The Chinese University of Hong Kong
2017-2018 Term 2
ECON4130
Economic Analysis for Social Networks

**Time & Venue** Friday 8:30AM - 11:15AM at ELB 207

**Instructor:** Chih-Sheng Hsieh ([cshsieh@cuhk.edu.hk](mailto:cshsieh@cuhk.edu.hk)) from Jan 12th to Feb 23rd
Vinci Chow ([vincichow@cuhk.edu.hk](mailto:vincichow@cuhk.edu.hk)) from Mar 2nd to Apr 20th

**Instructor Office Hours:**
- Chih-Sheng Thursday 10-12 pm or by appointment at ELB 911
- Vinci Tuesday 3-4 pm or by appointment at ELB 1004

**TA:** Jinan Lin ([jlin@link.cuhk.edu.hk](mailto:jlin@link.cuhk.edu.hk))

**TA Office Hours:** Friday 11:30 am - 12:30 pm or by appointment at ELB 1017

**Course Overview:**

In this course, we will introduce empirical network analysis in Economics. Facing the rapid growth of network studies in the economic research, it becomes an attractive and must-know subject for economic undergraduates, particularly when network data are widely available in this big data era.

In the first half of this course, we will learn how to describe network data and incorporate network information into the regression analysis. Next, we will discuss how to empirically model peer (spillover) effects in networks and network formation. In the second half of the course, we will cover techniques to obtain and process data for network analysis, as well as machine learning methods commonly used in this area. Throughout this course, students will learn to use two types of software—R and Python—to collect, arrange, and analyze network data. Students will also learn network visualization software to facilitate presentation of analysis results.

Students are recommended to have knowledge of basic statistics and regression analysis before taking this course.

**Learning Outcomes:**

After completing this course, the student should be:

1. Acquainted with basic terminologies in social and economic network analysis.
2. Able to perform econometric regressions on network data and provide economic interpretations.
3. Understand the common machine learning techniques used in analyzing data from social media.
4. Able to use software R and Python to collect data and conduct network analysis.
Requirements:

1. Course participation 20%
   There will be several on-lecture assignments which exercise the use of R and Python

2. Research proposal and presentation 80%
   Students have to hand in two research proposals and give a presentation at the end of
   the semester. Students should meet and discuss their proposals with the instructor at
   least once before submitting the proposal and presenting.

Research Proposal:

The topic of the first research proposal should be related to social and economic networks.
The second proposal should be related to machine learning (or data mining). The length of
each proposal is limited to seven pages. The structure of the proposal includes: (1) abstract
(2) long term impact (3) objectives (4) background and research methodology (5) reference

Textbooks:

There is no mandatory textbook. Course materials will be designed and compiled by the
instructors.

Recommended Readings:

Hastie, Trevor, Robert Tibshirani and Jerome Friedman (2016) The Elements of Statistical
Learning, Springer

Tentative Lecture Schedule:

Week 1 (Jan 12th): Introduction of social networks

Week 2 (Jan 19th): Regression analysis with network variables

Week 3 (Jan 26th): Peer effects from social networks

Week 4 (Feb 2nd): Network formation models (I)

Week 5 (Feb 9th): Network formation models (II)

Week 6 (Feb 16th): **No class due to Lunar New Year holiday**
Week 7 (Feb 23rd): Network sampling and missing link problems (due of preliminary version of the 1st proposal)

Week 8 (Mar 2nd): What are Machine Learning and Data Mining?

Week 9 (Mar 9th): Modelling choice behavior (due of the 1st proposal)

Week 10 (Mar 16th): Working with image data

Week 11 (Mar 23rd): Working with image data II

Week 12 (Mar 30th): No class due to Easter holiday

Week 13 (Apr 6th): Working with text data I

Week 14 (Apr 13th): Working with text data II (due of preliminary version of the 2nd proposal)

Week 15 (Apr 20th): Student Presentation (the second proposal due on April 27th)

Access ELB 916 Computing Lab:

There are two things to note before you can use the computer in the Lab:

1. To enter the computing lab, you need to use your student card.
2. To log in computers, you need to input your “Computing ID” and your “PC LAN password”. Please note that your PC LAN password is different from your CWEM password. Your PC LAN password is provided to you from ITSC with a Computing Accounts Information Slip.

Honesty in Academic Work

Please visit the following website for details of university policy on Honesty in Academic Work: http://www.cuhk.edu.hk/policy/academichonesty/. Every assignment must be accompanied by a signed declaration of originality