BIO 376 – Urban Ecosystems (3 credits) *(in-person required; NOT a fully remote course)*

Time: Mondays & Thursdays 2:00-3:20 Location: GHH 206

Instructor: Dr. Loren B. Byrne Phone: X 3890 Office: MNS 227 Email: lbyrne@rwu.edu

Office Hours: Email to schedule a Zoom appointment: good times are Mon & Th 1-2; Wed & Fri @ noon, or by appt.

Dr. Byrne's teaching and learning philosophy that frames the dynamics of this course can be found here: http://faculty.rwu.edu/lbyrne/educational_philosophy.html These quotes summarize that philosophy:

"High-quality learning is absolutely essential for high-quality living." ~ L.D. Fink

"The mind is not a vessel to be filled but a fire to be kindled." **~** Plutarch

"Teachers open the door. You must enter by yourself." ~ Chinese proverb

"Today a reader, tomorrow a leader." ~ W. Fusselman

"(Intelligence) is 1% inspiration and 99% perspiration." ~ T.A. Edison

"When we try to pick out anything by itself, we find it is tied to everything else in the universe." ~ John Muir

Course Description

Prerequisite: *BIO 104 or consent of instructor*

For the first time in history, more humans live in urbanized environments than rural ones. Urbanization is expected to continue unabated into the future resulting in further anthropogenic environmental changes. The ecological characteristics of urban ecosystems are the focus of urban ecology (within the natural sciences tradition), with a particular focus on examining relationships between sociocultural and ecological variables that affect ecological patterns. In this course, a range of topics will be explored, primarily from a biophysical science perspective, to better understand the unique ecological features of urbanized ecosystems. This course is developed for upper-level students interested in integrating ecological knowledge with that from other disciplines to better understand the complex interactions of ecological and sociocultural variables that affect the characteristics of urban ecosystems. Among other goals, learning activities will challenge students to 1) critique and integrate readings, 2) develop their own ideas and questions, and 3) improve their writing skills.

Be prepared: *This course is reading and discussion intensive, like a senior seminar.* Thus, you will maximize your learning during this course if you read assigned texts carefully and critically before class and then ***engage with your classmates in civil discourse*** about the material during class. (See quotes 4 and 5 above.)

Course goals/outcomes

After this course, you will have foundational knowledge and understanding that should enable you to:

- Articulate a transdisciplinary conceptual framework and approaches for the holistic study of urban socio-ecosystems and complex urban issues
- Describe general patterns & ecological effects of urbanization from local to global scales
- Explain how sociocultural variables affect ecological variables in urbanized environments
- Discuss how human activities affect urban ecosystem services and disservices and in turn impact the health and well-being of humans and urban societies
- Communicate how ecological science data & theory can guide the sustainable design & management of urbanized landscapes to diverse audiences

Required texts: No textbook; required papers will be provided via Bridges or as hard copies

Learning activities and grading *(determined in part with student input and votes)*

Your learning success and grades will be based on the following assignments:	**% value of final grade**
• In-class and home- work (e.g., half sheets, presentations, quizzes)	25%
• Semester project	20%
• Seminar discussions	10%
• Reflection essays	20%
• Case study mini-projects	20%
• New/journal article club presentations & discussion	5%

Urban Ecosystems Course Schedule

Week	Topic	Readings (*TBD = to be determined*)
		On some dates, students may not need to read all listed articles
1	2/1: Zoom: What are urban ecosystems? Why care? 2/4: Is urbanization more disturbance or ecosystem engineering or something else?	2/1: Articles sent in email 2/4: Jones et al. 1994, Turner et al. 01
2	2/8: Global urbanization: places & populations 2/11: Urban land cover patterns & problems	2/8: Foley et al. 2005, TBD 2/11: TBD
3	2/15: Transdisciplinarity & Seeing the whole: Integrating the social & natural sciences 2/18: How does ecology relate to other urban topics?	2/15: McIntyre et al. 2000, Redman et al. 2004, Liu et al. 2007 2/18: Student-chosen
4	2/22: Individual project meetings 2/25: How should ecologists study urban systems?	2/25: Pickett et al. 1997, Grimm et al. 2000, Alberti et al. 2003, TBD
5	3/1/: Ecology "in" vs. "of" the city 3/4: Urban biodiversity I: introduction	3/1: Pickett et al. 2001 or 2011 3/4: Nassauer 88, McKinney 2002
6	3/8: Urban biodiversity II: birds & bugs 3/11: Urb biod III: Non-natives & novel ecosystems	3/8: Find an article 3/11: TBD
7	3/15: Urban biodiversity VI: food webs 3/18: Urban habitat structure & soils	3/15: Faeth et al. 05, Palomino and Carrascal 05 3/18: Byrne 07 or Pavao-Zuckerman & Byrne 09
8	3/22: Ecology of urban soil pollution 3/25: Air pollution & ground-level ozone	3/22: Find an article 3/25: TBD
9	3/29: Urban greening and ecosystem services 4/1: Urban restoration ecology	3/29: Pataki et al. 2011 4/1: TBD
10	4/5: Aesthetics & ecological landscaping 4/8: Lawn & garden socio-ecology	4/5: TBD (e.g., Kaushal et al. 2005) 4/8: Nassauer 94, Byrne and Grewal 2009
11	4/12: Individual project meetings 4/15: Evolution in urbanized environments	4/12: 4/15: case studies
12	4/19: Management of a stream, river, pond, run off 4/22: Managing a species (not invasives)	4/19: case studies 4/22: case studies
13	4/26: A city's greening program (e.g., tree planting) 4/29: A city's climate change response plan	4/25: case studies 4/29: case studies
14	5/3: Urban planning, Buildings as ecosystems 5/6: Presentations	5/3: TBD, Mueller Report 2006 5/6:
15	5/10: Presentations	5/10: TBD

Final exam period: Required meeting: Friday May 14, 12:30-2:30pm

Synthesis: toward urban sustainability & healthier, more just urban socio-ecosystems & people

*****The professor reserves the right to modify this schedule at any time as necessary*****

Assignment submission & class communications

The online system *Bridges* will be used for submission of assignments and to provide course materials. Email (.rwu accounts only) is used to provide course information and communicate important reminders. Students are responsible for using these resources and should communicate any concerns to the professor ASAP.

Essential info. about the following topics is provided on the **e-version sent via email** and located in Bridges. You are fully responsible for reviewing this information and will be held accountable to all official policies provided there: Assignment submission, class communications; attendance policy; academic integrity; support services. Students should familiarize themselves with these and abide by them to succeed in the course.