# GTECH 72200
# Advanced Topics in GeoVisualization
**Hunter College, CUNY**
**Department of Geography**

**Spring 2017**
**Thursdays 5:35PM to 9:15PM**

**Instructor:** Doug Williamson, PhD
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**Office Hours:** By Appointment
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**Relevant Texts (NOT required):**
- **Mapping: A Critical Introduction to Cartography and GIS**, by Jeremy W. Crampton, Wiley-Blackwell, 2010
- **Cartography: Visualization of Geospatial Data**, by Menno-Jan Kraak and Ferjan Ormeling, Prentice Hall
- **Cartography: Thematic Map Design**, 5th Edition, by Borden Dent, 1999, McGraw Hill
- **Cartographers' Toolkit**, by Gretchen Peterson, CRC Press, Taylor and Francis Group, 2012
- **GIS Cartography: A Guide to Effective Map** Design by Gretchen N. Peterson, CRC Press, Taylor and Francis Group, 2009

**Additional Readings:**
These and others will be provided in class.

Fairbairn, D., Andrienko, G., Andrienko, N., Buziek, G., and Dykes, J. (2001). Representation and its Relationship with Cartographic Visualization. Cartography and Geographic Information Science, vol. 28, no. 1: 1-29.

Slocum, T. A., Blok, C., Jiang, B., Koussoulakou, A., Montello, D. R., Fuhrmann, S., and Hedley, N. (2001). Cognitive and Usability Issues in Geovisualization. Cartography and Geographic Information Science, vol. 28, no. 1: 61-75.

Fabrikant, S.I. (2005). Towards an understanding of geovisualization with dynamic displays: Issues and Prospects. Proceedings, American Association for Artificial Intelligence (AAAI) 2005 Spring Symposium Series: Reasoning with Mental and External Diagrams: Computational Modeling and Spatial Assistance. Stanford University, Stanford, CA, Mar. 21-23, 2005.

**Course Overview:**
GTECH 722 immerses students in the current issues and technology in Cartography and Geographic Visualization. It takes the fundamentals learned in GTECH 721 and expands into animated and interactive maps, web mapping, and new visualization techniques. GTECH 722 is an advanced course in the theory of map design, the fundamentals of how interactive maps work and how information is transferred from map to reader and the practical application of these concepts into digital, interactive cartographic products. The digital revolution has changed how we make maps, how we use them, and how we think about them. The rapid and concurrent developments in desktop computing capabilities, the availability of digital geospatial data, and the growth of the Internet have radically changed the cartographic landscape. In an age where the user has increasingly become their own mapmaker (e.g., Google Maps, online GIS) this course examines recent issues in cartography related to map animation, the Internet, geovisualization, and on-demand cartographic systems—focusing on the new cartographic challenges and opportunities associated with interactive, digital mapping systems.

**Course Objective:**
By the end of the class you should be able to understand how interactive and dynamic maps are made, be able to articulate the conceptual strengths and weaknesses of these maps, and understand where this rapidly evolving field is headed. You will also gain valuable (and marketable) skills in designing and implementing working examples of dynamic Web maps using vector-based animation tools. The course consists of two closely related components: lectures and labs geared toward a symbiotic relationship between theory and practice. The lecture component of the course covers the extant cartographic theories and prior cartographic success stories that are important for thinking critically about the design and development of interactive maps. The laboratory component of the course emphasizes the practical skills needed to design cartographic interfaces. Following an introduction to the environment, each lab assignment requires you to grapple with topics previously discussed in lecture, with the final map deliverable representing your critical thinking and cartographic creativity regarding the topic.

**Learning Outcomes**
This is a practical, hands-on course; when you have completed it, you will be able to:
• Attain actionable knowledge of cartography and geovisualization.
• Design and construct interactive maps for communicating spatial information to others.
• Choose and arrange map and user interface elements for better cartographic communication.
• Choose and control labels, symbols and colors for best effect.
• Utilize a variety of thematic mapping and geovisualization techniques.

**Assignments:**
There are a number of assignments that are due throughout the semester. The assignments and brief descriptions are as follows:

**1) Visualization Assignments (3)**
Create a high quality visualization products from a variety of data sources based on principles discussed in class.

**2) In-class Presentations (2)**
Present a review of a relevant journal article from the field of Geovisualization and present a brief demonstration of any geovisualization tool/algorithm (not covered in class; i.e., not Carto, Socrata, Tableau or ESRI)
One of these will require you to work in pairs.

**3) Final Group Project**
Working in small teams of 3-4 people you will compile necessary data to create a professional-grade interactive geovisualization using ESRI.

**Policies:**
Attendance
- Attendance is crucial, as a large percentage of your grade will be based on participation in class discussions
- Unexcused absences will lead to a drop in letter grade; an excused absence is at the discretion of the professor.

Hunter College Policy on Academic Integrity
Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures.

ADA Policy
In compliance with the American Disability Act of 1990 (ADA) and with Section 504 of the Rehabilitation Act of 1973, Hunter College is committed to ensuring educational parity and accommodations for all students with documented disabilities and/or medical conditions. It is recommended that all students with documented disabilities (Emotional, Medical, Physical, and/or Learning) consult the Office of AccessABILITY, located in Room E1214B, to secure necessary academic accommodations. For further information and assistance, please call: (212) 772- 4857 or (212) 650-3230.

<u>Lab Policies</u>
Read and follow the lab rules. They are located here:
http://geography.hunter.cuny.edu/techsupport/rules.html

**Grading:** Evaluation of your performance in this course will be based on both lecture (discussion) and laboratory components. Each student starts off the semester with a grade of a B-. Your grade can go up or down depending on whether you make a conscious effort or not. If you contribute often to class discussions and 'go the extra mile' on your final project, you will get an A. If you fail to come to class, miss assignments or turn in substandard work, your grade will be lowered accordingly. In short, your grade is your choice.

A note on the grading of your final projects… The grades for your final projects will be based on the oral critiques from your peers.  Based on what they have learned throughout the semester, your peers will critique your drafts in class and then provide a grade for the final deliverable.

- Participation                  20%
- Visualization Assignments      30%
- Presentations                  20%
- Final Project                  30%

| SPRING 2017 | | GTECH 722: Advanced Topics in GeoVisualization | Doug Williamson |
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| | | **SUBJECT TO CHANGE!!!** | |
| **Meeting** | **Date** | **Topic** | **Assignment** |
| 1 | 02/02 | Course Introduction & Overview | |
| 2 | 02/09 | Geovisualization, Exploration, and Insight | |
| 3 | 02/16 | OpenData Uses and Examples | |
| 4 | 02/23 | Productivity, Complexity, and Constraint | Assignment 1 Due |
| 5 | 03/02 | Literature Review Presentations | Presentation |
| 6 | 03/09 | Overview of Carto | |
| 7 | 03/16 | Tableau and Designing Dashboards | Final Assignment 2 Due |
| 8 | 03/23 | Designing Infographics | |
| 9 | 03/30 | Introduction to ESRI StoryMaps and Insights | |
| 10 | 04/06 | Principles of Interaction | Final Assignment 3 Due |
| | **04/13** | **No Class (Spring Break)** | |
| | **04/20** | **No Class (Hunter follows a Monday schedule)** | |
| 11 | 04/27 | Student Demonstration of Visualization Tools | Presentation |
| 12 | 05/04 | Interactive Maps: Usability vs. Utility | |
| 13 | 05/11 | User-Centered Design | |
| 14 | 05/18 | Project Critiques | Draft Final Project Due |
| 15 | 05/25 | Project Presentations | Final Project Due |