

# Geography 3053: Cartography and Information Design

## Fall 2016

lectures T Th 2-3:15 GUGG 205  
labs Wed and Thurs 9 – 11:50 GUGG 6 (KESDA Lab)

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Mapping supports most tasks in Geography. Maps are used to explore environmental data, perform spatial analysis, and present results. This course provides a hands-on introduction to mapping and information design in a GIS environment. Lectures cover principles of scientific visualization, graphical design and mapping. We'll intermix lectures with in-class exercises, design critiques, and discussion. In labs, you will design maps and create a working cartographic database using ArcGIS. By the end of this course, you will be capable to create high quality cartographic displays, to work comfortably with GIS software, and to process geographic data for GIS mapping.

**PREREQUISITES:** Some prior experience with Windows computing. GEOG 3053 is a prerequisite for the Geography GIS courses, and a core course for the undergraduate certificate in GIS. A beginning course in statistics is recommended and may be taken concurrently. You must complete a course in statistics to enroll in subsequent GIS classes in our department.

**TEXTBOOKS:** (Additional readings on class website)

Dent BD, Torguson JS, and Hodler TW. 2009. *Cartography: Thematic Map Design*. 6<sup>th</sup> Ed. New York: McGraw-Hill.  
(available on Amazon Hardcover: \$200 new, \$111 used; \$24 to rent)

Brewer CA. 2016. *Designing Better Maps*. Redlands: ESRI Press. (2<sup>nd</sup> Ed. on Amazon Paper for \$21 new; \$10 used)

**LECTURE HANDOUTS:** The class website [http://www.colorado.edu/geography/babs/geog\\_3053\\_f16/](http://www.colorado.edu/geography/babs/geog_3053_f16/) contains copies of this syllabus, lecture handouts, readings, and due dates. Students are expected to retrieve their own handouts and readings.

**GRADING** A total of 275 points may be earned. Exercises, due dates and exams are given on the next page.

Lab assignments (12)	140 points (51%)	In-Class Exercises (7)	60 points (22%)
Quizzes (3)	45 points (16%)	Readings abstracts (3 sets)	30 points (11%)

**ATTENDANCE:** The key to learning map design lies in working with other students as a group. This can succeed only if students attend lectures and labs. To insure this, students must attend full lab periods each week. They may be absent for up to four lectures during the semester without penalty. Four percent will be taken off the final semester grade for each unexcused absence, unless written permission is given in advance by Dr. Buttenfield. Asking the TA or sending an email request does not by itself constitute permission to be absent.

**LATE POLICY:** Assignments (due dates listed below) are due at the beginning of lab unless stated otherwise in writing. 20% of an assignment grade will be taken off for each weekday that an assignment is late, beginning on the due date. All assignments must be handed in no later than 2 pm Thursday 8 Dec 2016 to receive a passing grade, regardless of how many points have been taken off for lateness. Readings abstracts must be turned in via email, and will not be accepted after the class period in which they are due.

*Please Note -- I do not give incompletes. Please turn off your cell phones during class and lab periods.*

WEEK	LECTURE	READINGS	POINTS	LAB EXERCISE
1				
23 A	<b>Introduction (5)</b>	Dent 1, Brewer 1	5	KESDA / ArcGIS orientation
25	Mapping Your World	Wright		due end of lab 24/25 A
2				
30 A	Map Functions and Types	Cartwright	10	ArcMap & ArcCatalog
1 S	Visual Variables 1	Dent 4,12		due 7/8 S
3				
6 S	Visual Variables 2	Dent 7,8; Brewer 3,9	10	Small Scale Mapping
8	Thematic Symbols 1	Brewer 2		due 14/15 S
4				
13 S	Thematic Symbols 2		15	Thematic Mapping
15	Color 1	Dent 14; Brewer 7,8; "ColorBrewer"		due 28/29 S
5				
20 S	Color 2	<i>Rdgs abstracts #1 due 20 Sept (10)</i>		Thematic Mapping
22	<b>Design Critique 1 (10) REVIEW</b>			(cont.)
6				
27 S	<b>Quiz #1 (15)</b>		15	Emergency Mapping
29	Where to Find GIS Data Online			due 12/13 O
7				
4 O	Scale and Resolution	Dent App A		Emergency Mapping
6	<b>What is GIS and GIS data (10)</b>	Dent 9		(cont.)
8				
11 O	Map Projections 1	Dent 2,3,10; "USGS Map Projections Poster" 10		Mapping Terrain
13	<b>Map Projections 2 (5)</b>	"Anamorphic", "Cartograms"		due 19/20 O
9				
18 O	Generalization 1	Beard	10	Mapping Water
20	<b>Generalization 2 (10)</b>			due 26/27 O
10				
25 O	Typography	Dent 13, Brewer 5,6, Imhoff, "TypeBrewer"	10	Mapping Roads
27	Type Placement	<i>Rdgs abstracts #2 due 27 Oct (10)</i>		due 2/3 N
11				
1 N	<b>Design Critique 2 (10) REVIEW</b>		10	Typography
3	<b>Quiz #2 (15)</b>			due 9/10 N
12				
8 N	Data Classing 1	Dent 5,6	10	Choropleth Symbols
10	Data Classing 2			due 16/17 N
13				
15 N	New Technologies for Mapping	Dent 16, "NYT Animation", Kraak;	15	Mapping Residuals
17	Additional Help with Residuals Lab	Brewer 4		due 30 N/ 1 D
14				
22/24 N	FALL BREAK			
15				
29 N	Mapping Error and Uncertainty 1	Buttenfield (a), Buttenfield (b),	20	Portland Layout
1 D	Mapping Error and Uncertainty 2	Beard and Buttenfield		due 8 Dec @ 2 pm
16		<i>Rdgs abstracts #3 due 1 Dec (10)</i>		
6 D	<b>Design Critique 3 (10) REVIEW</b>			Portland Layout
8	<b>Quiz #3 (15)</b>			(cont.)

