



Course GEOG3304: Tools for Spatial Analysis
Professor Dr. Bryan Chastain
Senior Lecturer, EPPS
Term Spring 2013
Meetings Tuesdays 1:00-3:45 PM, GR 3.602

Instructor's Contact Information

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Office Location GR 3.232
Email Address chastain@utdallas.edu
Office Hours Monday 2:00 – 3:00 PM or by appointment
Other Information We will use the new eLearning for this class. Please contact me through eLearning for all class related issues.
Teaching Assistant Amir Najian, axn112630@utdallas.edu, GR3.414
Office Hours: Tuesdays 4:00-5:00pm; Thursdays 11:00-noon

General Course Information

**Pre-requisites,
Co-requisites, &
other restrictions**

There are no formal prerequisites; however students will be expected to have competence in microcomputer use, familiarity with MS Windows XP (file management, directories, subdirectories, copying, etc), MS Word, MS Excel and Internet usage.

This course examines in detail the fundamentals of Geographic Information Systems (GIS) and their applications. These systems are often the core of local (city, county) government operations, are being rapidly adopted by state and federal governments to manage operations from highway planning to environmental resource conservation, and are playing a major role in businesses as diverse as market research, site selection, real estate, civil engineering, and geophysical exploration. Additionally, academic research in disciplines ranging from the Social Sciences to the Geosciences is using GIS to expand research possibilities and productivity.

**Course
Description**

GIS is a combination of software and hardware with capabilities for manipulating, analyzing and displaying **spatially-referenced** information--that is, information which is referenced by its location on the earth's surface. By linking data to maps, a GIS can reveal relationships not apparent with traditional item-referenced information systems and data base management products, and by displaying information in a graphic form can communicate complex spatial patterns succinctly. The course emphasizes the concepts needed to use GIS correctly and effectively for manipulating, querying, analyzing, and visualizing spatial-based data. It also develops basic proficiency in industry-standard GIS software usage for analyzing spatial patterns in social, economic, environmental and geologic data, and for generating cartographic output from the analysis.

The course will comprise both lecture and lab. The lab component will focus on the use of **ArcGIS** (Version 10) software in a Windows 7 environment in the Green Computer Lab (GR3.602, GR 3.402 & 3.206). (The software will not be available in the university's McDermott Microcomputer lab.)

At the end of this course, students will be able to:

Learning Outcomes

- Understand the fundamental concepts of geographic information systems and their differences from other types of information systems.
- Utilize modern industry-standard GIS software for conducting basic GIS analyses and producing cartographic output
- Conduct studies typically carried out in GIS including site selection, analysis of spatial/temporal processes, geocoding and point pattern analysis, and corridor studies.

Required Texts & Materials

- Longley, Goodchild, Maguire, Rhind Geographic Information Systems and Science, 3rd Ed. Wiley, 2011
- Ormsby, Napoleon, Burke, Groessl and Feaster. Getting to Know ArcGIS Desktop (10) (ESRI Press, 2010)

Assignments & Academic Calendar

[Topics, Reading Assignments, Due Dates, Exam Dates]

Students are expected to have read the assigned chapters prior to coming to class.

Week	Date	Topic
1	15-Jan	<p>GIS Fundamentals (Introduction to GIS) & Exercise 0</p> <p>Longley Ch. 1, 2, and skim 3</p> <p>Goodchild What is GIS? @ http://www.ncgia.ucsb.edu/giscc/units/u002/</p> <p>Foote and Lynch GIS: Context, Concepts, and Definitions @ http://www.colorado.edu/geography/gcraft/notes/intro/intro_f.html</p> <p>Foote and Huebner Database Concepts @ http://www.colorado.edu/geography/gcraft/notes/datacon/datacon_f.html</p> <p>Application examples:</p> <p>Scan GeoWorld, Geospatial Solutions, EOM (Earth Observation Magazine)</p> <p>Application discussions:</p> <p>Federal Geographic Data Committee: GIS Success Stories @ http://www.fgdc.gov/library/success-stories/index_html</p> <p>Greenman, C Turning a map into a layer cake of information @ http://www.nytimes.com/library/tech/00/01/circuits/articles/20giss.html</p> <p>Foote and Crum Cartographic Communication @ http://www.colorado.edu/geography/gcraft/notes/cartocom/cartocom_f.html</p> <p>Daniel, Larry GIS Helping to Reengineer Real Estate @ http://www.colorado.edu/geography/gcraft/notes/gisapps/reengr.html</p>

