GEO 141 / PSC 201: GEOGRAPHIC INFORMATION SYSTEMS - I

Fall 2019| Department of Geography, DePaul University

Instructor:	**Nandhini Gulasingam**		
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Website:	D2L		

I. Liberal Arts and Science Domain: Scientific Inquiry

II. Course Description

An introductory-level course covering the fundamentals of GIS. Topics include data models (vector and raster), coordinate systems, map design, GPS and remote sensing. Instruction is accomplished through lectures and hands-on computer lab exercises using ArcGIS.

In this course, you will learn and apply concepts, techniques and software that are part of geographic information systems (GIS). GIS brings together traditional cartographic principles, computer assisted analytical cartography, relational database design, and digital image processing and analysis to enable people to develop geospatial databases, analyze those databases, and use maps and other visual representations as part of this analysis. Lectures, readings, labs and project activities are designed to provide a solid grounding in the concepts and techniques that underlie GIS, an understanding of how spatial analysis and representation are carried out with GIS, and experience using GIS software (ArcInfo) in guided labs and assignments. No previous work in GIS or computer programming is necessary. Previous computer experience with Windows is helpful.

III. Learning Objectives

After successfully completing this course, you should be able to:

- Apply multiple cartographic techniques to represent geographic information, choosing an appropriate representation for your data set or project goal;
- Apply principles of map design to create a map that is coherent and convincing, as well as technically correct;
- Explain how spatial and attribute data are represented in a GIS, and understand the implications of these different data models;
- Perform basic analytic operations in a GIS;
- Critically analyze cartographic and GIS applications to analyze research questions and recommend solutions.

IV. Prerequisite(s)

LSP 120 or HON 180.

VI. Optional Textbook and Required Accessories

- There is no textbook for this class since most of what is going to be taught is applied GIS. Whenever applicable, internet links and PDFs will be posted on the class website
- A portable USB drive with at least 16GB free space.

VII. Assignments, Activities, and Grading

Lab Activities (8)	15%	See Schedule for details
Discussion (1)	5%	See schedule for details
Assignments (5)	20%	See schedule for details
Quizzes (4)	20%	See schedule for details
Final Exam	40%	See schedule for details

Grading Scale

A	93-100 points	C+	77-79.99 points
A-	90-92.99 points	C	73-76.99 points
B+	87-89.99 points	C-	70-72.99 points
B	83-86.99 points	D	50-69.99 points
B-	80-82.99 points	F	< 50

You should be aware that a grade of "C" indicates that you fulfilled all course requirements and met all course expectations, but nothing more. A grade of "B" means that your performance was slightly better than average and that you exerted yourself a bit more than expected. The grade of "A" is reserved for the small percentage of students who exhibit excellence in the classroom and on written assignments, students whose performance is truly superlative.

VIII. IMPORTANT NOTICES

Schedule:

The organization of each Week is broken into two parts. It is recommended that students plan their week so that the **first part** is done in between Thursday-Sunday and the **second part** is completed between Monday-Wednesday.

First Part:

1. Doing the required readings provided to you as PDFs or internet links
2. Listening to the lecture videos
3. Taking an ungraded quiz (OPTIONAL)
4. Completing the lab activity using the step-by-step instructions provided to you in the form of videos and/or word document, and submitting it via D2L

Second Part:

1. Taking a graded short quiz
2. Completing an assignment and submitting it via D2L

All deliverables should be submitted by the due date. I will not accept any late work, see the late assignment/quiz/exam policy below and the schedule for due dates.

Turnaround Time:

Emails – Emails responses to questions will be within 24 hours.

Deliverables – Feedback and grades for all deliverables will be provided within 7 days.

Computer and Software Requirements:

Software Requirements:

We use ArcInfo (ArcMap, ArcCatelog, ArcToolbox), ArcScene, Microsoft Excel and Microsoft Word.

Hardware Requirements:

ArcInfo and ArcScene runs ONLY on windows platform. If you are a MAC user, you need to have a virtual machine or windows partition to run the software. The software requires a lot of resources, so make sure you have enough memory and space to install and run the applications.

