课程大纲
COURSE SYLLABUS

1.	课程代码/名称 **Course Code/Title**	社交网络模型及应用 Social Network Models and Applications
2.	课程性质 **Compulsory/Elective**	选修课 Elective Courses
3.	课程学分/学时 **Course Credit/Hours**	3/64
4.	授课语言 **Teaching Language**	中英双语 English & Chinese
5.	授课教师 **Instructor(s)**	胡大宁 HU Daning
6.	先修要求 **Pre-requisites**	无 No
7.	教学目标 **Course Objectives**	
	本课程是一门研究方法课程，主要涵盖以下课题：社交网络数据的获取、处理和挖掘，社交网络分析，计量经济因果推断方法，以及对计量经济学方法和机器学习的结合等，考察社交网络行为原理、效应机制及模型，介绍在社交网络作用下正在浮现与发展起来的一些交叉学科领域，讨论社会、经济和技术领域相互联系的基本网络问题。通过学习，使学生掌握网络的基本概念及原理，并运用这些原理分析社会与经济中的网络系统特性。该课程为社交网络分析和建模提供了基础，为学生学习金融科技技术，从事创新金融行业奠定基础。 This course is about research methods. The main topics include data mining, social network analysis, causal inference, integration of econometrics and machine learning, the basic concepts and methodologies in network analysis from perspectives of economics, society, computing and information sciences. The course covers the basic network analysis problems in society, economics, and technology domains. Students can learn the basic network analysis methods, and learn how to use them. The course will equip students the basic skills in social network analysis and models to pursue further study in the Fintech domain.	
8.	教学方法 **Teaching Methods**	
	理论课形式主要为课堂讨论研究文章及方法，并辅以研究方法实际操作，共 32 学时理论课和 32 学时实验课。 The lecture is mainly for the discussion of research articles and methods, and the practical operation of the research methods is supplemented. There are total 32 hours of lectures and 32 hours of lab courses.	
9.	教学内容 **Course Contents**	
	理论 Lecture	
	Section 1	社交网络模型及应用的基础知识介绍 This part introduces the basic concepts in social network models and applications.
	Section 2	节点级分析：介绍网络度中心性的概念的计算方法 Node Level Analysis: This part introduces the definition and calculations of degree centrality.
	Section 3	链接级分析：介绍社交网络中的链接 Link Level Analysis: This part introduces links in a social network.
	Section 4	群组级分析: 介绍如何在社交网络中侦测社区，即连通性非常密集的图的子图

	Group Level Analysis: This part introduces how to detect a community in a social network, that is, a subgraph of a graph with dense connectivity.
Section 5	网络级分析：介绍社交网络数据分析中的方法应用，如随机、小世界、无标度网络拓扑模型 Network Level Analysis: This part introduces the methodologies in social network analysis such as random, small-world and scale free topological models.
Section 6	基于社交网络环境的普通线性回归的原理和使用 This part introduces the principle and use of ordinary linear regression under social network environment.
Section 7	基于社交网络环境的普通线性回归的研究方法和文章讨论 Seminar: Discussion of research methods and literature about ordinary linear regression under social network environment.
Section 8	基于社交网络环境的工具变量法的原理和使用 This part introduces the principle and use of instrumental variables under social network environment.
Section 9	基于社交网络环境的工具变量法的研究方法和文章讨论 Seminar: Discussion of research methods and literature about instrumental variables under social network environment.
Section 10	基于社交网络环境的双重差分法的原理和使用 This part introduces the principle and use of difference-in-differences under social network environment.
Section 11	基于社交网络环境的双重差分法的研究方法和文章讨论 Seminar: Discussion of research methods and literature about difference-in-differences under social network environment.
Section 12	基于社交网络环境的断点回归法的原理和使用 This part introduces the principle and use of regression discontinuity under social network environment.
Section 13	基于社交网络环境的断点回归的研究方法和文章讨论 Seminar: Discussion of research methods and literature about regression discontinuity under social network environment.
Section 14	基于社交网络环境的面板数据的原理和使用 This part introduces the principle and use of panel data under social network environment.
Section 15	基于社交网络环境的面板数据的研究方法和文章讨论 Seminar: Discussion of research methods and literature about panel data under social network environment.
Section 16	期末复习 Final Review
实验 Lab	
Section 1	网络可视化工具 NetDraw 的介绍 This part introduces the network and data visualization tools—NetDraw.
Section 2	NetDraw 网络分析：介绍 NetDraw 的功能。通过本部分的学习，学生会

		使用 NetDraw 进行社交网络分析。 This part mainly explains the functions of the network visualization tool—NetDraw. In this part, students will learn how to use NetDraw for social network analysis.
	Section 3	R 基础语法（上）：赋值，数值比较，特殊常量 This part mainly explains assignment, value comparisons and special constants in R.
	Section 4	R 基础语法（中）：向量，元素，矩阵，数组 This part mainly explains vector, factor, matrix and list in R.
	Section 5	R 基础语法（下）：列表，数据框，流量控制与循环 This part mainly explains lists, data frames, flow control and loops in R.
	Section 6	R 画图和错误排除 This part introduces R plots and troubleshooting.
	Section 7	介绍 R 语言中 igraph 包，以及如何读取使用 R 语言读取社会网络文件。 This part focuses on the use of the igraph package in R, and shows how to read network data from files.
	Section 8	使用 igraph 包画出社会网络图 This part mainly instructs students how to use the igraph package to draw a social network map.
	Section 9	对社交网络数据进行基本测度 This part mainly instructs students to make measures of social network data.
	Section 10	课程报告（上）：指导学生利用 NetDraw 和 R 完成一份完整的社交网络模型报告。 This part instructs students to complete a social network model report by using NatDraw and R.
	Section 11	课程报告（中）：指导学生利用 NetDraw 和 R 完成一份完整的社交网络模型报告。 This part continues to instruct students to complete a social network model report by using NatDraw and R.
	Section 12	课程报告（下）：指导学生利用 NetDraw 和 R 完成一份完整的社交网络模型报告。 This part continues to instruct students to complete a social network model report by using NatDraw and R.
	Section 13	Python 基础语法 This part introduces Python basic grammar.
	Section 14	利用 Requests 库进行 Python 爬虫 This part introduces how to use Requests in Python to do web crawler.
	Section 15	利用 BeautifulSoup 库抓取网络上的图片和文本 This part introduces how to use BeautifulSoup in Python to grab images and text from the internet.
	Section 16	期末复习 Final Review
10.	课程考核	

	Course Assessment
	30%平时作业 + 70%期末报告 30% Assignments + 70% Final Report
11.	**教材及其它参考资料** **Textbook and Supplementary Readings**
	(1) 网络群体与市场：提示高度互联世界的行为原理与效应机制 [Networks，Crowds，and Markets Reasoning about a Highly Connected World]. 大卫·伊斯利 著，李晓明，王卫红，杨韫利 译. 清华大学出版社, 2011. (2) 乔舒亚·安格里斯特, 约恩-斯特芬·皮施克. 基本无害的计量经济学[M]. 格致出版社, 2012.