BIOLOGY COURSE SYLLABUS

Course Number & Title: BIOL UA 390/ENVST UA 390 URBAN ECOLOGY

Instructor(s): Katie Schneider Paolantonio

Course Description:

We are currently living in a time where city residents outnumber people who live in rural areas. In addition, the projected expansion of human population growth is largely predicted to occur in urban areas. Urban Ecology is an interdisciplinary and emerging field of research focused on the consequences of urbanization on ecological processes. In addition to a physically transformed natural landscape, cities are unique from other systems in terms of hydrology, temperature, noise, air quality and many other abiotic factors. In this course we will investigate the consequences of urban constructs on ecological systems. We will discuss factors such as nutrient cycling, organismal behavior and phenology, disease, and the drivers and patterns of biodiversity in urban systems. We will also talk about green spaces, urban planning, and the future of these expanding manmade landscapes. A significant component of this course will involve discussion of current literature. This is an upper-level reasoning course designed primarily for students majoring in biology (ecology track) and environmental studies.


Textbook(s)


Additional readings will be posted on NYU Classes.

Grading Information: Course grades will be based on the following:

- 40% Class participation and response papers
- 30% Student led paper discussions
- 30% Class project

Tentative Course Schedule and Readings
<table>
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<tr>
<th>Week</th>
<th>Lecture or Discussion Topic</th>
<th>Assignment due</th>
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<tr>
<td>1</td>
<td>Course Expectations, Introduction to Urban Ecology</td>
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<tr>
<td></td>
<td>What are urban ecosystems?</td>
<td>Response</td>
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<td>2</td>
<td>Modeling and Urbanization</td>
<td>Response</td>
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<td></td>
<td>Hydrology discussion</td>
<td>Response</td>
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| 3    | *Grant Writing – Identifying Questions*  
Biogeochemistry and Ecosystem Functioning | Response |
|      | Biogeochemistry and Ecosystem Functioning discussion | *Response |
| 4    | Plants | Response |
|      | Plants discussion | *Response |
| 5    | Evolution in Urban Environments | Response |
|      | *Grant Writing: Parts of the Proposal*  
Foraging | Response |
| 6    | *Discussion of Proposal Ideas* | Annotated Bibliography Part I |
|      | *Discussion of Proposal Ideas* | Annotated Bibliography Part II, Outline |
| 7    | Behavior and Communication | Response |
|      | Behavior and Communication discussion | *Response |
| 8    | Physiology | Response |
|      | Invasive Species discussion | *Response |
| 9    | Disease in Urban Ecosystems | Response |
|      | Disease in Urban Ecosystems discussion | *Response |
| 10   | *Patterns and Drivers of Urban Biodiversity* discussion | *Response |
| 11   | Climate change and urban ecology | Response |
| 12   | Climate change and urban ecology discussion | *Response |
|      | Humans and Nature | Papers Due |
| 13   | *Grant Writing: Peer review* | Peer Review Due |
|      | Green spaces and urban planning, restoration | Response |
Weekly readings will be chosen from this list and posted the week before class.

**Week 1: Introduction**
**Tuesday:** Gaston Chapter 1: Urban Ecology (9 pages)


**Thursday: Discussion Papers**


**Week 2: Modeling and Urbanization, Hydrology**
**Tuesday:** Gaston Chapter 2: Urbanisation (25 pages)


**Thursday: Hydrology**


**Week 3: Biogeochemistry, Ecosystem Functioning**

**Tuesday:** Gaston Chapter 3: Urban environments and ecosystem functions (18 pages)


**Thursday: Biogeochemistry discussion (choose 2)**


Week 4: Species Response to Urbanization: Plants

Tuesday: Gaston Chapter 4: Individual species and urbanization (35 pages)


Thursday: Potential Discussion Papers (choose two)


Week 5: Species Response to Urbanization: Evolution and Foraging

Tuesday – Adaptation and evolution in Urban Environments

http://www.nytimes.com/2016/07/24/opinion/sunday/evolution-is-happening-faster-than-we-thought.html


Thursday – Grant Writing/Foraging: Potential Discussion Paper (choose one)


**Week 6: Proposal Discussion**

**Week 7: Behavior and Communication**

**Tuesday:**


**Thursday: Potential Discussion Papers (choose two)**


Week 9:
Tuesday: Physiology and Organismal Ecology: Potential Discussion Papers (choose two)


Thursday: Invasion - Background Chapter and Discussion (two discussion papers):
Gaston Chapter 6: Urbanisation and alien invasion (14 pages)


Week 10: Disease in Urban Landscapes
Tuesday:


Thursday: Potential Discussion Papers (choose two):
Silvina Fenoglio, M., M. Videla, A. Salvo, G. Valladares, Beneficial insects in urban environments: Parasitism rates increase in large and less isolated plant patches via enhanced parasitoid species richness, Biological Conservation, Volume 164, August 2013, Pages 82-89.


**Week 11**

**Tuesday: Urban Biodiversity**

Gaston: Chapter 5 (32 pages)

**One review paper**

McKinney, M. L. (2002). Urbanization, Biodiversity, and Conservation: The impacts of urbanization on native species are poorly studied, but educating a highly urbanized human population about these impacts can greatly improve species conservation in all ecosystems. BioScience, 52(10), 883-890.


**and One experimental paper:**


**Thursday: Climate Change and Urban Landscapes**


Solecki, W., & Marcotullio, P. J. (2013). Climate change and urban biodiversity vulnerability. In Urbanization, Biodiversity and Ecosystem Services: Challenges and Opportunities (pp. 485-504). Springer Netherlands.

**Week 12: Climate continued, humans and nature**

**Tuesday: Climate Potential Discussion Papers (choose two):**


**Thursday: Humans and Nature**  
Gaston Chapters 7, 9 and 12 (66 pages)


**Week 13:**  
**Tuesday – Grant writing, peer review**

**Thursday: Green spaces and Urban Planning**  
Gaston: Chapter 10 and 11(57 pages)


**Week 14: Future directions and unanswered questions**  
**Tuesday:** Gaston Chapter 12 (22 pages)


**Thursday: Finals papers due, Presentations begin**

**Week 15: Finish Presentations of Grant Proposals**