

NATIONAL UNIVERSITY OF SINGAPORE  
School of Business  
Department of Decision Sciences

### **DSC3214-Introduction to Optimisation**

**Lecturer** : Prof Melvyn Sim  
**Time** : 3 hours weekly  
**Place** : TBA  
**Office Hours** : TBA  
**Session** : Semester I, 2015/2016

### **Prerequisites**

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**

After this module, students should have the proficiency to model a fairly large class of real-world optimization problems and solve them using commercial grade solvers.

### **Course Outline**

- Linear Optimization
- Geometry of Linear Optimization Problems
- Duality and Sensitivity Analysis
- Optimization Software
- Network Optimization
- Discrete Optimization
- Quadratic and Conic Quadratic Optimization
- Optimization under Uncertainty

### **References**

- Introduction to Linear Optimization by Dimitris Bertsimas and John N. Tsitsiklis

## Assessment

- Class participation & Homework (20%)
- Group project and presentation (40%)
- Final Exam (40%)