

GEO 441: GIS for Community Development
MPS 604: Special Topics in Applications in GIS
Summer 2012 | Department of Geography | DePaul University

Time: Tue 6:00-9:15 pm

Location: 14 E Jackson Room 1327

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Course Description: This course will focus on applications of Geographic Information Systems (GIS) to community studies and community development. As an amalgam of information technologies (e.g. database management, Web 2.0) and earth measurement technologies (e.g. global positioning systems, remote sensing), GIS is rapidly entering the realm of community development. The course will enable students to perform common GIS techniques including data management, mapping, and spatial analysis geared toward community development. The course is conducted through interactive lectures and hands-on activities using ArcGIS. Students should propose a small GIS project for community development by week 8, and conduct the project both guided by instructors and independently. **Prerequisite(s):** Bachelor's Degree

Learning goals

- Understand how earth coordinates are defined (concept of geospatial coordinate systems)
- Comprehend how geographic data is collected (principles of data capture technology), including GPS and remote sensing
- Understand how data is structured to represent geography (data model for GIS), including vector, raster, and relational data model
- Learn how to design effective maps (cartographic design)
- Learn techniques of spatial analysis, including buffering, overlay, and query
- Discern in what ways GIS can improve community development

Learning Outcomes: At the completion of GEO 441/MPS604, you should be able to

- Use common geospatial coordinate systems appropriately, such as geographic (latitude and longitude), Universal Transverse Mercator and State Plane coordinates
- Collect earth coordinates using a GPS receiver, and import GPS data into GIS
- Differentiate types of resolution that characterize remotely sensed imagery
- Assess strengths and weaknesses of data models representing geography
- Employ cartographic design principles to make maps suited to a given problem
- Conduct suitability analysis (what 's suitable location for...?) using spatial analysis
- Develop basic ArcGIS 10 skills, including geocoding, exploring geographic data, working with attribute tables, table join, making thematic maps, and conducting spatial analysis.
- Conduct GIS project for community development

Course Readings: John Jensen & Ryan Jensen, 2012, Introductory Geographic Information Systems, Pearson (ISBN: 978-0136147763)—required. Additional readings will be posted on D2L.

The required text is available in the Loop college bookstore, and is shelved at Loop Reserves (link: <http://eres.lib.depaul.edu/eres/coursepage.aspx?cid=5761>).

Outlines of Topics & Tentative Schedules

W	Topic	Read	Activities	Assignment
1	Course overview Introduction to GIS	Ch1	1. Introduction to ArcGIS	
2	Datum & map projections Coordinate systems	Ch2	2. Understand map projections 3. Change coordinate systems	1. Base mapping
3	Global positioning systems Remote sensing	Ch3	4. Collect data using a GPS receiver 5. Classify remotely sensed images	2. POI mapping
4	Spatial data model Relational database	Ch5	6. Explore geographic data 7. Work with attribute table	3. Census mapping
5	Map reading Map design	Ch10	8. Make thematic map I 9. Make thematic map II	4. Toxic mapping
6	Spatial analysis	Ch6	10. Vector spatial analysis 11. Raster spatial analysis	5. Suitability analysis
7	GIS for community development	TBD	Suggestions and guidelines for project proposal	
8	Discuss project proposal			Proposal
9	Project			
10	Project			
11	Presentation			Project report

Grading Breakdown

Type	Breakdown	When
3 pop quizzes	12 %	In the class on week 3, 5, 7
11 activities	22 %	In the class on week 1-6
5 assignments	15 %	Due Week 3-7 Friday midnight on D2L
Exam (take-home)	20 %	Week 8 Friday midnight on D2L
Project	21 %	Week 11 6 pm on D2L
Participation	10 %	Throughout the quarter

Grading Scale	B+	= 87-89.99%	C+	=77-79.99%	D+	=60-69.99%	
A	= 93-100%	B	= 83-86.99%	C	=73-76.99%	D	=50-59.99%
A-	= 90-92.99%	B-	= 80-82.99%	C-	=70-72.99%	F	=0-49.99%

Pop quizzes: pop quizzes are to monitor your knowledge of GIS fundamentals. Pop quizzes will be held in week 3, 5, and 7. The quiz will cover materials from the previous week. For instance, a pop quiz on week 3 will cover contents of week 1 and 2. The format of pop quizzes will vary from true and false, multiple choice, short answer, term definition, and short essay. Pop quizzes will take 10-20 minutes. All are written tests; that is ArcGIS skills are not tested in pop quizzes.

