ENVI 277 | Sustainable Cities: Urban Environmental Science

Tuesday, Thursday   3:00-4:30   OLRI 243

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Course Description

The world is becoming more and more urban, with over 80% of the US population and half of the world's population living in cities. This trend (and the environmental problems it creates) will only increase throughout the 21st century, yet ecologists are just beginning to understand humans as organisms that influence their environment. Cities are hubs of activity that influence the physical structure, climate, element and energy cycling, and plant and animal communities within the urban footprint. However, these urban environments are influential well beyond their perceived borders. Urban ecologists are expanding their focus from ecology in cities, where they studied urban plants and wildlife, to the ecology of cities, where they consider human-biological interactions with increasing attention to the complex interplay among people, society, and environment. Importantly, this course acknowledges how the lived experiences of urban dwellers vary tremendously, both within and across cities. This course examines current developments in urban ecology and looks at the role it can play in planning and managing urban environments to create equitable futures for all.

Learning Outcomes

At the end of this course you will:
1. Recognize cities as ecosystems comprised of natural, social, and built components
2. Apply core ecological concepts to urban ecosystems and environmental problems
3. Evaluate the intersections of urban ecology with systemic racism and other forms of oppression
4. Examine and critique current best practices in urban environmental management
5. Analyze and interpret data and disseminate knowledge to science and non-science audiences

Course materials
This class does not require a textbook. Reading materials will consist primarily of peer-reviewed journal articles and other reliable publications such as news, popular science articles, and podcasts (all posted on Moodle). These are required and will be discussed in-class activities.

Course structure
This class will primarily focus on the discussion of journal articles and podcasts. One class meeting per week will be devoted to a student-led discussion of a peer-reviewed journal article of choice. While the topic of these discussions (and thus the paper chosen) must be relevant to coursework, I encourage you to bring your own expertise to these discussions (for example, someone studying psychology could choose a paper from a psychology journal). Regardless of who is leading the class (students or instructor), there will be questions to answer online before class starts. *These are due before class, no exceptions.* A large component of the class will be a group research project in which you will harness existing data to address a novel research question relevant to urban environmental science. It is up to you to choose the topic and execute the research, but I will guide you along the way.

Generally, the weekly schedule will be:

Tuesday—I lead class discussion of a new weekly topic

Thursday—Student-led journal club or work on research projects

This course will primarily use Moodle to organize and deliver course materials. Please check Moodle often! We will also frequently use Google docs. Please make sure you are comfortable with these platforms.

Attendance
Attending class is required. However, if you are ill, please do not come to class. If you're feeling well enough to participate but are not comfortable attending for another reason, email me at least one hour before class and I can zoom you in. *I also require that you check-in with me individually at least once during the semester.* This will count towards your participation points. This can be during office hours or individually scheduled meetings.

Office Hours (a better name: *student* hours!)
Office hours are scheduled (and impromptu) time for you to come talk to me. I want to get to know you! You can come with specific questions, feedback on how the course is

going, personal struggles, questions about career paths…truly anything. This is a judgment-free zone—if you did poorly on an assignment or quiz, that creates an opportunity for us to figure out what we can do differently next time (both of us!). We can talk about anything during these hours—you do not need to come with a specific question. I am here to support your learning in any way I can, including topics beyond the classroom.

Participation

Participation constitutes a major percentage of your grade (10%). To earn full participation points, you need to significantly contribute to class discussions. To earn full points for participation: (1) participate in all class activities and (2) share at least 4 'Urban Ecology in the News'. I reserve the right to administer 2 percentage points based on my own evaluation of your participation. The other 8% you will earn through participating in in-class and online discussions and by sharing news items:

Urban Ecology in the News
When you see Urban Ecology, share with the class using the forum at the top of Moodle. You need to share 4 news items throughout the semester, and two must be shared in the first 6 weeks (you cannot wait until the end of the semester). Post a photo of something you see in the world or a relevant news item. For example, if you saw lots of dead leaves in a street gutter this spring, you might share a photo and state,

> "These leaves will leach phosphorus into the storm drains that will eventually make its way to the Mississippi River where it can promote algal growth."

Journal Club Paper Discussions

On multiple Thursdays, students will lead a class discussion of a scientific journal article. Groups of two to three students will independently lead the discussion. You can sign up for the week of your choice below. You may choose any scientific journal article, but if you would like guidance, I am happy to provide you with options. There are also multiple 'optional' papers listed each week that could be selected. I will meet with you to help plan the discussion and come up with questions to send out to the class. I expect groups to meet with me *at least one week prior* to leading the discussion. There is a [short handout](#) you will fill out prior to meeting with me. Paper discussion questions will be due to me on the Monday before the discussion, and I will then circulate them to the class via Moodle. *Answers are due to Moodle before discussion.* Discussion leaders will facilitate the discussion, but I will be available to assist as necessary.