2	22-Jan	<p>Lab: Intro. to ArcGIS Software and ArcMap</p> <p>Longley Ch. 7</p> <p><i>Getting to Know ArcGIS Desktop</i>, Ch. 1,2,3. Parts of Ch. 5, 6, 9, 18, 19</p>
3	29-Jan	<p>Lab: Intro. to ArcCatalog and GIS Applications</p> <p>Longley Ch. 12</p> <p><i>Getting to Know ArcGIS Desktop</i>, Ch. 4</p>
4	5-Feb	<p>The World (Terrestrial Data Structures)</p> <p>Longley Ch. 5 (espec. 115-123)</p> <p><i>Getting to Know ArcGIS Desktop</i>, Ch. 13</p> <p>Dana, Peter H. Coordinate Systems Overview @ http://www.ncgia.ucsb.edu/education/curricula/giscc/units/u013/u013_f.html</p> <p>Kirvan, Anthony Latitude and Longitude @ http://www.ncgia.ucsb.edu/education/curricula/giscc/units/u014/u014_f.html</p> <p>Dana, Peter H. The Shape of the Earth/ Geodetic Datums @ http://www.colorado.edu/geography/gcraft/notes/datum/datum_f.html</p> <p>NGA, Geodesy for the Layman @ http://earth-info.nga.mil/GandG/publications/geolay/toc.html</p>
5	12-Feb	<p>Representing Geographic Features (GIS Data Structures)</p> <p>Longley Ch. 3, 8, 9</p> <p>Foote, Kenneth E. Database Concepts @ http://www.colorado.edu/geography/gcraft/notes/datacon/datacon_f.html</p> <p>Goodchild, Rasters @ http://www.ncgia.ucsb.edu/education/curricula/giscc/units/u055/u055_f.html</p> <p>Goodchild, Quadrees and Scan Orders @ http://www.ncgia.ucsb.edu/education/curricula/giscc/units/u057/u057_f.html</p>
6	19-Feb	Midterm Exam
7	26-Feb	<p>Data Quality</p> <p>Longley Ch. 6, 20</p> <p>Veregin, Howard Data Quality Measurement and Assessment @ http://www.ncgia.ucsb.edu/education/curricula/giscc/units/u100/u100_f.html</p> <p>Foote, K.E. and Donald J. Huebner Error Accuracy and Precision @ http://www.colorado.edu/geography/gcraft/notes/error/error_f.html</p>
8	5-Mar	<p>Lab: Data Input--Internet Acquisition</p> <p>Links to GIS Resources on the Internet http://www.utdallas.edu/~briggs/other_gis.html</p> <p>Foote and Lynch Data Sources for GIS http://www.colorado.edu/geography/gcraft/notes/sources/sources_f.html</p>

9	12-Mar	<i>Spring Break</i>
10	19-Mar	Data Input—(Preparation and Integration) Longley Ch. 9 <i>Getting to Know ArcGIS Desktop</i> Ch.11 Cowen, David GeoReferencing @ http://www.ncgia.ucsb.edu/education/curricula/giscc/units/u016/u016_f.html Dana, Peter GPS @ http://www.colorado.edu/geography/gcraft/notes/gps/gps_f.html
11	26-Mar	Lab: Data Editing and Topological Structures <i>Getting to Know ArcGIS</i> Ch. 15, 16
12	2-Apr	GIS Analysis and Modeling Longley Chap 14, 15, 16 <i>Getting to Know ArcGIS</i> Chap. 11, 12 White, Dennis The Polygon Overlay Operation @ http://www.ncgia.ucsb.edu/education/curricula/giscc/units/u186/u186_f.html Haining and Wise Exploratory Spatial Data Analysis @ http://www.ncgia.ucsb.edu/education/curricula/giscc/units/u128/u128_f.html
13	9-Apr	Lab: Spatial Analysis
14	16-Apr	Data output, Application Examples & The Future of GIS Longley Chap 12 (review), 13, 18-20 Daniel, Larry Identifying GIS for What its Worth @ http://www.colorado.edu/geography/gcraft/notes/atwork/identify.html
15	23-Apr	<i>TBD</i>
16	30-Apr	Final Exam

Course Policies

Grading (credit) Criteria	<ul style="list-style-type: none"> • 10% Quizzes, Attendance & participation • 30% Exercises • 60% Exams <p style="text-align: center;">93-100 points = A; 90-92 points = A- 87-89 points = B+; 83-86 points = B; 80-82 points = B- 77-79 points = C+; 73-76 points = C; 70-72 points = C- 67-69 points = D+; 63-66 points = D; 60-62 points = D- 59 and below = F</p>
Make-up Exams	No Make-up project will be given without a legitimate excuse accompanied by proper formal documentation (e.g., a doctor's excuse).

Extra Credit	Will be given to optional lab works
Late Work	Late submission for labs will be penalized 10% per day late
Special Assignments	TBD
Class Attendance	Class attendance is required. Students are expected to actively participate in class discussion.
Classroom Citizenship	Please make sure you turn off your cell-phone before coming to the classroom. Viewing anything that is not related to class and communicating with others using instant messenger are prohibited during the class.
Academic Dishonesty	All suspected cases of academic dishonesty (cheating, plagiarism, collusion, etc.) will be immediately forwarded to the Office of Judicial Affairs. Students have a right to due process through Judicial Affairs, but if the accused student is found guilty of misconduct, Judicial Affairs has sole authority for determining punishment.
UT Dallas Syllabus Policies	http://coursebook.utdallas.edu/syllabus-policies/

These descriptions and timelines are subject to change at the discretion of the Instructor.