Marine Urban Ecology

I. Course Description:

Urban ecology is an emerging, interdisciplinary field that aims to understand how human and ecological processes can coexist in human-dominated systems. This course will focus on the modern-day ecological challenges of the greater Boston area, as a result of current or historical human-induced disturbance. Topics include the impact of toxic releases, invasive species, coastal and urban development, fishing and whaling, and politics on ecosystems such as the rocky intertidal, saltmarshes, local rivers (Charles, Mystic, and Neponset), the Boston Harbor, and surrounding areas. In the laboratory portion of the course, students will collaborate on original research projects investigating a single urban event and determining how to test the ecological ramifications thereof. Projects will be evaluated based on both a scholarship component and an experimental design component. The course will include fieldtrips and guest lectures by a number of local experts. This course is offered during Block 3 of the Fall 2017 Marine Semester.

II. Prerequisites: Admission to the Marine Semester.

III. Instructor:

Dr. Randi Rotjan, Phone: 617-353-5087, E-mail: rrotjan@bu.edu

Teaching Fellow: Dave Minkoff, Email: dminkoff@bu.edu

IV. Grading

30% of your grade will be based on the quality of your research and a final oral research report.
35% of your grade will be based on the seminar discussions (lead AND participation).
35% of your grade will be based on course assignments, presentations, quizzes, and exams.
Everyone is required to write a quiz question and turn it in to Dave, DAILY. Questions are always due at the beginning of class in the morning.

Attendance at all lectures, paper discussions, collecting trips, and laboratory sessions is mandatory. Your final grade will be penalized 2.5% for each unexcused absence from a lecture or lab session.

V. Readings & Other Resources

- Background Readings for each day (Available as .pdf files on the course website):
  - *Selections from the primary & popular literature, listed below*
- ***Boston: A Topographical History*** by Walter Muir Whitehill and Lawrence W. Kennedy
- ***Urban Ecology*** by Marzluff, Shulenberger, Endlicher, Alberti, Bradley, Ryan, Simon, ZumBrunnen
- ***Urban Ecology: Patterns, Processes, and Applications*** by Niemela, Breuste, Guntenspergen, McIntyre, Elmqvist, and James
- ***Mapping Boston***, by Krieger, Cobb, and Leventhal

VI. Draft Calendar

◄ October		~ November 2017 ~				December ►
Sun	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**
	30 **Class starts 10 am**	**31** Hurricane Presentations / Project Planning	**1** Scavenger Hunt Field Day	**2** Scavenger Hunt presentations	**3** Field Trip – WaterWorks	**4**
5	**6** MYSTIC RIVER TRIP	**7** Fells Field Trip / Mystic River Watershed Association	**8** NEPONSET RIVER TRIP Quiz 1	**9** Dan Jaffe / Katie Banks Hone	**10** Project Prep	**11**
12	**13** DEER ISLAND FIELD TRIP ROZALIA PROJECT – Rachel Miller	**14** Intertidal Explorations	**15** PROJECT DAY Quiz 2	**16** PROJECT DAY	**17** Field Trip TBD	**18**
19	**20** PROJECT DAY Final Exam	**21** RESEARCH PROJECT SYMPOSIUM	**22**	**23**	**24**	**25**
26	**27**	**28**	**29**	**30**	**Notes:**	

More Calendars: December, January, February

NOTE: This is a DRAFT – all trips subject to change

On scheduling: This is an adaptive, flexible class. The calendar is your best guide to activities, but we will actively change our plan based on weather, traffic, and other logistics. We will also take advantage of class-relevant opportunities as they arise. My advice: go with the flow. Don't worry too much about daily planning; if you NEED to schedule something (doctors appointment, interview, etc), let me know and we'll figure out a mutually agreeable time. Thanks!

VII. Lecture & Research Schedule – *WORKING DRAFT*

WEEK 1: *Urban Ecology in Boston and surrounding areas*

Monday Oct 30

Readings led by Dave

- ➔ Schochat et al. 2006 TREE
- ➔ Urban Ecology & the Marine Realm: TREE 2008
- ➔ Science 2011 – Update & projections on human population

AM: **Remote Lecture 01.** Course layout, description, and expectations
Class Introductions: Why are we all here?
Remote Lecture 02. What is marine urban ecology?

