Where the City Meets the Sea: Studies in Coastal Urban Environments

Biol-UA 140 and ENVST-UA 275

Syllabus – Fall 2021

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Skype: mary.killilea1
Office: 285 Mercer Room 906
Office Hours: Thursday 8:30-10:30

Class Location (Wednesday): Classes will meet on Governors Island from September 8, 2021 to October 27, 2021. From November 3, 2021 to December 8, 2021 class will meet in the classrooms assigned in Albert.

Course Description: Over half of the human population lives within 100 km of a coast and coastlines contain more than two-thirds of the world’s largest cities. As a result, the world’s natural coastal environments have been substantially modified to suit human needs. This course will use the built and natural environments of coastal cities as laboratories to examine the environmental and ecological implications of urban development in coastal areas. Using data from multiple coastal cities, student teams will use field-based studies and Geographic Information System (GIS) data to examine patterns and processes operating in coastal cities. This semester we will use group work to perform comparative analyses of urban environmental issues in New York and Abu Dhabi with other coastal cities around the globe.

Course Purpose: This course is designed as a non-majors science course for the purpose of introducing students to the scientific process of inquiry, methods used in environmental research, and the acquisition, storage, analyses, and communication of data both within and among groups operating across large geographic scales. These processes will be introduced through content relating to the aquatic, terrestrial, and built environments of coastal urban areas.

Prerequisites: None

Software Required: GoogleEarth; ArcGIS; GoogleDrive; GoogleDocs; GoogleSheets
Learning Outcomes:

Upon completion of this course, students will be able to:

- Apply appropriate techniques to design and implement a desk-based study of environmental/ecological parameters related to urban ecology (Process)
- Select, analyze, and interpret data for spatial and/or statistical comparisons of quantitative environmental data (Process)
- Communicate scientific findings using appropriate style and format both orally and in writing (Process)
- Use technology to collate, analyze, exchange, and communicate data (Process)
- Describe the impacts of urbanization on coastal ecosystems at both a local and global scale (Content)

Attendance Policy: Students are expected to attend all labs and to complete all lecture-related assignments. Student attendance of at least 75% of labs will be considered full attendance. All lecture and lab assignments are expected to be completed.

Grade Breakdown:

<table>
<thead>
<tr>
<th>Assessment Tool</th>
<th>Percent Contribution</th>
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<tbody>
<tr>
<td>Pre-lesson Reading Assignments</td>
<td>10</td>
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<tr>
<td>Project Preparation: Post-lecture Forum Reflections</td>
<td>10</td>
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<tr>
<td>Project: Midterm Video Presentation</td>
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<td>Project: Final Video Presentation</td>
<td>10</td>
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<tr>
<td>Weekly Lab Assignments</td>
<td>20</td>
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<tr>
<td>Midterm Exam</td>
<td>20</td>
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<tr>
<td>Final Exam</td>
<td>20</td>
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<tr>
<td>Total</td>
<td>100%</td>
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Assignments Deadlines: Reading assignments are due at or before their deadline; late submissions are NOT permitted and will receive a grade of zero. Late Lab assignments will be penalized 20% per day starting immediately after the time when they are due. Lab assignments will not be accepted after 48 hrs from the deadline unless prior approval is provided by faculty.
**Policy on missed exams:** Exams will be excused only for medical or family emergencies. Your instructor needs to be notified by phone or email before the exam time. An unexcused absence from an exam will be calculated as 0% for that particular test! If you miss an exam and present a legitimate excuse, a make-up test may be made available to you. This situation will be dealt with partly on an individual basis.

**Grade Scale:** A = 94-100, A- = 90-93, B+ = 87-89, B = 84-86, B- = 80-83, C+ = 77-79, C = 74-76, C- = 70-73, D+ = 67-69, D = 64-66, F = below 64

**Academic Integrity:** Plagiarism: the presentation of another piece of work or words, ideas, judgements, images or data, in whole or in part, as though they were originally created by you for the assignment, whether intentionally or unintentionally, constitutes an act of plagiarism. Please refer to your Student Handbook for full details of the plagiarism and academic integrity policy. Students are required to meet the standards of NYU and that or their individual site. [http://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/academic-integrity-for-students-at-nyu.html](http://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/academic-integrity-for-students-at-nyu.html)

**Disability Disclosure Statement:** Academic accommodations are available for students with disabilities. The Moses Center website is [www.nyu.edu/csd](http://www.nyu.edu/csd). Please contact the Moses Center for Student Accessibility (212-998-4980 or mosescsd@nyu.edu) for further information. Students who are requesting academic accommodations are advised to reach out to the Moses Center as early as possible in the semester for assistance.