## Readings Abstracts

200 words plus one question for each of three abstracts, in Word (.doc or .docx) format (600 words in all with 3 questions, for each assignment). Email to babs before 2pm on the due date. Submit three abstracts in a single file called *lastname\_abs1.doc (or abs2, abs3)*, and be sure to include a full citation for each article. Copy citations from the list below.

Readings abstracts will not be accepted after the due date or in any other format than Word.

20 Sept – Wright, Cartwright, Brewer 9

27 Oct – Beard, "Cartograms", Imhoff

1 Dec – Beard and Buttenfield, Buttenfield (a), Kraak

**READINGS** (those in **bold** are eligible for abstract credit. Quizzes will cover *ALL* readings incl. textbooks.)

**Beard, M.K.** 1991 Constraints on Rule Formation. Chapter 7 in: Buttenfield, B.P. and McMaster, R. B. (Eds) *Map Generalization: Making Rules for Knowledge Representation*. New York: Longman: 121:135

**Beard, M.K. and Buttenfield, B.P.** 1999 Detecting Errors by Graphical Means. Chapter 15 in Longley, Goodchild, Maguire and Rhind (Eds) *Geographical Information Systems: Principles, Techniques, Management and Applications*. London: John Wiley 219-233.

**Buttenfield, B.P. (a)** 2015. Uncertainty and Reliability. In: Monmonier, M.S. (Ed.) *Cartography in the Twentieth Century*, Vol. 6 of *The History of Cartography* (Edney, M, Woodward, D. Harley, B. (Series Eds.). Madison, WI: University of Wisconsin Press: 1642-1644.

Buttenfield, B. P. (b) 2001 Mapping Ecological Uncertainty. Chapter 6 in: Hunsaker, C., Goodchild, M.F., Friedl, M. and Case, T. (Eds.) *Uncertainty in Spatial Data for Ecological Analyses*. New York: Springer-Verlag: 116-132.

**Cartwright, W.** 2009 Art and Cartographic Communication. Ch. 2 in Cartwright, W. (Ed.) *Cartography and Art*. Berlin: Springer Verlag: 9-22.

**Imhoff, E.** 1975 Positioning Names on Maps. *The American Cartographer* 2(2):128-144.

**Kraak, M.J.** 2007 Cartography and the Use of Animation. Chapter 22 in Cartwright, W., Peterson, M.P. and Gartner, G. (Eds.) *Multimedia Cartography*. 2<sup>nd</sup> Edition. Berlin: Springer Verlag: 317-326.

**Wright, J. K.** 1966 Mapmakers are Human: Comments on the Subjective in Maps. Chapter 3 in J.K. Wright (Ed.) of *Human Nature in Geography*. Cambridge, Mass: 33-52. Reprinted from *Geographical Review* 1942, 32(4): 527-544.

## Web Resources

"Anamorphic" in the course schedule refers to a suite of websites showing sidewalk chalk art of Julian Beever.

<http://www.julianbeever.net> <http://media.cnpapers.com/chalk/>

[http://www.bbc.co.uk/birmingham/content/articles/2006/01/27/pavement\\_picasso\\_feature.shtml](http://www.bbc.co.uk/birmingham/content/articles/2006/01/27/pavement_picasso_feature.shtml)

"Bing Maps" <http://www.bing.com/maps> is Microsoft's free web mapping tool.

