Course Staff and Schedule

Instructor:  Prof. Robert Goodspeed (rgoodspe@umich.edu)
Office:  2223C Art & Architecture Building
Office Hours:  3:40 – 5:00 PM (sign up via CTools link)

GSI:  Kelly Richardson (richakel@umich.edu)

Lectures:  T&Th 2:30–3:30 PM, Room 2213, Art & Architecture Building
Labs:  
004  Th 4:30–7:00 PM – Windows Training Room 3
002  Fr 8:30–11:00 AM – Windows Training Room 2
003  Fr 1–3:30 PM – Windows Training Room 1

All labs held in the Duderstadt Center

Summary and Learning Objectives

This course is designed to introduce students to the dynamic field of geographic information systems (GIS). The course has three interrelated objectives: (1) provide a foundation in concepts from cartography, spatial analysis, and computer science used in GIS applications, (2) develop specific skills using ESRI’s ArcMap and other software applications through a set of hands-on exercises, and (3) allow students to apply these skills through a mapping project on a topic of their choosing. Although urban planning topics will be emphasized, the course is intended to serve as a general introduction to GIS. Students will learn the basic principles of GIS, practice mapping spatial data, study examples GIS analysis, and develop and implement simple analysis models.

Note on Labs: Students should enroll in one of the three lab sessions, which will meet in Windows Training Rooms 2 and 3 located on the second floor of the Duderstadt Center. If for some reason a student cannot attend their own session for a given week, please ask the GSI to assign you to another session.

Materials

Textbooks

  Available at the North Campus Bookstore. It is important ensure your copy is the correct edition, and is accompanied by the data CD.
  Available at the North Campus Bookstore. This textbook also has a data CD, which will be useful but is not needed for class assignments.

Additional Texts (Available on reserve at the Art, Architecture & Engineering Library)

Textbook with useful cases on environmental, health, crime, and other planning topics.


Readings

- All required readings not from the course textbooks will be posted to CTools. Many of the “Additional Readings” are also available online. While not required, they are recommended for doctoral students, students planning to pursue a PhD, or students interested in exploring the topics further.

Other

- USB Drive, minimum 2 GB
- See course CTools website for links to a variety of GIS resources.

Assignments

- Class Participation and Discussion (lecture and lab) (5%)
- Lab Assignments (30%)
- Midterm Exam (15%)
- Module 2 & 3 Reading Response Posts (15%)
- Final Project Paragraph (5%), Proposal (10%), Poster (20%)

Lab Assignments – Lab assignments are due at the beginning of the lab session the following week. The course content is cumulative and there are many assignments, so it is particularly important for students to keep up with the pace of the course. Late labs will be penalized 10% for each day late.

Midterm Exam – The midterm is based on the lecture presentations and readings. It will be a bluebook exam completed in-class. Students should provide their own bluebook, a blank exam booklet available from all campus bookstores.

Module 2 & 3 Reading Response Posts – After the midterm exam, students should post a 200-500 word reading responses to the class website each week before the Monday lecture. These responses should address the article(s) assigned for that week, and/or respond to other students’ posts. Responses are due for a minimum of 4 of the 6 weeks. The grade is the percent of required posts completed (maximum of 100%).

Final Project – Additional details on the final project will be provided separately. A short paragraph is due at the start of class on Tues., Feb. 24, and a detailed project proposal is due Tues., March 24.

Resources

Getting Help
GIS is professional software, meaning it is used by a community of expert users who are already familiar with its interface, specialized functions, and underlying concepts. This makes it different than most of the software applications you have used before, which are designed for use by broad
audiences of general users. As a consequence, you may find GIS software to be buggy, confusing, and frustrating. When you encounter problems, there are several resources available to you:

- Classmates
- Class CTools forum
- Online help files, FAQs, listservs, and other resources (get started at [http://resources.arcgis.com/en/help/](http://resources.arcgis.com/en/help/))
- Course instructors
- SAND Lab Librarians

Corrupted files, error messages, missing menus, and other challenges you may encounter are not problems, but learning opportunities along the path of becoming a skilled professional GIS user.

