11:573:437 | Spatial Data Visualization and Map Design

Rutgers, the State University of New Jersey
School of Environmental and Biological Sciences
Fall 2019

Meeting Place: Blake Hall, Room 129
Meeting Time: Friday 3:55 – 6:55 p.m.
Credits: 3

Instructor:
Dave Smith
Office: Room 224, Blake Hall
Email: dave.c.smith@rutgers.edu
Office Hours: By appointment

Learning Goals:
1. Understand and apply the basic principles of the visual representation of spatial data such as symbol use, classification, and generalization.
2. Develop and apply technical skills required for computerized mapmaking using ArcGIS and Adobe Illustrator.
3. Develop and apply skills for clear visual communication of spatial information through mapping, such as appropriate color selection, development of strong visual hierarchy, and designing map products within specified formatting constraints.
4. Develop and apply a strong aesthetic foundation for map design through practice, analysis, and critique.

Prerequisites:
Fundamentals of Environmental Geomatics Lab (11:573:233) or equivalent.

Course Description:
Mapping has been at the center of how we understand and communicate information about our world for thousands of years. It is true that recent developments in technology have changed the way we think about and investigate spatial information in many ways. While we may work with complex overlay analyses, geostatistical modeling, and other rich analytical methods; clear, well-designed maps are still at the core of how we understand and communicate that information.

This course introduces students to the fundamental concepts of cartography: the design and construction of maps. By the end of this course, students should be able to design effective and aesthetically sophisticated maps. They should also have the ability to interpret and critically evaluate the many maps that they encounter as they continue their academic and professional careers.

Course Website:
Canvas -- "MAP DESIGN (FALL 2019)" https://rutgers.instructure.com/courses/30294

Textbook:
Printing Fees:
This course requires the submission of printed work. There is a small cost associated with printing from the Blake Hall computer lab. The expected overall cost for each student for the semester is about $20 on average. This cost is not tied to any university-wide printing accounts and can not be paid using any such accounts.

Course Structure:
Class sessions will consist of a brief peer critique of maps from the previous week, followed by a short lecture and a hands-on demonstration of relevant techniques. After this, students will be presented with a mapping exercise to work on outside of class. Students will also apply what they have learned throughout the semester to develop a final mapping project.

Projects and Assignments:
Mapping Exercises: each class session, students will be presented with an exercise that addresses a different topic in map design or data visualization. These exercises will be completed outside of class.

Critiques: Each week, one or two students will volunteer to have their most recent map critiqued by the class. All students will be expected to volunteer to have at least one map critiqued, and all students will be expected to participate in critiques of their classmates' work.

Map Analysis: Every two weeks, each student will be tasked with finding a map that they find to be particularly well designed and to write a short critique analyzing the cartographic decisions that contribute to the map’s effectiveness.

Final Project: Each student will design a fully developed large-format map or map series that communicates some phenomenon or phenomena of interest to the student.

Weekly Meetings:
Feedback is an essential part of the process of improving as a designer. Each week, students will schedule a 15-minute one-on-one meeting with the course instructor to discuss and receive feedback on their most recent assignment.

Late Submission Policy:
Students are responsible for submitting all work on time. The material presented in this course is cumulative, and feedback is essential to improving. Any work submitted late will receive a 10% grade deduction. In addition, no specific feedback will be provided for work submitted more than one week late.

Grading:
<table>
<thead>
<tr>
<th>Composition of Final Grade</th>
<th>Numerical Ranges for Letter Grades</th>
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<tbody>
<tr>
<td>Mapping Exercises</td>
<td>A: 90-100%</td>
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<tr>
<td>Map Analyses</td>
<td>B: 80-86%</td>
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<tr>
<td>Critique Participation</td>
<td>B+: 87-89%</td>
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<tr>
<td>Final Project</td>
<td>C: 70-76%</td>
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<tr>
<td>Attendance</td>
<td>C+: 77-79%</td>
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<td>D: 60-69%</td>
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<td>F: under 60%</td>
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**Attendance Policy:**

*More than two unexcused absences will result in a 10% reduction in your final grade. Each additional unexcused absence will result in a further 10% reduction in your final grade.*

Students are expected to attend all class session for the full duration of the class period.

Absences may be excused in cases of illness, family emergency, or organized professional development events (e.g. conferences). In such cases, inform your instructor in writing within seven days of returning to campus.

