The New Science of Networks

Course Description

The study of networks has become a topic of increasing interest across a range of academic disciplines, including sociology, anthropology, economics, physics, biology, mathematics, and computer science. With new tools provided by powerful but affordable computers and computing software, researchers have made impressive gains in modeling and theorizing the nature of networks as complex, large-scale, interactive systems. One of the results of this research has been the greater appreciation of the way that networks and their properties provide a bridge between formerly separate disciplines and areas of study. The aim of this course is to provide an introduction to and overview of this newly emerging science of networks. More specifically, the course will focus: (1) the current state of knowledge and debate concerning the general properties of networks as complex, interactive systems; (2) representative examples of substantive research on networks from a range of academic fields; and (3) training in the methods of empirical network analysis using real-world data and cutting-edge computer software.

Course Readings

The two main texts for the course are:


Both of these can be purchased at the UO Bookstore or from one of the online booksellers. Additional readings will be made available online.

Network Software

The software program *Ucinet 6* will be used to teach the basic methods of network analysis. Students can download a fully functional 30-day trial version of the software from Analytic Technologies (http://www.analytictech.com/ucinet.htm). The download includes several additional freeware programs (*NetDraw*, *Pajek*, and *Mage*) that should be installed along with *Ucinet*. For $40 students can register their copy of *Ucinet*, which will enable it to function beyond the 30-day period. Those who can afford to do so are encouraged to register the software. There will also be copies of *Ucinet* installed on five workstations in the Honors College computer lab.

Course Website

The website for the course is located at http://uoregon.edu/~vburris/hc431. The website will provide links to additional readings, assignments, and various resources relevant to networks and network analysis.
Student Evaluation

Students will be evaluated based on their class participation (30 percent), a series of brief lab assignments (40 percent), and a 10-15 page term paper that explores some aspect of network theory and research (30 percent). Term papers are due on Monday, March 20. There will be no exams.

Class Schedule and Required Readings

The following schedule is somewhat tentative and only a bare skeleton of readings for the class. Additional readings (required or recommended) may be added during the course of the term and others may be dropped. The final four weeks of the term are reserved for exploring specific topics in greater depth and may be modified depending upon the topics that prove to be of greatest interest to students in the class. Updated versions of the schedule will be posted on the course website.


January 11. Graph theory, random networks, small worlds.
  • Albert-László Barabási, Linked: The New Science of Networks, chapters 1-5.

January 16. MLK Day (no class meeting).

  • Albert-László Barabási, Linked: The New Science of Networks, chapters 6-10.

January 23. Internet, WWW, biological networks, economic networks, complexity.


  • John Scott, Social Network Analysis: A Handbook, chapters 1-4

February 1. Centrality.

February 6. Subgroups.

February 8. Roles and positions.
February 13. Visualizing networks I.

February 15. Visualizing networks II.

February 20. Special topic: Social capital.


February 27. Special topic: Scientific networks.


March 15. Final class (no readings).