

# BIOLOGY 5440/CMP 6610

## Urban Ecology

### Spring Semester, 2018

**Time and Place:** Tuesday & Thursday 10:45 a.m. 12:05, Crocker Science Center (CSC) 208

**Instructor:** Rose Smith

**Textbook:** Urban Ecosystems: Ecology Principles for the Built Environment (F. R. Adler and C. J. Tanner)

**Office:** 502B ASB

**Office Hours:** Tuesday & Thursday 1:00-3:00 or by appointment

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**Teaching Assistant:** Emerson Arehart

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**BIOL 5440 Course Description:** Applying the principles of modern ecology to urban ecosystems. Detailed examination of how altered flows of energy, water, and nutrients affect plants, animals and ecological communities in highly modified environments.

**CMP 6610 Course Description:** Urban ecology discusses the convergence of natural systems with human habitation and civilization. It explores the capacity for synthetic cooperation between natural and cultural systems which lessens the conflict between them and offers opportunities for innovative design and planning applications by enhancing local ecosystem services.

**Combined Course Description:** The two catalogue descriptions above illustrate that the study of urban ecosystems involves both biological and social perspectives on the science of ecology. We will try to integrate these two perspectives in this class. Urban ecological processes are dominated by human activities and decision-making, but also interact with the local environment and with other organisms to influence biodiversity, habitat, resources, pollution, public health, and many other aspects of human-environment interactions. We will examine different methods and perspectives of the study of cities as ecosystems, and the implications for urban policy, planning, and design. We will focus on several case studies in Salt Lake City and its surroundings, which will provide a framework for place-based urban ecology.

**Course Outcomes:** By the end of this course, you will be able to:

- Apply the principles of ecology and their associated methodologies in both the biological sciences and planning
- Use quantitative skills to critically examine the inter-relationships among the natural and built environments of cities, and how these complex relationships have led to unintended consequences
- Apply urban ecological research methods for answering questions about the functioning of cities
- Design and carry out experiments and plans in an interdisciplinary team
- Communicate clearly and effectively through oral, written, and visual/graphic means
- Proactively source and synthesize a wide range of quantitative and qualitative information to generate new knowledge in urban ecosystem science and its application to urban health and wellbeing

**Teaching and Learning Methods:** This course is problem-based and employs active learning. There will be some short lectures, interspersed with discussions and in-class activities and short field trips. There will be a focus on both quantitative and qualitative methods, and students should be prepared to carry out calculations both independently and in groups. In addition to class activities, you will also work in interdisciplinary teams on an applied project that will be graded in phases throughout the semester. Some of this work will take place outside of class hours, but some will occur during the class period. Therefore, attendance is essential. Exams will be based on understanding concepts, not memorization. It will be very difficult to succeed in this class without keeping up with the readings and attending almost every class session.

**Classes:** Class on most Tuesdays will be lecture and discussion to present general concepts. On Thursdays, we will explore particular points in more detail with a guest, a field trip, focused discussion, or a group activity.

**Readings and Assignments:** Weekly readings are due before class. On Tuesdays, our in-class lectures and activities assume that you have already done the assigned textbook and supplemental reading for that week. You won't get much out of your time in class if you skip the readings. Everyone gets busy during the semester and readings tend to fall by the wayside. . . so, each week there will be quiz in Canvas due before Tuesday's class to make sure that you've understood the key points from the reading assigned for that week. No one likes quizzes, but this is the only way to keep readings high on the priority list they are important! Every semester we try to make sure the readings are current, relevant, and engaging.

**Deliverables.** Grades will be determined by performance on the following elements.

1. Midterm, March 21 2019 (20%),
2. Take-home final, handed out on April 25, 2019, due May 1, 2019 (20%),
3. Weekly homework assignments due in class on Thursday every week (20% total). Weekly assignments will alternate between short calculation-based problem sets from the textbook, and 1-page essays reflecting on the readings. Homework assignments must be handed in as a hard copy in the beginning of class on Thursday. If you cannot attend class, please get us either a hard copy of the homework or a pdf by the end of the class period on the due date. Students are welcome to work together on math-based homework problems from the textbook. One-page essays must be written individually based on the readings, consisting of a summary of the paper followed by a reflection on a particular strength, weakness, application or other extension of the article.
4. One capstone project, developed in groups, to be submitted in two phases (15% each for a total of 30% March 8 and April 23). Capstone project groups and projects will be assigned in week 3 or 4.
5. Participation in discussions and other class activities (5%)
6. Weekly quizzes are due in canvas before class each Tuesday (5%)

**Canvas:** This syllabus and all course material including assignments, readings (except the text- book), announcements, and other useful information can be found on the Canvas site for this course. Weekly quizzes on the readings will be submitted through Canvas.

**Grading Policy (Evaluation Methods & Criteria):** Weekly quizzes are based on the readings and should be completed individually. You may work in groups to complete weekly homework assignments, but you must turn in your own assignment. The exams will focus on the material we cover in class. The capstone project is a group project that will have two phases, each worth 15% of your grade.

Weekly quizzes are due in canvas on the due date. You can miss one quiz without penalty. Homework assignments should be completed as a hard copy and brought to class on Thursday. 10 points (on a scale of 0 to 100) will be deducted each day for late assignments. There are no exceptions to this policy.

This class is focused on understanding concepts, not memorization; therefore exams are open book and open notes. Many aspects of urban ecology are quantitative so some simple calculations may be required,

as well as short essay questions. Study questions are provided at the end of every lecture so you will know which concepts are important for you to learn. Assigned grades are final and non-negotiable; requests for grade changes will be denied.

