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.	**课程名称 Course Title**	工程优化基础 Fundamentals of Engineering Optimization
2.	**授课院系** **Originating Department**	机械与能源工程系 Department of Mechanical and Energy Engineering
3.	**课程编号** **Course Code**	ME426
4.	**课程学分 Credit Value**	3
5.	**课程类别** **Course Type**	专业选修课 Major Elective Courses
6.	**授课学期** **Semester**	秋季 Fall
7.	**授课语言** **Teaching Language**	英文 English
8.	**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& Contact（For team teaching, please list all instructors）**	杨再跃 机械与能源工程系 Department of Mechanical and Energy Engineering yangzy3@sustech.edu.cn
9.	**实验员/助教、所属学系、联系方式** **Tutor/TA(s), Contact**	待公布 To be announced
10.	**选课人数限额(可不填)** **Maximum Enrolment（Optional）**	

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		24		48

12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	MA102B 高等数学（下）A CalculusIIA MA103A 或 MA103B 线性代数 IA 或线性代数 IB Linear Algebra I A or Linear Algebra I B
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	凸优化等课程
14. 其它要求修读本课程的学系 Cross-listing Dept.	电子、计算机等

教学大纲及教学日历 SYLLABUS

15. **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.

16. **预达学习成果 Learning Outcomes**

掌握线性规划、非线性规划、整数规划、动态规划、博弈论、启发式方法的基础理论和常用算法。

Comprehend the fundamental theories and typical algorithms of Linear Programming, Nonlinear Programming, Integer Programming, Dynamic Programming, Game Theory and Heuristic Approaches

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.)

课程内容(学时)Course Contents(Credit Hours)

章节/chapter	教学内容/Course Contents	学时/Hours
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	2
2、线性规划 /linear programming	线性规划问题模型、单纯形法、其它单纯形法、对偶理论与灵敏度分析、/linear programming and its model, simplex method, other simplex methods, duality theory and sensitivity analysis	10
3、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	10
4、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	6
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、动态规划与静态规划的关系/dynamic programming, optimality principle, applications of dynamic programming, dynamic programming vs static programming	6
6、博弈论/game theory	博弈论、完全信息静态博弈、纳什均衡、完全信息动态博弈/game theory, static games of complete information, Nash equilibrium, dynamic games of complete information	8
7、启发式方法 /heuristic approaches	启发式方法及其应用、遗传算法/heuristic approaches and applications, genetic algorithm	6

18. 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.

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				
课堂表现 Class Performance				
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments		30%		
期中考试 Mid-Term Test				
期末考试 Final Exam		70%		
期末报告 Final Presentation				

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
