

# DBA3701/ DSC3214: Introduction to Optimization

NUS Business School  
Department of Analytics & Operations (DAO)

## ADMINISTRATIVE INFORMATION

<b>Instructor:</b>	Prof. Melvyn Sim	<b>Office:</b>	BIZ1 8-76
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**Prerequisite:** This module assumes prior knowledge of multi-dimensional calculus and linear algebra and certain maturity in mathematics. Basic proficiency with Microsoft Excel will be assumed.

**Course Objective:** This module introduces students to the theory and applications of modern optimization techniques. Formulation and modeling of real-life optimization problems via sophisticated software tools will be emphasized to strengthen students' understanding of various fields in optimization. Throughout the course, references will be made wherever appropriate, to business applications, such as portfolio selection and others. Students who are interested in computer and quantitative approaches in business will learn many useful techniques in large business system management from this course.

**Learning Outcomes:** The module provides students an overview modeling and solving real-life optimization problems. After this module, students should be able to gain an overall knowledge of what optimization is, model some standard optimization problems, and solve optimization problems using Python.

### Course Outline

- Linear Algebra Basics
- Linear Optimization Models
- Solving Optimization Problems with Julia
- Geometry of Linear Optimization
- Sensitivity Analysis and Duality
- Network Optimization
- Discrete Optimization
- Nonlinear Optimization
- Optimization under uncertainty

### Evaluation

- Class participation (20%)
- Individual project (40%)
- Class Quiz (40%)

### References:

- Lecture notes provided will be sufficient.