**Classroom etiquette.** Students will maintain a respectful and safe learning atmosphere, and class will be cancelled if this atmosphere is violated.

### **University Policies**

1. The Americans with Disabilities Act. The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, (801) 581-5020. CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in an alternative format with prior notification to the Center for Disability Services.

2. Addressing Sexual Misconduct. Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veterans status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801- 581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS). As a responsible employee and your instructor, I am required to report instances of sexual misconduct that I witness or learn about to Office of Equal Opportunity and Affirmative Action. More information about this process can be found in the links below. More resources regarding sexual misconduct or discrimination (definitions, information about reporting, confidential resources, etc.) can be found here: <https://oeo.utah.edu/services/sexual-misconduct.php> and here: <https://sexualassault.utah.edu/>.

3. Student Code: <http://regulations.utah.edu/academics/6-400.php>

4. Accommodation Policy (see Section Q): <http://regulations.utah.edu/academics/6-100.php>

**Course Policies:** It is my responsibility to come to class on time and prepared, to be available during office hours and by email to answer your questions, and to grade your assignments and exams fairly and in a timely manner. It is your responsibility to come to class on time and prepared, to turn in your assignments on time, and to complete your assignments and exams honestly, refraining from academic misconduct as defined in the campus wide Student Code. Documented cases of academic misconduct will result in sanctions according to university policy.

**Attendance & Punctuality:** Attendance of all class sessions is mandatory. Attendance will not be recorded; however, 5% of your grade will be based on class participation and assignments that are completed and turned in during class. You can miss one of these assignments without penalty. If you will be absent from class for officially sanctioned university activities or government obligations ("type 1" absences as defined in Policy 6-100-III-O), you can arrange for a makeup assignment with at least 1 week notice beforehand. For illnesses or other emergencies, you can request a makeup assignment no more than twice during the semester. If you have questions about these policies, or extenuating circumstances please contact me directly.

**Food & Drink:** Beverages will be allowed within reason. Please respect our janitorial staff and leave the classroom as clean as you found it.

**Electronic Devices in Class:** With the exception of exams, laptops and other electronic devices are allowed in our classroom if you are using them for taking notes or otherwise taking part in the classwork of this course. At the discretion of the instructor or teaching assistant, you will be asked to turn off your devices if you are using them for non-academic purposes in class. No electronic devices will be allowed during in-class exams.

**Note:** This syllabus serves as an outline and guide for our course. Please note that we may modify it with reasonable notice to you. We may also modify the Course Schedule to accommodate the needs of our class. Any changes will be announced in class and posted on Canvas under Announcements.

**Schedule:** This schedule is a rough guide of the topics to be covered, subject to change with sufficient notice, throughout the semester. Watch the web site in case the readings are updated. Papers from the 'Reading' column will be the subjects for the one-page essays, due on Thursday of the assigned week. Readings listed under "Topic" are all from the required textbook.

Week of	Topic	Thursday activity	Assignment	Reading
January 8 & 10	Introduction to urban ecology (Chap 1)	Discussion	Quiz 1: Practice quiz *Due Thursday 10:45am	[Adler Ch 1, Tanner et al. 2012, TNOC Discussion 2018]
January 15 & 17	Urban Metabolism (Chap 2)	Discussion and calculation of ecological footprints	Essay #1 & Quiz 2	[Adler Ch 2, Chester 2013]
January 22 & 24	Urban Climate (3.1)	Discussion	Problem set 3.1.1 & Quiz 3	[Adler Ch 3.1, Imhoff et al. 2010]
January 29 & 31	The Urban Water Cycle (3.2)	Get started on capstone project	Problem set 3.2.3 & Quiz 4	[Adler Ch 3.2, Litvak et al. 2017]
February 5 & 7	Urban Nutrient Dynamics (3.3)	Jordan River Field Trip	Problem set 3.3.2 & Quiz 5	[Adler Ch 3.3, Pataki et al. 201, Hobbie et al. 2016]
February 12 & 14	Urban Green Infrastructure	Visit to Landscape lab	Essay #2 & Quiz 6	[Jefferson et al. 2017 & Felson 2013a]
February 19 & 21	Urban Biodiversity	Guest Lecture- Pollinators	Problem set 4.1.2 & Quiz 7	[Adler Ch 4.1 & Faeth et al. 2011 & Aronson et al. 2014 ]
February 26 & 28	Invasive Species & Urban Homogenization (4.1)	Discussion	Essay # 3 & Quiz 8	[Adler Ch 4.2 & von de Lippe et al. 2008; Wheeler et al. 2017]
March 5	Urban Ecological Design and Policy (5.2)	Discussion & Project work	Quiz 9 & <b>CAPSTONE PROJECT PHASE 1 DUE MARCH 8 5pm</b>	[Adler Ch 5.1, Felson 2013b]
March 19	Review	<b>MIDTERM 3/21</b>		
March 26	Urban Political Ecology Jeff Rose	Discussion	Essay # 4 & Quiz 10	[TBD]
April 2	Urban Environmental health (4.4), 5.1)	Visiting physician	Problem set 5.1.2 & Quiz 11	[Adler Ch 4.4 & 5.1 & Kondo et al. 2017 & Clougherty et al. 2007]
April 9	Local Pollution Issues	Discussion	Essay #5 (Final Essay) & Quiz 12	[none]
April 16	<b>Final presentations</b>	Final Presentations & Discussion		[none]

April 23	<b>CAPSTONE PROJECT PHASE II DUE</b> <u>Review</u>	<u>Take-home final</u>		none
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