

CME494 Cities and Sustainable Infrastructure

- Instructor:** Professor S. Derrible, 2071 ERF, derrible@uic.edu
Office hours: Monday: 2:00 – 4:00; Thursday: 2:00 – 4:00
- TA:** S. Bulusu, 4266 SEL, sbulus5@uic.edu
Office hours: TBD
- Hours:** Lectures: Tuesday, Thursday: 5:00 – 6:15.
- Summary:** This course exposes students to concepts of smart cities and integrated urban infrastructure engineering. Infrastructure systems studied include: water, wastewater, electricity, transportation, and buildings. Emphasis is put on framing novel urban infrastructure issues using principles of sustainability and resilience. The main assessment is a team design project where students are expected to design an entire neighborhood.
- Pre-requisites:**
- Undergraduate students: CME302 Transportation Engineering and CME311 Water Resources Engineering, or consent of the instructor.
 - Graduate students: consent of the instructor.
- Objectives:** This course aims to provide students with the critical knowledge and technical expertise to visualize and design urban systems as integrated, distributed and intelligent entities. More specifically, at the end of this course, students should be able to:
1. understand how water distribution, wastewater collection, electricity generation, transportation, building heating/cooling, and other urban infrastructure characteristics work and operate individually from an energy and urban metabolism perspective.
 2. integrate their knowledge to identify inter-dependencies between each infrastructure system and plan an entire urban environment that is both sustainable and resilient.
 3. apply sound carbon accounting and financial engineering techniques to assess the feasibility of an undertaking and its efficiency in terms of global greenhouse-gas reduction.
- Textbook:** No textbook required. List of useful resources for the course:
- Bauer, K. (2010) City Planning for Civil Engineers, Environmental Engineers, and Surveyors, CRC Press, Taylor and Francis Group, Boca Raton, FL
 - Hudson, R., Haas, R., Uddin, W. (1997) Infrastructure Management: integrating design, construction, maintenance, rehabilitation, and renovation, McGraw-Hill, New York, NY

- OECD (2006) Infrastructure to 2030: Telecom, Land Transport, Water and Electricity, Organization for Cooperation and Economic Development Publishing, Paris, France
- Thuesen, G. J., Fabrycky W. J. (2000) Engineering Economy (Ninth Edition) Prentice Hall, Englewood, NJ
- SIG (2010) Getting to Carbon Neutral: A Guide for Canadian Municipalities, Sustainable Infrastructure Group at University of Toronto, produced for the Toronto and Region Conservation Authority, available at: <http://trca.on.ca/dotAsset/81361.pdf>

Blackboard: All published material “should” be posted on blackboard, including syllabus, lecture materials and homework. Any document placed on blackboard can be modified/deleted at any time without notification from the instructor.

Grading Policy: Attendance, participation, behavior (10%)
 Book Review (G) / History of Urban Planning (UG) (5%)
 Homework (15%)
 Technology report (5%) and presentation (5%)
 Mid-term exam (15% each)
 Design: progress report (10%), leaflet for book compilation (5%), report (15%), presentation (10%), poster (5%).

The grading policy can be changed at any moment during the term.

Work submitted late may receive a penalty. All homework must be submitted or students will be assigned a 0 grade for all of their homework.

While I understand it is easier to learn by collaborating, submissions must be individual except for the design project.

Plagiarism: Plagiarism is a serious offense and it will not be tolerated; see university policy.

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:

Class	Date	Topic
1	Jan 15	No class
2	Jan 17	No class

3	Jan 22	Presentation
4	Jan 24	Part 1 Introduction
5	Jan 29	Part 2 Principles of Sustainable Urban Design
6	Jan 31	Special Class: Cities as Fractals
7	Feb 5	Part 2 Principles of Sustainable Urban Design
8	Feb 7	Part 3 Methods of Environmental Assessment
9	Feb 12	Part 3 Methods of Environmental Assessment
10	Feb 14	Part 4 Energy Use & Greenhouse Gases
11	Feb 19	Part 4 Energy Use & Greenhouse Gases
12	Feb 21	Part 4 Energy Use & Greenhouse Gases
13	Feb 26	Technology Report Presentation1
14	Feb 28	Technology Report Presentation2
15	Mar 5	Class Canceled (Weather)
16	Mar 7	Part 5 Transportation
17	Mar 12	Part 5 Transportation
18	Mar 14	Part 5 Transportation
19	Mar 19	Part 5 Transportation
20	Mar 21	Discussion on project
21	Mar 26	Spring Break
22	Mar 28	Spring Break
23	Apr 2	Part 6 Buildings
24	Apr 4	Part 6 Buildings
25	Apr 9	Part 7 Electricity
26	Apr11	Part 7 Electricity
27	Apr 16	Presentation by Hal Sprague (CNT)
28	Apr 18	Screening of Urbanized (http://urbanizedfilm.com/)
29	Apr 23	Presentation by Cynthia Klein-Banai (UIC Sustainability Office)
30	Apr 25	Final Exam
31	Apr 30	Special Session: Starts at 4pm with Posters in CME atrium, followed by Presentations at 5pm
32	May 2	End of class discussion