

厦门大学研究生课程教学大纲范本

开课学院/研究院	经济学院	授课学期	2018 年秋季学期
课程名称	数理经济学		
课程英文名称	Mathematical Economics I		
*课程编码		面向对象	经济学院一年级硕、博研究生
先修课程或 预备知识要求	中级微观经济学 高等数学（微积分，线性代数，概率统计）		
课程学科分类	<input type="checkbox"/> 一级学科课程 <input type="checkbox"/> 二级学科课程 <input type="checkbox"/> 研究方向课程		
课程内容分类 (可多选)	<input type="checkbox"/> 理论讲授类 <input type="checkbox"/> 实验类 <input type="checkbox"/> 实务或实践类 <input type="checkbox"/> 研究方法类 <input type="checkbox"/> 研讨类 <input type="checkbox"/> 文献类 <input type="checkbox"/> 其他_____ (请注明)		
总学分/总学时	56	实践(含实验)学时	0
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助教		联系方式	
中文课程简介 (Course description in Chinese)	<p>本课程会介绍高年级本科经济学课程中需要用到的一些数学概念、数学工具和数学技巧。本课程会较多的使用线性代数和微积分知识。数学已经成为现代经济学分析的语言工具。运用数学工具有助于量化研究经济变量之间的关系，而且有助于规范化和清晰表述这些关系的一些性质。这样会进一步帮助研究人员分析经济行为中的一般规律。</p> <p>根据授课教师不同，本课程可能采用全英文授课方式。学生需要适应全英文教学方式，并在本课程学习中掌握经济课程中常用到的基本数学工具。除了课堂讲授方式，本课程还采取一定的课堂互动教学方式，例如在讲授某一内容时在课堂中临时布置理解相关内容的作业题然后选择部分学生上讲台展示他们的问题解答。学生还需要在每次课堂讲授接受后对所学内容进行及时复习，会不定期针对之前课堂讲授内容进行随堂小测验。</p>		

<p>英文课程简介 (Course description in English)</p>	<p>This course is designed to introduce a wide of range of mathematical techniques used in senior undergraduate level economics courses. The course will extensively employ linear algebra and basic calculus. Mathematics has become the language of modern analytical economics. It quantifies the relationships between economic variables and among economic actions. It formalizes and clarifies properties of these relationships. In the process, it allows economists to identify and analyze those general properties that are critical to the behavior of economic systems.</p> <p>This course is taught in English. Students should get used to lecturing in English and grasp basic mathematical tools commonly used in economics courses. In addition to lecturing, some class interactions are also involved, especially in-class assignments for which selected students are expected to demonstrate the answers in front of their cohorts. Students are also expected to review materials at the end of each lecture class and are expected to take a quiz for every a few weeks.</p>
<p>课程内容 与预期成果 (Course content & Expected Learning Outcomes)</p>	<p>1: Review of Basic Knowledge of Calculus and Linear Algebra (Chapter 2, 3, 6, 7, 8, 9) 复习微积分和线性代数的基本知识 (指定教材第 2, 3, 6, 7, 8, 9 章)</p> <p>2: Euclidean Spaces (Chapter 10) In this chapter, we begin with studying how to generalize notions of points, lines, planes, distances, and angles to n-dimensional Euclidean spaces. Later, our analyses of n-commodity economies will make heavy use of these concepts. 欧几里得空间 (指定教材第 10 章) 在本章中, 我们首先研究如何将点、线、平面、距离和角度的概念推广到 n 维欧氏空间。我们对多个商品的经济分析将会对这些概念进行大量的使用。</p> <p>2: Linear Independence (Ch 11) In this chapter, we begin with the definition and characterization of linear independence. The complementary notion of span and the concept of a basis for Euclidean space are then introduced. 线性独立 (指定教材第 11 章) 本章我们首先介绍线性独立的概念, 然后介绍欧式空间基的概念。</p> <p>3: Limits and Open Sets (Ch 12) This chapter focuses on studying in some detail the notions of sequence, limit, neighborhood, open set and closed set.</p>

极限和开集（指定教材第 12 章）

本章我们介绍数列、极限、邻域、开集和闭集等概念。

4: Functions of Several Variables (Ch 13)

This chapter begins the study of nonlinear functions of several variables. It develops some vocabulary for working with multivariable functions and indicates how to visualize these underlying relationships geometrically, at least, when there are only three or four variables involved.

多元函数（指定教材第 13 章）

本章我们介绍多元函数的概念，以及引入有关多元函数的一些术语和画出水平集。

5: Calculus of Several Variables (Ch 14)

A primary goal in economic analysis is to understand how a change in one economic variable affects another. This chapter introduces multivariable calculus as the primary tool for understanding how variables affect others in economic relationships described by functions of several variables.