**Academic Integrity Policy:**

Students will be held to the University's Policy on Academic Integrity, which can be found at: [http://academicintegrity.rutgers.edu/academic-integrity-policy/](http://academicintegrity.rutgers.edu/academic-integrity-policy/)

*Plagiarism in any form is not accepted in this course.* Cartography is a field where we often learn best from the work of others. There is a good chance that someone has already found a solution to a problem you are struggling with, or that you will find a map that inspires you think differently about how to approach a map that you are working. While it is acceptable—and even encouraged—to incorporate some of those ideas into your own work, the majority of what you present in any map should be your own work. Imitating the overall style or layout of another cartographer’s work is not acceptable. While this is something of a gray area in terms of plagiarism, *it should still be avoided at all costs.*

**Use of the Computer Lab:**

Students will be provided with swipe access into Blake Hall and the computer lab. Students may work in the lab at any time that there is not another class meeting in the room. Bear in mind that during, certain parts of the semester, use of the lab may be in high demand and access to a computer may be limited.

While working in the lab, standard computer lab rules and common sense apply:

- No food or open drinks are allowed in the lab.
- Clean up your desk before leaving.
- Be respectful of others working in the lab.
- Do not leave any logged in computers unattended.
- Do not attempt to install any software on any computer without express permission from your instructor.
- Report any malfunctioning computers to your instructor as soon as possible.
Course Schedule:

**Week 1 (September 6): Introduction**
- **Assignment:** Illustrator CS6 Video Tutorial (Due September 13)

**Week 2 (September 13): Illustrator and Map Layout**
- **Assignments:** Preliminary Layout Mock-ups (Due September 20)
  - Map Analysis 1 (Due September 27)
- **Readings:** Brewer, Chapter 1 “Planning Maps”
  - Brewer, Chapter 3 “Explaining Maps”
- **Optional Reading:**

**Week 3 (September 20): Typography**
- **Assignment:** Glen Helen Map Layout with Descriptive Text (Due September 27)
- **Reading:** Brewer, Chapter 5 “Type Basics”
- **Optional Reading:**

**Week 4 (September 27): Labeling**
- **Assignments:** Glen Helen Map Layout with Descriptive text and Labels (Due October 4)
  - Map Analysis 2 (Due October 11)
- **Reading:** Brewer, Chapter 6 “Labeling Maps”
- **Optional Reading:**

**Week 5 (October 4): Projections, Coordinates, and Scale**
- **Assignment:** Mapping Forest Change at Multiple Scales (Due October 11)
- **Readings:** Kimmerling, Chapter 2 “Map Scale”
  - Kimmerling, Chapter 3 “Map Projections”
- **Optional Reading:**

**Week 6 (October 11): Thematic Mapping of Categorical Data**
- **Assignments:** Categorical Data - Hurricane Preparedness (Due October 25)
  - Map Analysis 3 (Due October 25)
- **Reading:** Brewer, Chapter 9 “Customizing Symbols”
- **Optional Reading:** Huffman, “The Power of Appearances”
- **Optional Video:** Huffman, “Mapping in Full Monochrome”

**Week 7 (October 18): NO CLASS**

**Week 8 (October 25): Mapping Statistical Data I: The Choropleth Map**
- **Assignments:** Mapping Demographic Data in New Jersey I (Due November 1)
  - Map Analysis 4 (Due November 8)
- **Readings:** Axis Maps Cartography Guide - Choropleth Maps
  - Smith, “Comparing Traditional Methods for Selecting Class Intervals on Choropleth Maps”
  - Brewer, Chapter 8 “Color on Maps”
- **Optional Reading:** Brewer and Pickle, “Evaluation of Methods for Classifying Epidemiological Data on Choropleth Maps in Series”
Week 9 (November 1): Mapping Statistical Data II: Other Methods
Assignment: Mapping Demographic Data in New Jersey II (Due November 8)
Reading: TBA
Optional Reading: Quinnan, et al. "Examining Implicit Discretization in Spectral Schemes"

Week 10 (November 8): Mapping Terrain Data
--FINAL PROJECT PROPOSALS DUE--
Assignments: Glacier National Park Terrain Representation (Due November 15)
Map Analysis 5 (Due November 22)
Reading: Imhoff, Chapter 5 “The Problem and Its Characteristics”
Optional Reading: Bell, “Drawing Hillshade: A tutorial (with time lapse videos)”

Week 11 (November 15): Reference Maps
Assignment: Glacier National Park Trail Map (Due November 20)
Reading: Brewer, Chapter 2 “Basemap Basics” and TBA
Optional Reading: 

Week 12 (November 22): Map Series
Assignment: Reference Map Style Guide (Due November 27)
Reading: TBA
Optional Reading: 

Week 13 (November 27): NO CLASS

Week 14 (December 6): Project Work and Pin-Up
--FINAL PROJECT DUE--
Optional Reading: Nelson, “20 Unrequested Map Tips”

Finals Week (TBD): Final Project Critique
Optional Reading: Edney, Chapter 2 “Seeing, and Seeing Past, the Ideal”