课程大纲
COURSE SYLLABUS

1.	**课程代码/名称 Course Code/Title**	**工程优化基础/Engineering Optimization and Decision**
2.	**课程性质 Compulsory/Elective**	选修/ **Elective**
3.	**课程学分/学时 Course Credit/Hours**	3/48
4.	**授课语言 Teaching Language**	Chinese/English
5.	**授课教师 Instructor(s)**	杨再跃
6.	**是否面向本科生开放 Open to undergraduates or not**	是 Yes
7.	**先修要求 Pre-requisites**	研究生无先修课 本科生：高等数学、线性代数

8. 教学目标 Course Objectives

培养学生科学地运用运筹学理论和算法解决工程应用中的实际优化问题的能力。本课程要求学生掌握常见的运筹学模型、基本的优化理论，以及典型的优化算法。

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.

9. 教学方法 Teaching Methods

课堂讲授与课后练习相结合。
Lecturing and assignments.

10. 教学内容 Course Contents

Section 1	绪论、线性规划问题模型/Introduction, linear programming and its model
Section 2	单纯形法/Simplex method
Section 3	其它单纯形法/Other simplex methods
Section 4	对偶理论与灵敏度分析/Duality theory and sensitivity analysis
Section 5	非线性规划问题模型、无约束问题/Nonlinear programming and its model, unconstrained problem
Section 6	有约束问题、凸规划问题/Constrained problem, convex problem
Section 7	无约束算法、有约束算法/Unconstrained algorithms, constrained algorithms
Section 8	整数规划问题模型、分支定界法/Integer programming, branch and bound method
Section 9	割平面法、0-1 规划/Cutting plain method, 0-1 programming

	Section 10	动态规划问题模型、最优性原理/Dynamic programming, optimality principle
	Section 11	动态规划应用、动态规划与静态规划的关系/Applications of dynamic programming, dynamic programming vs static programming
	Section 12	博弈论、完全信息静态博弈/Game theory, static games of complete information
	Section 13	纳什均衡/Nash equilibrium
	Section 14	完全信息动态博弈/Dynamic games of complete information
	Section 15	启发式方法及其应用/Heuristic approaches and applications
	Section 16	遗传算法/Genetic algorithm
11.	**课程考核 Course Assessment**	
	50%平时成绩与 50%期末考试成绩。50% from assignments and 50% from final exam.	
12.	**教材及其它参考资料 Textbook and Supplementary Readings**	
	运筹学. 清华大学出版社, 第 4 版, 2012. 最优化理论与算法. 清华大学出版社, 第 2 版, 2005. Operations Research: An Introduction. Prentice Hall, 9th, 2011.	