**Spatial and Numeric Data Services (SAND) Lab**

The University Library’s Spatial and Numeric Data Services (SAND) provides assistance with spatial data, numeric data, and statistics for the University of Michigan community. One of the two UM SAND labs is located at Taubman College in room 2207 of the Art & Architecture building. The lab supports students from Taubman College, in addition to those from other North Campus programs including the Schools of Engineering and Information. SAND provides advanced computers and software to help students and researchers work with spatial and numeric data and access to data only available from within our labs. These labs are equipped with ArcGIS, ArcView, ERDAS, SAS, SPSS, StatTransfer, Stata, Adobe Creative Suite (Photoshop, Illustrator, InDesign, Dreamweaver), and more. SAND also provides access to and assistance with data from the Inter-university Consortium for Political and Social Research (ICPSR), Roper Center for Public Opinion Research, Europa World Plus, Global Insight, Geolytics, the U.S. Census Bureau, the U.S. Geological Survey, and other sources.

**UP 506 Sand Lab Use Guidelines**: Students with questions arising from course assignments should inquire with classmates and course instructors before visiting the SAND Lab. After reviewing the provided CTools links and conducting preliminary explorations, students are encouraged to consult with the SAND Lab librarians about data sources for the final project. For more information or to book an appointment, see: [https://taubmancollege.umich.edu/labs-workshops/spatial-and-numeric-data-services-sand-lab](https://taubmancollege.umich.edu/labs-workshops/spatial-and-numeric-data-services-sand-lab)

**Course Policies**

In addition to those specified here, policies which apply to students in this class include those of the Urban and Regional Planning Program, Taubman College, students’ home academic units, and the University.

**Academic Integrity**

Taubman College Policy on Plagiarism:

“Plagiarism is knowingly presenting another person’s ideas, findings, images or written work as one’s own by copying or reproducing without acknowledgement of the source. It is intellectual theft that violates basic academic standards. In order to uphold an equal evaluation for all work submitted, cases of plagiarism will be reviewed by the individual faculty member and/or the Program Chair. Punitive measures will range from failure of an assignment to expulsion from the University.”
Students will be provided guidance in class about academic integrity norms in GIS, including how to cite data sources and document analyses. Students with additional questions should contact the course instructor.

**Accommodations for Students with Disabilities**

It is Taubman College policy to "meet the educational needs of all persons, including those with physical or perceptual limitations, who are interested in the study of architecture, urban planning and/or urban design." If you think you need an accommodation for a disability, please let me know at your earliest convenience. Some aspects of this course, the assignments, the in-class activities, and the way the course is usually taught may be modified to facilitate your participation and progress. As soon as you make me aware of your needs, we can work with the Services for Students with Disabilities (SSD) office to help us determine appropriate academic accommodations. SSD (734-763-3000; http://ssd.umich.edu) typically recommends accommodations through a Verified Individualized Services and Accommodations (VISA) form. Any information you provide is private and confidential and will be treated as such.
Schedule

Module 1: Introduction to GIS

Week 1 - Introduction and Course Overview
Thurs., Jan. 8: Introduction & GIS Applications in Urban and Regional Planning
Lab 1: GTK 3
Readings:
  1. Chang, Ch. 1

Additional Readings:

Week 2 - Geographic Concepts: Coordinate Systems & Projections
Tues., Jan. 13: Concepts 1
Thurs., Jan. 15: Concepts 2
Lab 2: GTK 4 & 6
Readings:
  1. Chang, Ch. 2
  2. Monmonier, Ch. 2

Week 3 - Spatial Data Formats
Tues., Jan. 20: Overview and Vector Data
Thurs., Jan. 22: Raster Data
Lab 3: GTK 7-10
Reading:
  1. Chang, Ch. 3 & 4

