COURSE DETAIL

LINEAR AND NETWORK OPTIMIZATION

Country
Singapore

Host Institution
National University of Singapore

Program(s)
National University of Singapore

UCEAP Course Level
Upper Division

UCEAP Subject Area(s)
Mathematics

UCEAP Course Number
152

UCEAP Course Suffix

UCEAP Official Title
LINEAR AND NETWORK OPTIMIZATION

UCEAP Transcript Title
LIN/NTWK OPTIMIZATN

UCEAP Quarter Units
6.00

UCEAP Semester Units
4.00

Course Description

The objective of this course is to work on optimisation problems which can be formulated as linear and network optimisation problems. The course covers formulating linear programming (LP) problems and solving them by the simplex method (algorithm); looking at the geometrical aspect and developing the mathematical theory of the simplex method; studying problems which may be formulated using graphs and networks. These optimisation problems can be solved by using linear or integer programming approaches. However, due to its graphical structure, it is easier to handle these problems by using network algorithmic approaches. Applications of LP and network optimisation are demonstrated. Major topics: Introduction to LP: solving 2-variable LP via graphical methods. Geometry of LP: polyhedron, extreme points, existence of optimal solution at extreme point. Development of simplex method: basic solution, reduced costs and optimality condition, iterative steps in a simplex method, 2-phase method and Big-M method. Duality: dual LP, duality theory, dual simplex method. Sensitivity Analysis. Network optimisation problems: minimal spanning tree problems, shortest path problems, maximal flow problems, minimum cost flow problems, salesman problems and postman problems. The course requires students to take prerequisites.

Language(s) of Instruction
English

Host Institution Course Number
MA3252

Host Institution Course Title
LINEAR AND NETWORK OPTIMISATION

Host Institution Course Details
https://nusmods.com/courses/MA3252/linear-and-network-optimisation

Host Institution Campus

Host Institution Faculty

Host Institution Degree

Host Institution Department
Mathematics

Course Last Reviewed
2025-2026