Activities: activities are to help you practice concepts learned from the class, and learn basic ArcGIS skills. Although reasonable amount of time will be given to complete activities in the class, it is expected that you will complete remaining part of activities outside of the class in case you can't complete activities in the class. If this happens to you, I recommend that (a) you show

up during lab hours, and finish activities with the help of a lab assistant; (b) do it on your own in computer labs where ArcGIS is available, that is **SAC224, SAC268**, computer labs in **Richardson Library**, as well as the classroom; (c) if none of these works for you, email instructors to arrange an appointment. You can email instructors on any questions that you may have, but do not expect us to reply to you on a real time basis. I mean plan ahead rather than act right before the deadline. Each activity is due before the class one week after the activity is handed out in the class.

Assignments: five assignments will be given each week from week 2 to week 6. Assignments are to be done on your own outside of the class. Assignments will give yet another opportunity to practice GIS concepts and ArcGIS skills geared toward community development. Each assignment is due Friday midnight one week after the assignment is handed out unless noted otherwise. For instance, if the assignment is handed out on week 3, the assignment is due Friday midnight on week 4.

- #1 (base mapping): make base maps showing different parts of the world. You should be able to choose appropriate coordinate systems for depicting different parts of the world.
- #2 (POI mapping): map POI (Point of Interest) using GPS and address geocoding. You should be able to collect POI data by GPS and address geocoding, and make a point symbol map.
- #3 (census mapping): download census data, and make a census map by joining table to geographic data. You should be able to perform table join properly.
- #4 (toxic mapping): download Toxic Release Inventory (TRI) sites, and make a toxic map by geocoding XY data. You should be able to justify choice of different parameters of cartographic design (such as choosing appropriate map projection, map symbol, map type, data representation, and so on).
- #5 (suitability analysis): identify or/and assess suitable sites for a new school considering multiple criteria. You should be able to conduct suitability analysis using buffering, overlay, and query in both vector and raster environment properly.

Exam: one comprehensive exam will be taken outside of the classroom during week 8. The exam will be handed out in the classroom on Tuesday night on week 8 (so you can ask any questions in the class), and will be due on Friday midnight in the same week. The format of this exam varies short answers to discussion and application type of essay. Plagiarism in whatever the format or source may be, if detected, will automatically change your grade to zero.

Project: you should submit a one-page proposal of GIS project for community development by week 8. We will discuss this in Week 7 (including data or data sources). I recommend that you start this process early. If you have previous experience in community development (including course work and work experience), you can start from thinking about how GIS can be applied to the specific area of community development that you are interested in. If you don't have experience in community development, I suggest that you look into case studies relevant to the area of your interest—food desert, affordable housing, community garden, health inequity, promoting non-motorized mode of transportation, environmental justice, and so forth. If proposal of GIS project is deemed appropriate upon the discussion on week 8, you can start working on the project. You should submit a project report by week 11 before the class when all classmates will present results. While it is not mandatory (mainly due to schedule conflict among working students), I highly recommend that you work as a small group (two or more persons) for project. It will not only reduce the amount of time to do project per se, but also

improve the quality of project as long as the group shares the same goal. We should be able to form the right group depending on interests and needs as we get to know each other more throughout the quarter.

