

## 课程大纲 COURSE SYLLABUS

1.	课程代码/名称 Course Code/Title	高级非线性优化技术 Advanced Nonlinear Optimization
2.	课程性质 Compulsory/Elective	专业课
3.	课程学分/学时 Course Credit/Hours	3/64
4.	授课语言 Teaching Language	英语为主，辅以中文解释 English with Detailed Explanations in Chinese
5.	授课教师 Instructor(s)	程庆沙 Qingsha Cheng
6.	先修要求 Pre-requisites	线性代数，高等数学 Linear Algebra, Calculus
7.	<b>教学目标 Course Objectives</b>	
	<p>The course introduces linear and nonlinear optimization techniques. The topics includes</p> <ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Classical optimization approaches</li> <li>3. One dimensional search</li> <li>4. Unconstrained optimization</li> <li>5. Constrained optimization</li> <li>6. Non-gradient optimization</li> <li>7. Global optimization approaches</li> <li>8. Surrogate modeling and optimization</li> <li>7. Space mapping optimization</li> <li>9. Discussion of recent development in the field</li> </ol>	
8.	<b>教学方法 Teaching Methods</b>	
	<p>理论讲授+上机实验</p> <p>Through this course the students will learn theory and practical skills in optimization techniques and be able to apply them to solve simple problems.</p>	
9.	<b>教学内容 Course Contents</b>	
	<b>Section 1</b>	Introduction
	<b>Section 2</b>	Classical optimization approaches
	<b>Section 3</b>	One dimensional search
	<b>Section 4-5</b>	Unconstrained optimization
	<b>Section 6-7</b>	Constrained optimization
	<b>Section 8-9</b>	Non-gradient optimization
	<b>Section 10-11</b>	Global optimization approaches
	<b>Section 12-13</b>	Surrogate modeling and optimization
	<b>Section 14-15</b>	Space mapping optimization
	<b>Section 16</b>	Review and Discussion of recent development in the field
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10.	<b>课程考核 Course Assessment</b>
	6 Matlab Assignments 60% (10 次作业, 其中六次作业记分) Final Group Project 40% (小组课题) - Presentation 20% (答辩) - Report 20% (报告)
11.	<b>教材及其它参考资料 Textbook and Supplementary Readings</b>
	Mohamed H. Bakr, Nonlinear Optimization in Electrical Engineering with. Applications in MATLAB, IET Press, 2013. Singiresu S. Rao, Engineering Optimization Theory and Practice, 4th Edition, John Wiley & Sons Inc., 2009. Edwin K. P. Chong, Stanislaw H. Zak, An Introduction to Optimization, 4th Edition, John Wiley & Sons Inc., 2013. Various recent papers in optimization and modeling of microwave components.