课程大纲
COURSE SYLLABUS

1.	**课程代码/名称** **Course Code/Title**	工程优化方法 Engineering Optimization Methods
2.	**课程性质** **Compulsory/Elective**	专业选修课 Major Elective Courses
3.	**开课单位** **Offering Dept.**	系统设计与智能制造学院，SDIM
4.	**课程学分/学时** **Course Credit/Hours**	3/48
5.	**授课语言** **Teaching Language**	中英文 English & Chinese
6.	**授课教师** **Instructor(s)**	杨再跃，教授，系统设计与智能制造学院，yangzy3@sustech.edu.cn
7.	**开课学期** **Semester**	秋季 Fall
8.	**是否面向本科生开放** **Open to undergraduates or not**	是
9.	**先修要求** **Pre-requisites**	（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.） 研究生：有工程类、数理类的本科学位 本科生：高等数学或数学分析、线性代数、概率论与数理统计

10. 教学目标
Course Objectives

（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.）
For PG students: The objective is to enhance the ability of using fundamental theories and typical algorithms of operation research in dealing with practical engineering optimization and decision-making problems. The students are required to comprehend the mathematical models of operation research, the fundamental optimization theory and typical optimization algorithms.

For UG students: The objective is to extend their mathematical knowledge to the fundamental theories and typical algorithms of operation research, with applications to practical engineering scenarios.

11. 教学方法
Teaching Methods

（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.）

Classroom teaching, homework, quiz, and Matlab/Python projects. The same methods will be applied to UG students.

12. 教学内容
Course Contents
（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.）

Section 1	绪论/introduction 介绍工程优化与决策问题的应用场景、分类与算法/introducing the applications, classification and algorithms of engineering optimization

		and decision-making problems
	Section 2	线性规划/linear programming 线性规划问题模型、单纯形法、灵敏度分析 /linear programming and its model, simplex method, sensitivity analysis
	Section 3	整数规划/integer programming 整数规划问题模型、分支定界法、割平面法、0-1 规划/integer programming, branch and bound method, cutting plain method, 0-1 programming
	Section 4	非线性规划/nonlinear programming 非线性规划问题模型、无约束问题、有约束问题、凸规划问题、无约束算法、有约束算法/nonlinear programming and its model, unconstrained problem, constrained problem, convex problem, unconstrained algorithms, constrained algorithms
	Section 5	动态规划/dynamic programming 动态规划问题模型、最优性原理、动态规划应用 /dynamic programming, optimality principle, applications of dynamic programming
	Section 6	博弈论/game theory 博弈论、完全信息静态博弈、纳什均衡/game theory, static games of complete information, Nash equilibrium
	Section 7	排队论/queuing theory 排队论模型、泊松过程、M/G/1 公式/queuing model, Poisson process, M/G/1 formula
	Section 8	
	Section 9	
	Section 10	
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13. 课程考核
Course Assessment

（①考核形式 Form of examination；②.分数构成 grading policy；③如面向本科生开放，请注明区分内容。If the course is open to undergraduates, please indicate the difference.）

平时作业 Assignments 40%
期末考试 Final Exam 60%

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

《运筹学讲义》，熊军林，中国科学技术大学.

运筹学. 清华大学出版社，第 4 版，2012.

Operations Research: An Introduction. Prentice Hall, 9th, 2011.