All students will turn in written answers to these questions via Moodle before class. I will read them, but students will receive full credit for completion. I will not accept this assignment late – it is due before class. I expect all students to be prepared to discuss their responses. Every discussion will begin with students (not leaders) presenting figures (I will assign groups of students to each figure).

Date	Led by (2-3 people per slot)
10/5	
11/9	
11/16	
11/30	
12/7	

Quizzes

There will be six take-home quizzes administered throughout the semester, about every 2 weeks. These will be composed of essay questions and will be submitted via Moodle. They will always be available Thursday after class and due Monday at 11:59 PM. These quizzes are intended as a check to make sure you are keeping up with and understanding the readings, but also as a way for me to measure my teaching effectiveness. If everyone earned 100% on these, I would be ecstatic; it means we're both doing a good job! If you are keeping up with the reading and participating in class, you should do well. Your lowest score will be dropped at the end of the semester.

Research Projects

You will conduct research projects in small groups (see examples on Moodle) using publicly available datasets (see running list of data sources on Moodle). Much of this work will be done in groups (see below). You will present your results at a scientific poster session at the end of the semester and your final 'paper' will be the dissemination of your research to the public, either via a journal style article, website, presentation, Op-Ed letter or other appropriate media. This final 'paper' will be executed individually (not as a group).

Breakdown of grades (with due dates) contributing to your overall research project grade:

Assignment	Due date	%
Weekly update (group) + charter	weekly by midnight Friday	5
Proposal (group)	Friday 10/13	10
Research plan presentation (group)	Thursday 10/19	10
Dataset submission (group)	Friday 11/3	5
Methods section draft (group)	Friday 11/10	10
Results draft (group or individual)	Friday 12/8	10
Poster (group)	Thursday 12/14	20
Final 'paper' (individual)	Wednesday 12/20	30

Note that your overall research project grade will be modified by feedback from your peers. For example, if you got 100% on everything, but your peers only rated you 4/5 (averaged, including your evaluation of yourself), your overall research project grade would be 80%.If your peers rated you 5/5, you would get 100%.

Deadlines
Life happens and sometimes you can't submit an assignment by the deadline. I will drop up to two missing assignments (although not for the research project, those assignments are required). This means you can skip a few pre-class questions without it affecting your participation or journal club grade. Any additional assignments that are turned in late will be docked 5 percentage points per day (for example, if you turn something in 3 days late, you will lose 15% of the total points).

Grading
The number of points you accumulate throughout the semester will determine your final grade for this course.

Quizzes (6, can drop lowest)   30%
Independent research project   30%*
Journal club   30%
      Presentation (15%)
      Paper Discussion Questions (15%)
Participation   10%

*note that this grade will be augmented by peer evaluation of your contribution

D	C-	C	C+	B-	B	B+	A-	A
<70	70	73	77	80	83	87	90	>93

Accommodations
I am committed to providing assistance to help you be successful in this course. Please don't hesitate to reach out to me if you need help reaching out to any of the offices below.

In accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act, Macalester College works hard to ensure that all facilities and programs are accessible to all students. Accommodations are based on individual need substantiated by the appropriate process. What is reasonable is also determined by what is essential to this course. Any students who believe that they may need accommodations due to disability impacts should contact the Disability Services office by emailing disabilityservices@macalester.edu, or by calling 651-696-6974 to schedule an appointment to discuss your individual needs. Students should then follow up with me directly to discuss accommodations for this course.

Religion
Please look carefully at the syllabus during the first week of class. If any of the assignments conflict with a major religious holiday for your faith, then please let me know. I will make accommodations.

Macalester Academic Excellence (MAX) Center
The MAX Center supports students so that they can do their best possible academic work. The MAX Center focuses on: A) the disciplines of math, science, and writing; B) the skills required for good time-management and study habits; C) building a culturally diverse learning community; and D) academic accommodations for students with documented disabilities. *I offer extra credit for students who document their use of this resource.*

Academic Integrity
Students are expected to maintain the highest standards of honesty in their college work; violations of academic integrity are serious offenses. Students found guilty of any form of academic dishonesty -- including, for instance, forgery, cheating, and plagiarism -- are subject to disciplinary action. Examples of behavior that violates this policy, as well as the process and sanctions involved, can be found on the Academic Programs website,
http://www.macalester.edu/academicprograms/academicpolicies/academicintegrity/.

