

CME594 Cities and Complexity

Instructor: Professor S. Derrible, 2071 ERF, derrible@uic.edu
Office hours: TBD

Hours: Class: Tuesday, Thursday: 5:00 – 6:15.

Summary: This course exposes students to concepts of complexity and complex systems within the context of cities. Covered topics include scaling laws, power laws, network science, cellular automata, and agent-based modeling. Emphasis is put into understanding complexity from a conceptual standpoint, both at the qualitative and quantitative levels. The main assessment is a final paper where the students are asked to study a topic of their choice from a complexity point of view.

Objectives: This course aims to provide students with fundamental knowledge on complex systems in general, with a particular focus on cities, and explore complexity in their own field of research or interest through a practical application. More specifically, at the end of this course, students should be able to:

1. recall the major properties of a complex system,
2. critically assess a scientific article on the topic of complex systems,
3. identify real-life complex systems and explain which features of these systems makes them complex,
4. discuss the various techniques that can be applied to determine whether a system is complex or not,
5. measure and discuss the properties of complex systems,

Textbook: # Batty, M., 2013, “[The New Science of Cities](#)”, MIT Press, Cambridge, MA.

List of other useful resources for the course:

- # Batty, M., 2007, “[Cities and Complexity](#)”, MIT Press, Cambridge, MA.
- # Easley, D, & Kleinberg, J, 2010, “[Networks, Crowds, and Markets](#)”, Cambridge University Press, Cambridge, UK
- # Bar-yam, Y., 1997, “[Dynamics of Complex Systems](#)”, Westview Press,
- # Any books/resources related to complex systems, whether technical or non-technical. See a list [here](#).

Tentative Grading Policy: Attendance, participation, behavior (20%)
Book review (20%)
In class paper review, and discussion (7%)
Abstract (8%)
Presentation (5%)
Visualization (10%)
Final Paper (30%)

Work submitted late may receive a penalty.

Plagiarism: Plagiarism is a serious offense and it will not be tolerated; see university policy. All reviews, papers and any other submitted material will be run through a plagiarism tool.

Attendance Policy: All students are required to attend the lectures and be on time. If at any moment a student is to be absent, he/she should have discussed it prior with the instructor.

Professional Conduct: Students are always expected to conduct themselves with the utmost respect towards the instructor and their fellow students. Cellphones are to be turned off.

Class Schedule: TBD