PM: **Remote Lecture 03.** The Ecology of Urban Ecology
Seminar Discussion: TREE 2008 paper

Tuesday, October 31

Readings led by: _____

- ➔ The Asphalt Jungle
- ➔ Evolution Right Under Our Noses
- ➔ Habitat analogues and reconciliation ecology in urban and industrial environment

Brainstorming session for project topics (for final presentation)
Hurricane Project Presentations

Wednesday November 1

All Day Scavenger Hunt!

Thursday November 2

Readings led by: _____

- ➔ A brief history of water in Boston
- ➔ https://www.epa.gov/urbanwaterspartners/19-designated-urban-waters-locations
- ➔ Bent 2001

AM: *Scavenger Hunt Presentations* & Discussion
PM: Seminar discussions on readings

Friday November 3

- ➔ http://www.bostonlivingwithwater.org/
- ➔ Galloway et al. 1996
- ➔ Leschen et al. 2010

Field trip (all day): WaterWorks Museum and associated reservoirs

Am: Seminar discussions on readings

PM: Field Trip – WATERWORKS Introduction, water sampling, Living with Water

WEEK 2: *Saltwater to Freshwater Transitions*

Monday, November 6

Readings led by: _____

- ➔ Mystic River Herring Report
- ➔ TBD

Mystic River Field Trip - Seminar Discussion on the road
Preliminary experimental design & data sheets due

Tuesday, Nov 7

Readings led by: _____

- ➔ Readings TBD

Middlesex Fells Field Trip – Seminar Discussion on the road
Meeting with the Mystic River Watershed Association

Wednesday, Nov 8

Readings led by: _____

- ➔ Arrigo et al 2011 – Neponset River Water Quality Data
- ➔ Frasure et al – Neponset Integrative Management

Neponset River Field Trip - Seminar Discussion on the road

Thursday, Nov 9

Readings led by: _____

Green Infrastructure - *Class brainstorm: solving problems in your town with green infrastructure*

- ➔ Green infrastructure and climate change
- ➔ Lovell Taylor 2013 – Ecosystem Services
- ➔ Rooftop Gardens and Vegetables
- ➔ Excerpts from Cities as Sustainable Ecosystems

Movie: Reduce Runoff: slow it down, spread it out, soak it in
Lecture

Guest panel: Katie Banks Hone – Slow the Flow grant recipient, Dan Jaffe – NEW Garden in the Woods

Friday, Nov 10

TBD

WEEK 3: Our harbor and rocky intertidal: *Pollution (sewage, plastics, thermal)*

Monday, Nov 13

Reading 1 led by: _____

- ➔ Toward a healthy harbor
- ➔ Siegener and Chen 2002 – Caffeine in Boston Harbor seawater
- ➔ Hunt and Slone 2010 – Long-term monitoring using resident and caged mussels in Boston Harbor yield similar spatial and temporal trends in chemical contamination

Field Trip: Deer Island Sewage Treatment Plant
Seminar discussion in the field

Reading 2 led by: _____

- ➔ Carpenter 1972 (Polystyrene Spherules in Coastal Waters)
- ➔ Cole et al 2011 (Plastics review)
- ➔ Lavendar-Law and Thompson 2014 (Microplastics in the seas)
- ➔ Jambeck et al 2015 (Plastic waste inputs from land into the ocean)
- ➔ Taylor et al 2016 (Plastic microfibre ingestion by deep-sea organisms)

Rozalia project – Rachel Miller Guest Lecture in the field (with us at Deer Island)

Tuesday, Nov 14

Readings led by: _____

- ➔ **TBD**

Rocky intertidal field trip

Wednesday, Nov 15

Project Prep

Thursday, Nov 16

Project Prep

Friday, Nov 17

Readings led by: _____

- ➔ Pickett et al 2011 – Urban ecological systems – scientific foundations and a decade of progress

Project prep: "How to give an effective scientific presentation"

Project prep: Stats consultations and figure-making

WEEK 4*: exams, wrap-up*

Monday, November 20

AM – Final Exam

PM - preparation for final presentations

Tuesday, November 21

Final presentations

VII. Academic Conduct

It is each student's responsibility to know and understand the provisions of the Academic Conduct Code in the College of Arts and Sciences. The Code is available online at http://www.cs.bu.edu/ugradprogram/conduct.html. Cases of suspected misconduct will be referred to the Dean of the College. If the Dean's office comes to the conclusion that cheating or plagiarism has occurred, a grade of zero will be awarded for the assignment in question.