多元函数微积分（指定教材第 14 章）

经济分析的一个重要目标是理解经济变量之间的互相影响。本章我们介绍分析经济变量之间关系的求偏导数工具。

6: Implicit Functions and Their Derivatives (Ch 15)

Frequently, the equations which arise naturally have the exogenous variables mixed in with the endogenous variables. We still want to answer the basic question: how does a small change in one of the exogenous variables affect the value of the endogenous variable? This chapter will demonstrate how to answer this question for implicit functions.

隐函数定理（指定教材第 15 章）

本章介绍当函数没有显示给出时，如何回答外生变量的变化对内生变量影响的问题。

7: Quadratic Forms and Definite Matrices (Ch 16)

The natural starting point for the study of optimization problems is the simplest such problem: the optimization of a quadratic form. This chapter studies some basic properties about quadratic forms and definite matrices.

	<p>二次型函数及矩阵的正定性（指定教材第 15 章） 本章介绍如何将二次型函数写成矩阵表达方式并通过研究矩阵的正定性来确定函数的最优值。</p> <p>8: Unconstrained Optimization(Ch 17) Since optimization plays such a major role in economic theory, this chapter on unconstrained optimization can be considered a core of this course. This chapter turns from the matrix criteria that specify the conditions for optimizing a quadratic form to the first and second order derivative conditions that characterize the optima of a general differentiable function.</p> <p>无约束下的最优化问题（指定教材第 17 章） 本章在二次型函数基础上拓展到一般的多元函数如何寻找确定其最优值。</p> <p>9: Constrained Optimization (Ch 18) This chapter begins the treatment of constrained maximization problems. We bring all the mathematical background of the previous chapters to bear on this central topic of economic theory.</p> <p>约束条件下的最优化问题（指定教材第 18 章） 本章介绍求解约束条件下最优化问题的拉格朗日方法。</p> <p>10: Constrained Optimization II (Ch 19) This chapter continues our study of the central mathematical technique in economic theory: the solution of constrained optimization problems. We look at three other aspects of the Lagrangian approach.</p> <p>无约束条件下的最优化问题 II（指定教材第 19 章） 本章介绍无约束条件下最优化问题拉格朗日方法中的二阶条件以及包络引理。</p> <p>11: Homogeneous and Homothetic Functions (Ch 20) This chapter examines the important properties of a special kind of functions which arise in economic models: homogeneous functions and homothetic functions.</p> <p>齐次函数和位似函数（指定教材第 20 章） 本章介绍经济模型中常用的一类特殊函数：齐次函数和位似函数。</p> <p>12: Concave and Quasiconcave Functions (Ch 21) Concave functions play a role in economic theory similar to the role that homogeneous functions play. This chapter examines the important properties of concave and quasiconcave functions.</p>
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	<p>凹函数和拟凹函数（指定教材第 21 章）</p> <p>本章介绍经济模型中具有特殊性质的一类函数：凹函数和拟凹函数。</p>
<p>教学方式 和学习活动 (Teaching and learning activities)</p>	<p>The course is taught through lectures, Q&A in the class, homework, and quizzes. There are 28 lectures in total.</p> <p>本门课程的教学方式包括课堂讲授、课堂问答讨论、课后作业以及小测。一共有 28 次课堂讲授。</p>
<p>考核方式 Assessment Crite</p>	<p>Attendance/Homework/Quiz: 20% 出勤/课后作业/小测：20%</p> <p>Midterm Exam: 30% 期中考试：30%</p> <p>Final Exam: 50% 期末考试：50%</p> <p>The program defines scholastic dishonesty broadly as any act by a student that misrepresents the student's own academic work or that compromises the academic work of another. Examples include cheating on assignments or exams, plagiarizing (misrepresenting as one's own anything done by another), unauthorized collaboration on assignments or exams, or sabotaging another student's work. Students, who copy assignments, allow assignments to be copied, or cheat on quizzes will fail the assignment or quiz on the first offense, and fail the entire course on the second. Cheating on mid-term or final exams will result in automatic failure for the course.</p> <p>我们把学术上的不诚实定义为一个学生歪曲学生自己的学术工作或损害他人学术工作的行为。例如，在作业、小测或考试中作弊。第一次发现作业或者小测</p>

	<p>中的不诚实行为将导致本次成绩不合格，第二次发现将导致课程不及格。发现考试中的不诚实行为将直接导致课程不及格以及学校规定的其它处分。</p>
<p>学习资源 (Learning Resources)</p>	<p>包括教材、参考书、参考文献，以及其他获取课程学习资源的途径等。</p> <p>Mathematics for Economists, First Edition, by Carl P. Simon and Lawrence Blume</p> <p>Mathematical methods and models for economists , Angel de la Fuente, Cambridge University Pr., 2000</p>
<p>备注</p>	<p>凡表格以上部分无法涵盖、教师认为需要说明的问题，请在此列出。</p>

*新开设课程可不填写课程编码，同意开设后由教学秘书编码并填入本表。

注：凡授课对象含海外学生的课程必须同时提供本表中所有内容的英文版本。