Week 4 - Thematic Mapping, Symbology & Cartography
Tues., Jan. 27: Symbology & Cartography
Thurs., Jan. 29: Thematic Mapping
Lab 4: Cartography Assignment
Readings:
1. Chang, Ch. 9
2. Monmonier, Ch. 10 & 11

**Week 5 – U.S. Census**

Tues., Feb. 3: U.S. Census – Introduction, Census Geography & Data Products

Thurs., Feb. 5: U.S. Census – Neighborhood Scale Analysis & Examples

Lab 5: Census Assignment

Reading:
5. Hodges, K. and E. Christopher. Webinar: “Using the ACS to Measure Trends Over Time.” American Community Survey Data Users Group. Available online at: https://www.youtube.com/watch?v=Bvl2sZo1PNY#t=5

Additional Reading:

**Week 6 – Database Concepts and Data Sources**

Tues., Feb. 10: Database Concepts

Thurs., Feb 12: SAND Lab Librarian

Lab 6: GTK 15a, 15b & 16

Reading:
1. Chang, Ch. 8 & 10

Additional Reading:
**Week 7 – Midterm Exam and GIS Ethics**

Tues., Feb. 17: GIS Ethics

Thurs., Feb. 19: Midterm Exam

Reading:

**Module 2: Analysis in GIS**

**Week 8 – Creating Data**

Tues., Feb. 24: Creating Data: Digitizing, GPS & Metadata
- Project Paragraph Due

Thurs., Feb. 26: Geocoding

Lab 7: GTK 12, 13 & Geocoding Assignment

Reading:
1. Chang, Ch. 5, 7, & 16

**Week 9 – Spring Break**

*No Class*

**Week 10 – Spatial Analysis**

Tues., March 10: Spatial Analysis 1: Select, Dissolve, Clip

Thurs., March 12: Spatial Analysis 2: Model Builder

Lab 8: GTK 17 & 18

Reading:
1. Chang, Ch. 11

Additional Reading:

**Week 11: Spatial Analysis, Cont.**
Tues., March 17: Spatial Analysis 2: Buffer & Overlay

Thurs., March 19: Spatial Analysis 3 & Equity Mapping

Lab 9: Metropolitan Detroit Equity Analysis

Reading:
1. Chang, Ch. 17

**Week 12: Raster Analysis**

Tues., March 24: Raster Data Model & Map Algebra
- Project Proposal Due

Thurs., March 26: Raster Analysis & Modeling: Time and 3D Space

Lab 10: GTK 20

Reading:
1. Chang, Ch. 12

Additional Reading:
1. Chang, Ch. 13 (Terrain Mapping) and Ch. 14 (Viewshed and Watershed Analysis)

**Module 3: Emerging Applications and Final Projects**

**Week 13: Open Source GIS, Web Mapping, and Participatory GIS**

Tues., March 31: Open Source GIS & Web Mapping

Thurs., April 2: PPGIS & Volunteered Geographic Information

Lab 11: Web Mapping Assignment

Readings:

Additional Resources:

Week 14: Final Project Working Sessions
This week we will meet in a computer lab for a short "desk crit" to see your work so far and answer any questions. Each individual or group should check in with the instructor once during the two sessions.

Tues., April 7: Working Session – Shapiro Library PC Classroom (Room 2054)
Thurs., April 9: Working Session – Shapiro Library PC Classroom (Room 2054)

Week 15: Final Presentations
Tues., April 14: Advanced GIS Speaker
Thurs., April 16: Draft Poster Fair (class only)

Week 16: Planning Support Systems (PSS)
Tues., April 21: Planning Support Systems (PSS), and the Future of GIS in Planning

Reading:

Additional Resources:

Wednesday, April 29, 1:30 pm - 3:30 pm: Final Public Poster Fair