem with proofs. Interesting and practical applications, including the data classification, workshop scheduling, network flows; error code correction; and classical zero-sum games will be covered.

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課程進度：

Period	Hours	Syllabus
8/19	9:00-12:35	Modeling with linear programming.(The Diet Problems; Network Flow problem; Machine Scheduling; Data Classification; Packing Problems; Error Code Correction upper bound estimations)
8/20	9:00-12:35	(cont'd) Modeling with linear programming.(The Diet Problems; Network Flow problem; Machine Scheduling; Data Classification; Packing Problems; Error Code Correction upper bound estimations) Programming and Running linear programming on NEOS.
8/21	9:00-12:35	Farkas Lemma and LP Duality
8/22	9:00-12:35	Farkas Lemma and LP Duality
8/23	9:00-12:40	Zero-sum game and Nash Equilibrium

課程學習目標：

- (i) Learn how do formulate real life problems in an optimization mathematical model.
- (ii) Be familiar with duality theorem and its proof.
- (iii) Study and understand important applications of linear programming.

課程的重要性、跨域性與時代性：

This is an era of data sciences. Linear Programming is one of the most fundamental mathematical models for the real world applications. Many advanced modeling tools rely more or less on linear programming. Learning and using linear programming is critical for students to become contemporary and stay competent.

其他備註：