

CME494

Cities and Sustainable Infrastructure

- Instructor:** Professor S. Derrible, 2071 ERF, derrible@uic.edu
Office hours: open door policy and email
- TA:** N. Ahmad, 4266 SEL, sahmad38@uic.edu
Office hours: open door policy and email
- Hours:** Lectures: Tuesday, Thursday: 3:30pm – 4:45pm
- Location:** 1033 ERF (Engineering Research Facility)
- Summary:** This course exposes students to concepts of sustainability, cities, and infrastructure design. Infrastructure systems include: transport, buildings, electricity, and water. Emphasis is put on infrastructure integration and carbon accounting 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 analyze, plan and design future urban systems as integrated and low-carbon entities. More specifically, at the end of this course, students should be able to:
1. understand what sustainability means and how it can be applied for engineering projects.
 2. understand the role that cities can play and use various techniques to forecast population.
 3. analyze and calculate energy use and greenhouse-gas (GHG) emissions of most urban systems, including transport, buildings, water and electricity.
 4. integrate their knowledge to identify inter-dependencies between each infrastructure system and plan an entire urban environment that is both sustainable and resilient.
- Textbook:** No textbook required. Notes will be supplied by the instructor for each chapter. Beyond the notes, list of useful resources for the course:
- 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>

- Theis, T., and Tomkin, J. (2012) Sustainability: A Comprehensive Foundation, Connexions. Open-source Textbook, available at: <http://tiny.cc/7m9jqx>
- Bauer, K. (2010) City Planning for Civil Engineers, Environmental Engineers, and Surveyors, CRC Press, Taylor and Francis Group, Boca Raton, FL
- MacKay, D. (2009) (2014) Sustainable Energy - Without the Hot Air, UIT, Cambridge, UK, ISBN 978095445293. Free download at: <http://www.withouthotair.com/>
- Ascher, K., and Marech, W. (2005) The works: anatomy of a city, Penguin Press, New York, NY
- IPCC (2014) Climate Change 2014: Mitigation of Climate Change, Contribution of Working Group III Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, United Kingdom
- OECD (2006) Infrastructure to 2030: Telecom, Land Transport, Water and Electricity, Organization for Cooperation and Economic Development Publishing, Paris, France
- Striebig, B., Ogundipe, A., and Papadakis, M. (2015) Engineering Applications in Sustainable Design and Development, Cengage Learning, ISBN-10: 1133629776

Blackboard: All course notes will be published on blackboard, including syllabus, lecture materials and homework. Solutions to homework will not be published on Blackboard. Any document placed on blackboard can be modified / deleted at any time without notification from the instructor.

Grading Policy: Attendance, participation, behavior (8%)
 Homework (27%)
 Technology report and presentation (5%)
 Mid-term exam (15%)
 Final exam (15%)
 Design: progress report (5%), leaflet for book compilation (5%), report (10%), presentation and poster (10%)

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 13	No class
2	Jan 15	No class
3	Jan 20	Presentation
4	Jan 22	Chapter 1 Introduction
5	Jan 27	Chapter 2 Sustainability
6	Jan 29	Chapter 2 Sustainability
7	Feb 3	Chapter 3 Cities
8	Feb 5	Chapter 3 Cities
9	Feb 10	Chapter 4 Population
10	Feb 12	Chapter 4 Population
11	Feb 17	Chapter 5 Electricity
12	Feb 19	Chapter 5 Electricity
13	Feb 24	Chapter 6 Water
14	Feb 26	Extra Presentation – Group Discussion
15	Mar 3	Chapter 6 Water
16	Mar 5	Technology Presentations
17	Mar 10	Revisions
18	Mar 12	Mid-term 1
19	Mar 17	Chapter 7 Transport
20	Mar 19	Chapter 7 Transport
21	Mar 24	No Class (Spring Break)
22	Mar 26	No Class (Spring Break)
23	Mar 31	Chapter 8 Buildings
24	Apr 2	Chapter 8 Buildings
25	Apr 7	Chapter 9 Urban Planning
26	Apr 9	Chapter 9 Urban Planning
27	Apr 14	Chapter 10 Urban Metabolism
28	Apr 16	Chapter 10 Urban Metabolism
29	Apr 21	Field Trip
30	Apr 23	Revisions
31	Apr 28	Final Exam
32	Apr 30	Movie
32	May 5/7	Final Presentations