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<thead>
<tr>
<th>Date</th>
<th>Lesson Topic</th>
<th>Lab Topic</th>
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| Sept 8  | *Where the City Meets the Sea: An Introduction to Governors Island* | *Human Demographics-The Challenge of Change:*  
In this activity students will research and collate information on demographics for three cities in order to develop an understanding of the role that past, current, and projected human population growth has on coastal socioeconomics and ecology. |
| Sept 15 | *Using GIS to Monitor Development*  
How can GIS be used to track and analyze temporal changes in urban environments. | *Tree mapping lab:*  
This lab will introduce the creation of GIS data. |
| Sept 22 | *Heat Islands: The Climate of Coastal Cities*  | *Urban Heat Island Effects in Abu Dhabi:*  
In this lab students will use ArcGIS to analyze |
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<tr>
<th>Date</th>
<th>Topic</th>
<th>Event</th>
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<tbody>
<tr>
<td>Sept 29</td>
<td>How do high-density urban areas affect urban temperatures?</td>
<td>whether or not Abu Dhabi (a desert city) has a heat island effect</td>
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<td>Simplified Systems: How Human-built Environments Affect Biodiversity</td>
<td>TBD</td>
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<td>How does the homogenization of the natural environment through construction of cities affects biodiversity in both the terrestrial and marine systems? (MK)</td>
<td>TBD</td>
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<td>Oct 6</td>
<td>Coastal Cities and Marine Resources Use</td>
<td>Billion oysters</td>
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<td>How do coastal populations utilize marine resources for human consumption?</td>
<td>The Sea Harvest: Coastal Overfishing Lab</td>
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<td>Water, water everywhere….: Freshwater availability in coastal urban areas</td>
<td>In this lab students will examine the state of fisheries in their coastal city and make comparisons of industrial fishing practices and management efforts.</td>
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<td>Oct 13</td>
<td>Water, water everywhere….: Freshwater availability in coastal urban areas</td>
<td>How to Make Videos and organizing your midterm video</td>
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<td>Oct 20</td>
<td>Midterm Exam</td>
<td>TBD</td>
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<td>Oct 27</td>
<td>The Dead Zone: The ecology of urban effluents</td>
<td>Global Eutrophication Patterns</td>
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<td>How does the chemical output from cities in the form of point- and non-point discharge from industry, agriculture, and runoff affect the ecology of aquatic ecosystems surrounding cities?</td>
<td>In this activity we will use a large global dataset on coastal eutrophication to explore temporal and spatial patterns of nutrient pollution and recovery around the world. The lab will close with a comparative assessment of water quality around NYU’s global network cities.</td>
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<td>Nov 3</td>
<td>Air Quality</td>
<td>Student Video Presentations &amp; Discussions</td>
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<td>What are the sources of indoor and outdoor air pollution? How are NY and AD similar or different?</td>
<td>During our ‘live’ lab this week, we will watch the videos produced for each of the case-study cities that were the focus of the different student groups. This will be used as a springboard for a discussion on (and assignment about) the similarities and differences between the results you found for your city versus the observations of other groups.</td>
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<td>Nov 10</td>
<td>Energy</td>
<td>Remote Sensing</td>
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<td>Students will explore different types of passive remote sensing satellite data and create maps of land cover from reflectance</td>
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<tr>
<td>Date</td>
<td>Activity</td>
<td>Details</td>
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<td>Nov 17</td>
<td><strong>Cities at Risk: Climate Change &amp; Coastal Urbanization</strong></td>
<td>How will climate change and urbanization add to that risks of sea level rise?</td>
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<td><strong>Modeling Disasters in Coastal Cities</strong></td>
<td>In this activity, students will use georeferenced maps and images of their city to model the potential impact areas from projected 100 year sea-level change (according to various IPCC model estimates).</td>
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<td>Nov 24</td>
<td><strong>Shoring up Cities: Urbanization and Oceanography</strong></td>
<td>How do coastal cities protect their grounds from flooding, storm surges and other environmental extreme events?</td>
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<td><strong>Measuring Coastal Changes in Shanghai and Abu Dhabi:</strong></td>
<td>Using vector layers of the coastline of Chongming Island, Shanghai, from 1984 and 2011, students will track and analyze temporal changes in components of Shanghai’s Chongming Island coastline through time using GIS software.</td>
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<td>Dec 1</td>
<td><strong>Student Video Presentations &amp; Discussions</strong></td>
<td>During our ‘live’ lab this week, we will watch the videos produced for each of the case-study cities that were the focus of the different student groups. This will be used as a springboard for a discussion on the similarities and differences between the results you found for your city versus the observations of other groups.</td>
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<td>Dec 8</td>
<td>Final exam</td>
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