Artificial Intelligence (AI) Use Policy

In this course, you may use AI tools (such as Bard or ChatGPT) to help you generate ideas and write code. However, you should note that the material generated by these tools may be inaccurate, incomplete, or otherwise problematic. Beware that overuse of AI may stifle your own independent thinking and creativity, and use any tools (for generating text, code, video, audio, images, or translation) wisely and carefully.

You may not submit any work generated by an AI program as your own. If you include material—including both ideas and language—generated by an AI program, it should be cited like any other reference material, both in this course and at Macalester College in general. If you have any questions, please feel free to contact me.

Anti-oppression statement

"We believe that the benefit of the educational experience at Macalester is the development of individuals who make informed judgments and interpretations of the broader world around them and choose actions or beliefs for which they are willing to be held accountable. We expect them to develop the ability to seek and use knowledge and experience in contexts that challenge and inform their suppositions about the world. We are committed to helping students grow intellectually and personally within an environment that models and promotes academic excellence and ethical behavior."

-Macalester College Statement of Purpose and Belief

To promote ethical behavior, we must work to build a more equitable community that actively identifies and confronts oppressive behaviors. We can only identify how power and privilege play out when we are conscious and committed to understanding how white supremacy, patriarchy, classism, heterosexism, cisgenderism, ableism and all other systems of oppression affect each one of us.

As students in my class, I expect you to uphold the following:
1. recognize and reflect on the benefits and costs of your privileges, in particular, your complicity in upholding systems of oppression;
2. challenge yourself to be honest and open and to take risks in holding yourself and your classmates accountable to addressing racism, sexism, homophobia and transphobia head on;
3. communicate respectfully and listen non-defensively;
4. understand that making mistakes is okay but you should learn from them;
5. challenge the behavior or the idea, not the person (be sensitive and promote open dialogue);
6. recognize that when someone offers criticism around oppressive behavior it is a gift (rather than challenging the person or invalidating their experience);

7. understand and embrace that you must feel discomfort and pain as you face your part in oppression, and realize that this is a necessary part of the process of liberation and growth;
8. be conscious of how much space you take up or how much you speak in a group;
9. be proactive in educating yourself as to not burden students of color.

<mark>This is only a working list! I am excited to hear your thoughts and contributions to this list.</mark>
List adapted from https://beautifultrouble.org/theory/anti-oppression/

Course schedule (subject to change, check Moodle):

Module	Week of	Topic	Action items
■	Sep 4	Introduction to the course	Pre-course quiz, annotate syllabus, Excel tutorial
A B I O T I C	Sep 11	What is Urban Ecology? (Tuesday) Journal Club #1, led by Dr. B (Thursday)	Groffman et al. 2017 (Tuesday) Liu 2020 (Thursday)
	Sep 18	Urban soils and nutrient cycling Research project expectations & brainstorm	Hobbie et al. 2017; Herrmann et al. 2018 QUIZ 1 (Thursday-Monday)
	Sep 25	Urban climates and atmospheres Proposal workshop	Mitchell et al. 2018; Eisenman et al. 2019
	Oct 2	Urban hydrology and aquatic features Journal Club #2, led by students	Walsh et al. 2005; Roach et al. 2008 QUIZ 2
B I O T I C	Oct 9	Urban communities (plants, wildlife) Journal Club #3	Rodewalt & Gerht 2014; Cities-Natures New Wild Series, Episode 1: Residents *Group research proposal due Friday*
	Oct 16	Urban disease ecology Project presentations	Dawn Day Biehler, chapter 3 QUIZ 3
	Oct 23	Evolution in urban ecosystems *Fall break (no class Thursday)*	Winchell et al. 2018
	Oct 30	Ecosystem services Methods workshop	Bratman et al. 2019 *Research project dataset due Friday* QUIZ 4

E N V R A C I S M	Nov 6	Green gentrification Journal Club #4	Dooling 2009; Gould & Lewis 2016, chapter 3 *Group methods section due Friday*
	Nov 13	Data analysis workshop Journal Club #5	 QUIZ 5
	Nov 20	Results workshop *Thanksgiving break (no class Thursday)*	
	Nov 27	Urban political ecology Journal Club #6	Cousins & Newell 2015; Dillon 2013
	Dec 4	Urban vulnerability and resilience Journal Club #7	Tidball et al. 2010; Akese and Little 2018 *Results section due Friday*
	Dec 11	Poster + discussion workshop Poster session	 QUIZ 6 (complete before Dec 19)
	Dec 20	Final 'paper' due	