

## 课程详述

### COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	<b>课程名称 Course Title</b>	高等运筹学 Advanced Operations Research
2.	<b>授课院系 Originating Department</b>	信息系统与管理工程系 Department of Information Systems & Management Engineering
3.	<b>课程编号 Course Code</b>	MIS408
4.	<b>课程学分 Credit Value</b>	3
5.	<b>课程类别 Course Type</b>	专业选修课 Major Elective Courses
6.	<b>授课学期 Semester</b>	春季 Spring
7.	<b>授课语言 Teaching Language</b>	中英双语 English & Chinese
8.	<b>授课教师、所属学系、联系方式 (如属团队授课, 请列明其他授课教师) Instructor(s), Affiliation &amp; Contact (For team teaching, please list all instructors)</b>	陆晔, 信息系统与管理工程系, <a href="mailto:luye@sustech.edu.cn">luye@sustech.edu.cn</a> Lu Ye, Department of Information Systems & Management Engineering <a href="mailto:luye@sustech.edu.cn">luye@sustech.edu.cn</a>
9.	<b>实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact</b>	待公布 To be announced
10.	<b>选课人数限额(可不填) Maximum Enrolment (Optional)</b>	50

11. 授课方式 Delivery Method	讲授 Lectures	习题/辅导/讨论 Tutorials	实验/实习 Lab/Practical	其它(请具体注明) Other (Please specify)	总学时 Total
学时数 Credit Hours	48				48
12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	无 None				
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	无 None				
14. 其它要求修读本课程的学系 Cross-listing Dept.	无 None				

### 教学大纲及教学日历 SYLLABUS

#### 15. 教学目标 Course Objectives

本课程将为学生提供运筹学的背景、理论与应用，包括：

- 介绍运筹学的背景和基础
- 介绍最优化方法的理论和模型
- 介绍运筹学在金融与管理中的应用

This course is designed for students to acquire the background, theory and application of operations research, including

- introducing the background and basics of operations research,
- introducing optimization theory and models,
- introducing how operations research techniques can be applied to finance and management

#### 16. 预达学习成果 Learning Outcomes

完成本课程后，学生将了解运筹学的背景，掌握最优化方法的模型和方法，包括线性与非线性优化、整数规划、动态规划、鲁棒优化，并且可以了解到运筹学在金融风险控制、运营管理以及供应链系统中的应用。

Upon completing this course, students will learn the background of operations research. They will understand optimization models including linear and nonlinear optimization, integer programming, dynamic program, and robust optimization. They will know how these models can applied to financial risk management, operations and supply chain management.

17. 课程内容及教学日历（如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）  
**Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)**

**Lecture (48 hours)**

**Week 1:**

Introduction to operations research, its background and applications

**Week 2:**

Linear programming: formulation, application and sensitivity analysis

**Week 3:**

Integer programming: formulation, application and challenge

**Week 4:**

Nonlinear programming I: convexity set, convex function and their properties

**Week 5:**

Nonlinear programming II: optimality condition, global solution and local solution

**Week 6:**

Application in financial portfolio management: mean-variance model, stock examples with real data

**Week 7:**

Application in production planning: EOQ and DELS models

**Week 8:**

Application in pricing and inventory: price-setting Newsvendor problem, supply contract

**Week 9:**

Midterm Exam

**Week 10:**

Robust optimization formulation and its application

**Week 11:**

Dynamic programming I: examples, concept, and formulation

**Week 12:**

Dynamic programming II: finite horizon problems, asset selling with a deadline

**Week 13:**

Dynamic programming III: infinite horizon problems, credit default risk evaluation

**Week 14:**

Application in financial risk management: binormal tree model, Black-Scholes formula

**Week 15:**

Application in multi-period operations management problems, periodic-review inventory and pricing control

**Week 16:**

Paper presentation

18. 教材及其它参考资料 **Textbook and Supplementary Readings**

Dimitri P. Bertsekas. Dynamic Programming and Optimal Control. Vol 1. Third Edition. 2005  
 Dimitri P. Bertsekas. Nonlinear Programming: 3rd Edition. 2016

**课程评估 ASSESSMENT**

19. 评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
出勤 Attendance		10		
课堂表现 Class Performance				
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments		20		
期中考试 Mid-Term Test		20		
期末考试 Final Exam		30		
期末报告 Final Presentation		20		
其它（可根据需要改 写以上评估方式） Others (The above may be modified as necessary)				

20. 记分方式 **GRADING SYSTEM**

- A. 十三级等级制 **Letter Grading**  
 B. 二级记分制（通过/不通过） **Pass/Fail Grading**

**课程审批 REVIEW AND APPROVAL**

21. 本课程设置已经过以下责任人/委员会审议通过  
 This Course has been approved by the following person or committee of authority