

GIS Modeling

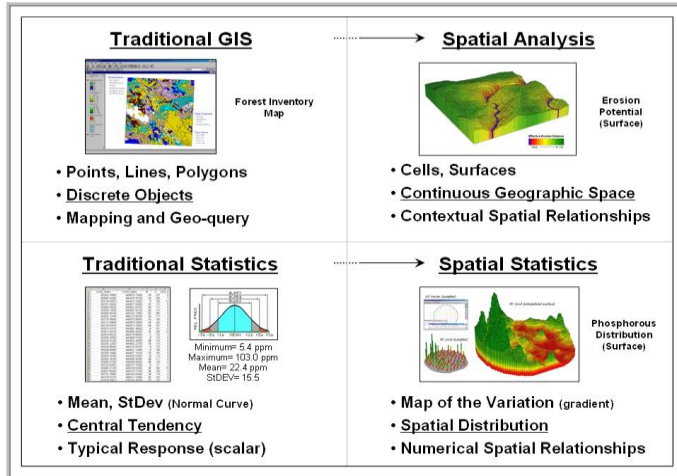
An Introduction to Grid-based Map Analysis and Modeling

GEOG 3110, Winter Term, 2012

Class Website: www.innovativegis.com/basis/Courses/GMcourse12/

Course: 4 credits, Thursdays, 6:00-9:30pm, Boettcher West 126 (GIS lab)

Instructor: Joseph K. Berry, email jkberry@du.edu; phone 970-215-0825

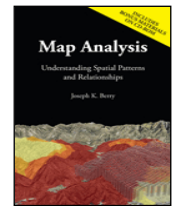


This intermediate course focuses on the concepts and procedures used in discovering and applying relationships within and among maps. It extends the mapping and geo-query capabilities of GIS technology to map analysis and construction of spatial models. The course establishes a comprehensive framework that addresses a wide range of applications from natural resources to geo-business ...a "map-ematics."

Topics include the *Nature of Mapped Data*, *Spatial Analysis* and *GIS Modeling* in the first six weeks followed by *Surface Modeling* and *Spatial Data Mining* operations in the ensuing four weeks. The lectures, discussions and lab exercises provide a foundation for creative application of GIS technology

in spatial reasoning and decision-making ... "thinking with maps."

The course uses Dr. Berry's book *Map Analysis: Understanding Spatial Patterns and Relationships* (GeoTec Media, 2007). Application areas addressed in the course include *Natural Resources* (*Habitat Mapping, Wildfire Risk, Visual Exposure Impacts, Accessibility*), *Precision Agriculture* (*Soil Nutrient Mapping, Yield Analysis, Fertility Program Optimization, Erosion Potential*), *Infrastructure* (*Routing and Optimal Paths, Risk Analysis, Consensus Building*), *Geo-Business* (*Store Siting, Competition Analysis, Retail sales Forecasting, Commercial Properties Investment*) and numerous other examples draw on the instructor's recent consulting, presentations and research projects.



Prerequisites: An introductory course in GIS (recommended) or instructor permission is required for enrollment. Familiarity with basic statistical concepts, general computer skills and interest in quantitative analysis are helpful.

Course Format: The class meets once a week for three hours. Class meetings involve lecture, discussion and real-time demonstrations of concepts in spatial statistics, spatial analysis and GIS modeling using *MapCalc* and *Surfer* software. Student teams complete homework exercises (approximately six hours per week) outside of class using GIS Lab facilities or software installed on student's personal computer. The operations used in the exercises are cross-referenced to the ArcGIS Grid and Spatial Analyst commercial systems. Students are expected to remain current on reading assignments (approximately two hours per week) and be prepared to contribute to class discussions.



Dr. Berry has been working with GIS technology for over 30 years both as a professor and as a principal in several consulting and software companies. He has written over 200 papers on map analysis, authored five books, and presented numerous national/international keynote addresses, plenary sessions, workshops and invited papers on grid-based analytical capabilities and applications.

For more information about the instructor see www.innovativegis.com/basis/basis/cv_berry.htm

Online References describing the course's scope:

Class Syllabus: www.innovativegis.com/basis/Courses/GMcourse12/ (course description, format and requirements)

Class Text and Companion CD: www.innovativegis.com/basis/Books/MapAnalysis/Default.htm (*Map Analysis*, Berry, 2007)

Related Online References:

www.innovativegis.com/basis/Papers/Other/GISmodelingFramework/ (white paper on the analytical framework for map analysis and GIS modeling)

www.innovativegis.com/basis/MapAnalysis/Topic24/Topic24.htm (an overview of spatial analysis and statistics)

www.innovativegis.com/basis/MapAnalysis/ (*Beyond Mapping III* online book with 27 chapters and over 350 figures)

www.innovativegis.com/basis/present/GeoTec08/GeoTec08_GeoBusiness.pdf (paper describing spatial data mining in Geo-business)

www.innovativegis.com/basis/present/GW06_retail/GW06_retail.pdf (discussion of Retail Sales Competition Analysis)

www.innovativegis.com/basis/present/GW05_wildfire/Wildfire_GW05.pdf (discussion of Quantifying Wildfire Risk)

www.innovativegis.com/basis/present/GW04_routing/GW_Apr04_routingPowerline.pdf (discussion of Transmission Line Routing)

www.innovativegis.com/basis/present/GW98_PrecisionAg/GW98_PrecisionAg.htm (discussion of Precision Farming)

...additional papers at www.innovativegis.com/basis/Papers/Online_Papers.htm

<**Note:** this flyer with live hyperlinks is posted at www.innovativegis.com/basis/Courses/GMcourse11/Syllabus/GMCourse.pdf>