CIE5015 – Operations Research

Objective

Learn to systematically analyze the problem of concern, formulate the problem into mathematical models, and find the optimal solution using available techniques.

Lecture Style

Three-hour weekly lectures and lab exercises will be given to facilitate your learning of fundamental principles and basics to operations research with the emphasis on optimization. The three-hour lecture will usually be divided into 2 parts: the lecture of theory and lab practice with software tools. Lab and homework assignments will be given in a regular basis. It is expected that students will in general spend about 5-8 hours every week after the class to comprehend the subject and complete assignments.

Course Schedule

Lecture: 09:10 – 11:10, Friday, 土木 224. Civil Engineering Building 224.

Lab: 11:20 – 12:10, Friday, 土木 224. Civil Engineering Building 224.

Lecturer and Teaching Assistant

Lecturer

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土木系館 317 Civil Engineering Building 317

TA

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土木系館 319 Civil Engineering Building 316

Textbook

Bradley, Hax, and Magnanti, "Applied Mathematical Programming," Textbook, Introduction to Optimization, Massachusetts Institute of Technology (MIT).

Tommi Sottinen, "Operations Research with Octave," University of Vaasa.

Bruce A. McCarl and Thomas H. Spreen, "Applied Mathematical Programming using Algebraic Systems," Webpage and Download:
http://agecon2.tamu.edu/people/faculty/mccarl-bruce/books.htm

Course Website

You should access the course materials from the course website via the login page of the NTU Cool system https://cool.ntu.edu.tw. For those who would like to audit the course, please inform the TA to add your login permission to the course websites.

Grading Scheme

HW：20%

Exams: 20% each, with total of 3 exams, which sum up to 60%.
Final Project: 20%

Tentative Course Schedule

Week	Date	Tentative Topic	Milestone
1	09/09	Holiday	
2	09/16	Course Intro	
3	09/23	Linear Programming (LP) and the Graphical Method	
4	09/30	LP II, Simplex and the 2-Phase Method	
5	10/07	LP III, Duality and the Dual Simplex	
6	10/14	LP IV Network Models, and the Transportation Algorithm	
7	10/21	Midterm 1	
8	10/28	Integer Programming (IP)	
9	11/04	IP II Vehicle Routing Problems	
10	11/11	IP III Solving IPs with Branch and Bound	
11	11/18	Midterm 2	
12	11/25	IP IV Solving IPs with the Lagrangian Relaxation	Project Announcement
13	12/02	Holiday & Conference	
14	12/09	Dynamic Programming	
15	12/16	Cutting Stock Problem and Column Generation	
16	12/23	Final Exam	