Ecological Analysis with Geographic Information Systems  
BIOL-UA 64 or ENVST-UA 372  
Spring 2016  
Lab: Mon & Wed 11:00am to 12:15pm  
Lecture: Wed 9:30am to 10:45am

Professor Mary Killilea’s Contact Information:  
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Email: mek5@nyu.edu  
Office Hours: By appointment

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Paramesh Karandikar – pvk221@nyu.edu

Course description:  
Being able to organize and analyze ecological data is an essential research tool. Geographic information systems (GIS) are computerized systems for the capture, storage, management, analysis and display of geographically referenced data and their attributes. In this course you will learn the basic principles and applications of GIS including coordinate systems, data transformations, spatial analysis, and accuracy assessment. Laboratory exercises will use ecological data and examples to provide extensive hands-on experience with ArcGIS a professional GIS software package.

Additional course goals:  
During the semester we will be reading a series of scientific articles to help hone your critical reading skills. This is an essential part of your scientific training. It will also help you develop an independent research project. Additionally you will receive training on how to write a scientific paper and present the results of your research project. As part of your training to write scientific papers.

Prerequisites:  
Principles of Biology II or Environmental System Science

Grades:  
The final grade for the class will be calculated as follows:  
Weekly lab assignments 10%  
Independent Project 40%  
Objective and Bibliography (5)  
Proposal (10)  
Paper (15)  
Presentation (10)  
Midterm 25%  
Final 25%
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 will be made available to you. There will be only one opportunity for such an exam; it could be an essay test, and the appropriate instructors will grade it. This situation will be dealt with partly on an individual basis.

Once a grade has been posted you have one week to contact me about your grade on any assignments or exams.

**Academic Integrity:**
Students are expected to abide by the CAS policies on Academic Integrity which can be found on the following website:
[http://cas.nyu.edu/page/academicintegrity](http://cas.nyu.edu/page/academicintegrity)
Any violations of these policies will result in a zero on the assignment or exam in question, and the incident will be reported to the Director of Undergraduate Studies and the Dean’s office.

**Disability Disclosure Statement:**
Academic accommodations are available to any student with a chronic, psychological, visual, mobility, learning disability, or who is deaf or hard of hearing. Students should please register with the Moses Center for Students with Disabilities at 212-998-4980.

**Required Texts and Readings:**

In addition to the text, we will be reading and discussing peer-reviewed literature that focuses on landscape ecology, biogeography, spatial ecology…

**Important Project Dates:**
- Objective and Bibliography (February 8)
- Proposal (draft due March 1 and final draft due March 29)
- Paper (draft due April 19 and final paper due May 10)
- Presentations (May 1 - 8)

**Undergraduate Writing Tutors Program**
In this class, we are fortunate to have help from the Undergraduate Writing Tutors Program. Writing tutors are curious, well-trained peers who provide feedback to their peers on drafts of writing assignments. Their role is to encourage and challenge students to strengthen their writing. Writing tutors are trained to support the aims of the class, learning about the expectations for writing in the class and listening carefully to student writers. While writing tutors are not Teaching Assistants and will not assess papers, they will focus writing conferences with students on questions that generate both clearer writing and stronger thinking about the content. Writing tutors will also look for patterns of grammatical error in student papers, explaining how students can learn to correct these errors. But the writing tutors’ main goals are to help students develop their writing and thinking in response to particular assignments and to become a better writers over the long term.

Students are required to meet outside class with writing tutors. Writing tutors should receive complete drafts from students, not outlines or rough notes. Late submission of drafts to tutors and missed writing conferences are reported to the Professor, who reduces the final grade on the finished version.
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<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics</th>
<th>Readings</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Discussion:</strong> Introduction to GIS, Data Models and Attribute Tables</td>
<td>Bolstad, Chapters 1, 2, &amp; 8</td>
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<td><strong>Lab:</strong> Introduction to GIS</td>
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<tr>
<td>Week 1</td>
<td>1/23 &amp; 1/25</td>
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<td>Week 2</td>
<td>1/30 &amp; 2/1</td>
<td><strong>Discussion:</strong> Digital data</td>
<td>Bolstad, Chapter 7</td>
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<td><strong>Lab:</strong> How and where to get GIS data</td>
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<td>Week 3</td>
<td>2/6 &amp; 2/8</td>
<td><strong>Discussion:</strong> Map Projections and Coordinate Systems</td>
<td>Bolstad, Chapter 3</td>
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<td><strong>Lab:</strong> How to convert data between projections</td>
<td>Objective and Bibliography due Feb 8</td>
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<td>Week 4</td>
<td>2/13 &amp; 2/15</td>
<td><strong>Discussion:</strong> Maps, Data Entry, Editing and Output</td>
<td>Bolstad, Chapter 4</td>
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<td><strong>Lab:</strong> Making maps</td>
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<td>Week 5</td>
<td>2/20 &amp; 2/22</td>
<td><strong>Discussion:</strong> Writing a proposal</td>
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<td>No Class on Monday 2/20</td>
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<td><strong>Lab:</strong> Writing a proposal</td>
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<td>Week 6</td>
<td>2/27 &amp; 3/1</td>
<td><strong>Discussion:</strong> Global Navigation Satellite Systems and Aerial and Satellite Images</td>
<td>Bolstad, Chapters 5 &amp; 6</td>
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<td><strong>Lab:</strong> Making maps</td>
<td>Proposal Draft due March 1</td>
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<td>Week 7</td>
<td>3/6 &amp; 3/8</td>
<td><strong>Midterm (Wednesday 3/8 at 9:30am)</strong></td>
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<td><strong>Lab:</strong> Remote sensing lab</td>
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<td>Week 8</td>
<td>3/13 &amp; 3/15</td>
<td><strong>Spring Break No Class</strong></td>
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<td>Week 9</td>
<td>3/20 &amp; 3/22</td>
<td><strong>Discussion:</strong> Basic Spatial Analysis</td>
<td>Bolstad, Chapter 9</td>
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<td><strong>Lab:</strong> Spatial Analysis</td>
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<td>Week 10</td>
<td>3/27 &amp; 3/29</td>
<td><strong>Discussion:</strong> Raster and Terrain Analysis</td>
<td>Bolstad, Chapter 10 and 11</td>
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<td><strong>Lab:</strong> Raster and Terrain Analysis.</td>
<td>Proposal due March 29</td>
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| Week 11  
4/3 & 4/5 | **Discussion:** Spatial Estimation | **Lab:** Spatial Estimation | Bolstad, Chapter 12 |
|-----------|----------------------------------|-----------------------------|---------------------|
| Week 12  
4/10 & 4/12 | **Discussion:** Spatial Modeling GIS; Writing Results and Discussions | **Lab:** Spatial Models | Bolstad, Chapter 13 |
| Week 13  
4/17 & 4/19 | **Discussion:** Data Standards and Data Quality – Semester Review | **Lab:** Projects | Bolstad, Chapter 14  
Paper Draft Due April 19 |
| Week 14  
4/24 & 4/26 | **Final (Wednesday 4/26 at 9:30am)** | **Lab:** How to prepare a presentation |
| Week 15  
5/1 & 5/3 | **Discussion:** Class Presentations | **Lab:** Class Presentations |
| Week 16  
5/8 | **Lab:** Class Presentations | **Paper Due May 10** |