"Cartograms" in the course schedule refers to a web site showing cartogram animations built by Dan Dorling in 2008. See geographical space morph into a projected cartogram, as well as cartograms that morph from one time period to the next. <http://www.worldmapper.org>

"ColorBrewer" refers to an excellent Web site on color theory and cartography built by Cindy Brewer, showing guidelines for designing color maps, along with specific mapped examples. <http://www.personal.psu.edu/cab38/ColorSch/SchHome.html>

"TypeBrewer" in the course schedule refers to a web site that lets you see the consequences of various type fonts, families, and styles on the overall map appearance. Built by Ben Sheesley in 2006. <http://typebrewer.org> (currently under construction)

"ArcGIS Online" <http://www.arcgis.com> is a web framework to create simple map overlays and show your own data.

"Google SketchUp!" <http://sketchup.google.com> is a simple service to create 3D objects to display in Google Earth or export.

"NYT Animation" refers to the New York Times Immigration Explorer, an interactive map for browsing immigration data about the United States. <http://www.nytimes.com/interactive/2009/03/10/us/20090310-immigration-explorer.html>

"Open Street Maps (OSM)" <http://openstreetmap.org/> is a free editable map of the entire world, and anyone can contribute.

"USGS Map Projections" <http://egsc.usgs.gov/isb/pubs/MapProjections/projections.html> is a collection of a selection of map projections commonly used for mapping. The website gives details about the projections without getting too deeply into the underlying mathematical foundations.

### **Department of Geography Code of Conduct**

In the Department of Geography, instructors strive to create an atmosphere of mutual trust and respect in which learning, debate, and intellectual growth can thrive. Creating this atmosphere requires that instructors and students work to achieve a classroom in which learning is not disrupted. At the most basic level, this means that everyone attend class, be prepared with readings and assignments, and that students pay attention. This means no conversations with friends, reading the newspaper, coming late or leaving early without a reason. Such behavior is disruptive to your fellow classmates.

These basics of classroom etiquette are an important means of building and showing mutual respect. Inevitably, however, disagreements will arise. Sometimes these disagreements will be about content, sometimes about grades or course procedures, and sometimes they will be about the treatment of participants in the class. In order to facilitate the resolution of these disagreements, the following guidelines should be followed by everyone:

- All interactions must be guided by mutual respect and trust.
- If you are bothered by some aspect of the class, identify what is bothering you and center discussion on that issue.
- Address issues that concern you early. Problems are easier to resolve early on.
- Consider whether it is best to address your concerns in class or in a separate appointment with the instructor. Remember, behavior that disrupts your fellow classmates is not acceptable.
- Abusive speech or behavior will not be tolerated in any interaction between students or between student and instructor. If an instructor feels that your speech or behavior is abusive, you will be asked to leave the room. If you believe an instructor has become abusive, you may leave the room and talk with the department chairperson. Debate and discussion can continue when all parties proceed with mutual respect.
- If mutual respect cannot be restored, either you or the instructor may take the issue to the department chairperson or the Campus Ombuds Office.

### **Policy on Plagiarism**

Plagiarism is the act of using someone else's words, pictures, ideas, or procedures without proper acknowledgement, or to present them as if they originated with you. In science and especially in academics, plagiarism is unacceptable. In an exam, for example, copying from someone else's test booklet and handing it in as if it were your own work is plagiarism. In some instances it is difficult to document whether plagiarism has occurred. In other situations, particularly learning situations, it is possible that students who do not know the protocols of academic expression can inadvertently plagiarize. In some cultures, direct use of another person's words bring great honor to the quoted person. At this university, plagiarism constitutes a form of cheating, and will not be tolerated. If you are unsure whether to cite someone else's work as you work on an assignment, talk with your professor about it. Do this before you hand in an assignment, not afterward.

### **Disability Accommodations**

If you qualify for accommodations because of a disability, please submit to your professor a letter from Disability Services in a timely manner (preferably the first week of class) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or at [dsinfo@colorado.edu](mailto:dsinfo@colorado.edu).

### **Religious Observances**

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Let your professor know at the beginning of the semester so that accommodations can be made.

## QUESTIONNAIRE

NAME \_\_\_\_\_

YEAR \_\_\_\_\_

PREVIOUS CARTOGRAPHY COURSES TAKEN

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RELATED COURSEWORK, INTERNSHIPS, OTHER EXPERIENCE (Art, Graphic Design, CAD, Architecture, Environmental Science or Civil Engineering)

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HAVE YOU TAKEN A COURSE IN INTRODUCTORY STATISTICS? \_\_\_\_\_

WHAT COURSE? \_\_\_\_\_ WHEN? \_\_\_\_\_

WHY ARE YOU TAKING THIS CLASS AND WHAT DO YOU HOPE TO LEARN?

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Thanks for filling this out; it will help us to teach you well.