數學系課程核心教材內容

課程名稱：（中文）線性規劃導論 （英文）Introduction to Linear Programming				開課單位	學士班
				課程代碼	2104553
學分數	3	必/選修	選	開課年級	四

教學目標： This course provides an introduction to linear programming, a tool widely used in operations research. The objective of the course is to learn what a linear program is, to be able to recognize it in real-world problems, and to be able to solve it efficiently.

課程概述：linear programming models and algorithms, transportation and assignment problems , network problems

先修科目或先備能力： Linear Algebra

建議參考書目	1. R, J, Vanderbei, *Linear Programming: Foundations and Extensions*, 3rd, ed., Springer, 2008 2. B, Kolman and R, Beck,, *Elementary Linear Programming with applications,* 2nd ed., Elsevier, 1996 3. W, L, Winston, *Operations Research: Applications and Algorithms*, 4th ed., Thomson, 2003 4. F, S, Hillier and G, J, Lieberman, *Introduction to Operations Research*, 8th ed., McGraw-Hill, 2005

課程大綱

單元主題	內容綱要	上課週數
Linear Programming Models and Preliminaries	linear programming models and modeling techniques, review of matrix theory, concept of vector spaces	1~3
Simplex Method	geometry of linear programming problems, the extreme point theorem, basic solutions, standard form, algorithm, artificial starting solution, degeneracy and cycling, infeasible solution, unbounded solutions, matrix notation, theory of simplex method	3~5
Duality and Sensitivity Analysis	dual problem, the duality theorem, computational relations between the primal and dual problems, the dual simplex method, sensitivity analysis and applications	2~3
Selected Topics in Linear Programming	dual simplex method, parametric linear programming*, the upper bound techniques*, interior point algorithm*	2~3
Special Types of Linear Programming Problems	the transportation problem, the assignment problems, graphs and networks, the shortest-path problem, minimal spanning tree algorithm, the maximal flow problem*, the minimum cost flow problem*	2~4
Integer Programming*	examples and applications*, cutting plane methods*, branch and bound methods*,	1~2
Dynamic Programming*	Examples and applications*, characteristics of dynamic programming problems*, deterministic dynamic programming*	1~2

*: optional