Participation: assigned according to the criteria below

- A (9 - 10) = Student is present in all or nearly class meetings, and prepared, at all times, to respond to questions. Student is an active participant in small group activities, in and out of class, and in class-time activities stays on task.
- B (8 - 9) = Student participates as above, 75% of the time.
- C (6.5 - 8) = Student does not volunteer comments; responses demonstrate vague familiarity with course readings. Student is a passive member of small group activities and/or does not stay on task during class-time activities.
- D (5 - 6.5) = Student never volunteers, cannot respond to direct questions, keeps silent during class discussions and is unable to summarize readings if asked.
- F (0-5) = Student misses many class sessions and/or sits silently in classes when present, or is disruptive and non-participatory in the classroom.

Late Work Policy: Late work can be accepted with the reduction of 20% of the grade per day being late. For instance, if you turn in labs 5 days after due dates, no points will be granted.

Makeup Exam/Incomplete Grade Policy: A makeup exam or an incomplete grade can be arranged or granted only when credible dire and documented medical or family situations arise and these circumstances are communicated in a timely fashion.

Attendance/Absentee Policy: Consistent with university's policy, all students are expected to attend class meetings. Unless absence is explained on medical or compassionate grounds (documentation is required), absence from any classes is grounds for a grade adjustment.

Academic Honesty and Plagiarism: Academic honesty and integrity are expected at all times. Academic dishonesty, such as cheating or copying during exams, will be punished severely. Plagiarism – using someone else's work without acknowledgment and, therefore, presenting their ideas or quotations as your own work – is strictly forbidden. DePaul University officials will be informed of any instance of academic dishonesty and notification will be placed in your file. Please read the DePaul Academic Integrity Resources page (<http://academicintegrity.depaul.edu/Resources/index.html>) for definitions and explanations of plagiarism and the University's Academic Integrity expectations for students. Cutting and pasting text taken directly from a web-site without appropriate referencing and quotation marks is plagiarism and is forbidden. Submitting work that has any part cut and pasted directly from the internet is grounds for an automatic grade of zero.

Accommodations: Any student who requires assistance is asked to contact the University's Office of Students with Disabilities (Phone 773/325-1677, TTY 773/325-7296, Fax 773/325-7396, [http://studentaffairs.depaul.edu/students with disabilities](http://studentaffairs.depaul.edu/students%20with%20disabilities)). They will be able to assist both student and faculty. If you have a condition that requires accommodation from the Productive Learning Strategies program (PLuS Program) please contact them at the Student Center room 370 (Phone 773/3251677 or online: <http://studentaffairs.depaul.edu/plus/>)

University Center for Writing-Based Learning: Collaborates with writers from all disciplines, backgrounds, levels of expertise, and roles within the University community. Their goal is to help develop better writers along with better writing and reflection through continual revision. If you need assistance with writing assignments, they can be contacted at: 773.325.4272 (LPC) or wcenter@depaul.edu

Appendix A. Department of Geography Learning Goals

Courses in the Department of Geography teach students:

1. Understand spatial patterns and processes of modification of the Earth's physical and cultural landscapes
 - (a) As social constructions.
 - (b) As systems that link the Earth with human society in interdependent, dialectical relationships, and
 - (c) Through mapping and visualization.
2. Understand the concept of scale as a spatial phenomenon that ties the local, the regional, the national, the transnational, and the global in a system of interaction.
3. Understand the phenomenology of the discipline of Geography—most importantly, “space”, “place”, “landscape”, “region”, and “location”.
4. Distinguish that spaces, places, and so on, may have both objective and subjective/symbolic dimensions.
5. Develop research and writing competences that would allow you to:
 - (a) Formulate a cogent research question about the spatial character of a physical, socio-cultural, or environment-societal phenomenon,
 - (b) Write about it in ways that reflect analytical and critical thinking, and
 - (c) Ethical concern over social and environmental justice, consistent with the University's social mission.
6. Engage competently in qualitative and quantitative spatial analysis, and with exercises that are concerned with explaining spatial regularities (for example, the spatial calculus behind the location of retail commerce in Chicago, or transnational flows of capital).
7. Learn the basic utility and use competently one or more of the information technologies that are now redefining the logistical limits of spatial analysis: geographic information systems (GIS) and remote sensing.
8. Achieve greater general knowledge of the world, its regions, its physical systems, its cultures, and political-territorial divisions.