

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

Rutgers, the State University of New Jersey
School of Environmental and Biological Sciences
Fall 2021 -- 3 Credits

This course will meet *in-person*. See note below on COVID-19 Guidelines.

Meeting Place: Room 129, Blake Hall

Meeting Time: Tuesdays, 5:00 p.m. – 8:00 p.m.

Instructor: Dave Smith

Office: Room 224, Blake Hall

Email: dave.c.smith@rutgers.edu

Office Hours: TBA

Course Website: CANVAS "MAP DESIGN (FALL 2021)" <https://rutgers.instructure.com/courses/138390>

Textbook: *Designing Better Maps: A Guide for GIS Users* by Cynthia A. Brewer (ISBN-13: 978-1589484405)

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

Learning Objectives:

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 Affinity Designer.
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.

Course Description:

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 Structure:

Class sessions will consist of a brief peer critique of one student's map 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.

One-on-One Meetings:

In addition to regular class meetings, 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.

COVID-19 Guidelines:

Despite the high rate of vaccination among our campus community, and the significant protection that vaccines provide, COVID-19 remains a very real threat. This is particularly true for members of our community who cannot be vaccinated or who have family members at home who cannot be vaccinated.

For that reason, and in keeping with university policy, please be sure to follow these standard guidelines.

1. Before coming to campus for class, be sure to **renew your Campus Pass** on MyRutgers.
2. If you feel unwell, **DO NOT come to class**. As discussed in the attendance policy below, I will work with you to make up any work that you miss due to excused absence.
3. All students and employees are expected to **wear a mask that fully covers the mouth and nose** at all times while inside campus buildings. Please avoid using masks with exhaust valves (these do not prevent disease-causing particles and aerosols from passing out of the mask, increasing the risk of you making others sick). See CDC guidelines for appropriate mask types and care here: <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/about-face-coverings.html>
4. **Maintain distance from classmates**. Avoid sitting directly next to other students. Allow other students space while entering and exiting the classroom, etc.
5. **Wash or sanitize hands thoroughly** before and after class.

Again, these guidelines should be followed **regardless of vaccination status**. I am fully vaccinated, and I will be following the same guidelines.

Projects and Assignments:

Mapping Exercises: each week, 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 time.

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.

Grading:

Composition of Final Grade:

Mapping Exercises	50%
Map Analyses	15%
Critique Participation	10%
Final Project	25%
Attendance:	See Below

Numerical Ranges for Letter Grades:

A:	90-100%	
B:	80-86%	B+: 87-89%
C:	70-76%	C+: 77-79%
D:	60-69%	
F:	under 60%	

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.**

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.

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/>

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 designing. While it is acceptable—and even encouraged—to incorporate some of those ideas into your own work, the core of what you present in any map should always be your own work. In order to avoid issues of plagiarism, always consider the following:

- 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.*
- Graphical elements (logos, icons, diagrams, etc.) that were created by someone else should never be included in your own work—with very few specific exceptions.
- The use of photographs or other imagery that were created by someone else should be avoided in most cases. If used, *full citations* should be provided for those images.

If you have any questions about whether a design decision you've made or an image you've used constitutes plagiarism, feel free to talk to me about your concern.

Use of the Computer Lab:

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

- ALL COVID-19 PRECAUTIONS AND POLICIES MUST BE FOLLOWED EVEN OUTSIDE OF CLASS TIME.
- No food or open drinks are allowed in the lab.
- Do not leave any logged in computers unattended.
- Clean up your desk before leaving.
- Be respectful of others working in the lab.
- Do not attempt to install any software on any computer in the lab.
- Report any malfunctioning computers to your instructor as soon as possible.

Course Schedule:

Week 1 (September 7): Introduction

Assignment: Affinity Designer Video Tutorial (Due September 14)

Week 2 (September 14): Graphics Software and Map Layout

Assignments: Preliminary Layout Mock-ups (Due September 21)

Map Analysis 1 (Due September 28)

Readings: Brewer, Chapter 1 *"Planning Maps"*

Brewer, Chapter 3 *"Explaining Maps"*

Week 3 (September 21): Typography

Assignment: Glen Helen Map Layout with Descriptive Text (Due September 28)

Reading: Brewer, Chapter 5 *"Type Basics"*

Week 4 (September 28): Labeling

Assignments: Glen Helen Map Layout with Descriptive text and Labels (Due October 5)

Map Analysis 2 (Due October 12)

Reading: Brewer, Chapter 6 *"Labeling Maps"*

Week 5 (October 5): Projections, Coordinates, and Scale

Assignment: Mapping Hurricane Tracks at Multiple Scales (Due October 12)

Readings: Kimmerling, Chapter 2 *"Map Scale"*

Kimmerling, Chapter 3 *"Map Projections"*

Week 6 (October 12): Thematic Mapping of Categorical Data

Assignments: Categorical Data - Hurricane Preparedness (Due October 19)

Map Analysis 3 (Due October 26)

Reading: Brewer, Chapter 9 *"Customizing Symbols"*

Optional Reading: Rost, *"How to pick more beautiful colors for your data visualizations"*

Optional Video: Huffman, *"Mapping in Full Monochrome"*

Week 7 (October 19): Mapping Statistical Data I: The Choropleth Map

Assignments: Mapping Demographic Data in New Jersey I (Due October 26)

Map Analysis 4 (Due November 2)

Readings: Foster *"Statistical Mapping (Enumeration, Normalization, Classification)"*

Brewer, Chapter 8 *"Color on Maps"*

Optional Reading: Brewer and Pickle, *"Evaluation of Methods for Classifying Epidemiological Data on Choropleth Maps in Series"*

Week 8 (October 26): Mapping Statistical Data II: Other Methods

Assignment: Design Iteration (Due November 2)

Reading: TBA

Optional Reading: Quinnan, et al. *"Examining Implicit Discretization in Spectral Schemes"*

Week 9 (November 2): Mapping Terrain Data

--FINAL PROJECT PROPOSAL DUE--

Assignments: Glacier National Park Terrain Representation (Due November 9)
Map Analysis 5 (Due November 16)

Reading: Imhoff, Chapter 5 *"The Problem and Its Characteristics"*

Optional Reading: Bell, *"Drawing Hillshade: A tutorial (with time lapse videos)"*

Week 10 (November 9): Reference Maps

Assignment: Glacier National Park Trail Map (Due November 16)

Reading: Brewer, Chapter 2 *"Basemap Basics"* and TBA

Week 11 (November 16): Map Series

Assignment: Final Project Draft (Due November 23)

Reading: TBA

Week 13 (November 23): NO CLASS

Week 14 (November 30): In-Class Project Work

Optional Reading: Nelson, *"20 Unrequested Map Tips"*

Week 15 (December 7): Final Project Draft Pin-Up

--FINAL PROJECT DRAFT DUE--

Optional Video: Leroux and Daniel, *"Imprimatur: Printing Maps in Today's Digital World"*

Finals Week (TBD): Final Project Critique

Optional Reading: Edney, Chapter 2 *"Seeing, and Seeing Past, the Ideal"*