

# National Cheng Kung University

## Modular Course 2020 Summer Program

實用線性規劃理論與應用

### Practical Linear Programming Theory and Applications

Instructor	Affiliation	Graduation (Ph.d.)
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許瑞麟

NCKU Math

North Carolina State University

Course Type	Course Credit	Student Size (Maximum)
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Lecture  
+  
Recitation

1

35

#### Student Background

College of Science、Institute of Technology、College of Electrical Engineering and Computer Science、Faculty of Management、College of Social Science

#### Format of The Course

Lecture 80%、Practice 20% (including in-class exams and computer laboratory recitation)

#### Grading Policy

Participation 20%、In class exam 40%、Take home exam 40%

#### Note:

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.

#### Code of Conduct for The Course

None

#### Course Description

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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### Timetable and Syllabus

Peroid	Timetable	Syllabus
8/17(MON)	14:00-17:35	Modeling with linear programming.(The Diet Problems; Network Flow problem; Machine Scheduling; Data Classification; Packing Problems; Error Code Correction upper bound estimations)
8/18(TUE)	14:00-17:35	(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.
8/19(WED)	14:00-17:35	Farkas Lemma and LP Duality
8/20(THU)	14:00-17:35	Farkas Lemma and LP Duality
8/21(FRI)	14:00-17:40	Zero-sum game and Nash Equilibrium

### Goal of the Course

- 1.Learn how do formulate real life problems in an optimization mathematical model
- 2.Be familiar with duality theorem and its proof
- 3.Study and understand important applications of linear programming

### The Importance, Cross-Over Disciplinary and Contemporary of The Curriculum

**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.**

### Remarks

#### References :

Course Slide will be uploaded before classes begin