Software Availability:

Software is available in various location on camps.

Lincoln Park Campus:

- LPC library - check at the reference desk to see which machines have ArcGIS
- SAC 224 (Check Lab availability – http://qrc.depaul.edu/hours.htm)
- SAC 268 (can use it only when classes are not in session)
- 990 W Fullerton Ave, 3rd Floor, Suite 3135. Click her to view availability

Loop Campus:

- LPC library - check at the reference desk which machines have ArcGIS
- Daley Building (14 E. Jackson Blvd., #1327) – can be used only on weekdays when there are no classes

Accessing ArcGIS via Virtual Server:

Step-by-step instructions on how to access ArcGIS using Virtual Server is posted under "FAQ" and "Getting Started" sections. This instructions will work only for Windows/PCs.

Submissions:

Lab activities, assignments, and final exam MUST be submitted to the appropriate D2L 'Submissions' section by the due date. Do not email me assignments or give me printed results, the only way to ensure that you get credit for any activity is to put it into the respective submissions folder.

Lab Activities:

Lab activities are designed to help students apply the concepts and techniques learnt in the lectures. Although these are practice activities, they will be graded, therefore should be done independently and turned in by the due date. All lab activities will include a step-by-step instruction, both in a written and video format. Lab activities should be submitted via D2L before the following session.

Ungraded Quizzes (OPTIONAL):

The ungraded quizzes are optional, and can be taken any number of times to test your understanding of the lectures. It will also help you prepare for the graded quizzes and the final exam.

Assignments, Graded Quizzes, and Final Exam:

Assignments will be similar to the lab activities to help reinforce the concepts and techniques you learnt. All assignments should be done **independently and cannot be discussed with anyone** other than your lab assistant or instructor. Assignments should be submitted via D2L by the due date.

Quizzes will typically include true/false, multiple choice and/or one word answers. They are timed quizzes and can be taken only once. All quizzes should be done **independently and cannot be discussed with anyone** including the lab assistant or the instructor.

Final Exam will comprise of two sections. First section will include the theory and concepts from your lectures and the second part will include a mapping portion that is similar to your assignments. Final exam should be done **independently and cannot be discussed with anyone** including the lab assistant or the instructor. However, if you run into any technical issues or have questions, email your instructor.

No assignments, quizzes or exams will be accepted past the due date. If you cannot complete any of these due to illness or family emergency, you must inform the instructor in advance by email.

Assignments, Graded Quizzes, and final Exam:

Grades and feedback on deliverables will be provided within 7 days.

Incompletes:

Extensions on any deliverables or incomplete for the class will NOT be granted unless exceptional circumstances require it or prior arrangements have been made. See me in extreme cases of medical or personal difficulties.

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/) for definitions and explanations of plagiarism and the University's Academic Integrity expectations for students. Cutting and pasting text or ideas taken directly from external sources without appropriate referencing and quotation marks is plagiarism and is forbidden. **Submitting work that is not yours is grounds for an automatic 'F' for the entire course – this includes taking content and ideas from others and consulting others to complete your deliverables other than your instructor or lab assistant.**

Accommodations (Students with Special Needs):

Any student requiring special considerations must inform me as soon as possible, preferably within the first week of the course. Students who feel they may need an accommodation based on the impact of a disability should contact me privately to discuss their specific needs. I can be contacted in office hours, by email or appointment. All discussion will remain confidential. To ensure that you receive the most reasonable accommodation based on

your needs, contact me as early as possible in the quarter (preferably within the first week or two of the course). Accommodations cannot be made retroactively; to protect your legal rights, you need to act before any exams, presentations or other course requirements are due. Also contact the Center for Students with Disabilities (CSD) for additional support and services (#370, Student Center, Lincoln Park Campus or 1420 Lewis Center, Loop campus), by phone 773.325.1677 or 312.362.8002, or email: csd@depaul.edu. See also: http://www.depaul.edu/university-catalog/academic-handbooks/graduate/university-resources/Pages/center-for-students-with-disabilities.aspx.

Universal Design for Learning:

GEO is committed to helping students achieve their full potential by removing barriers to learning and making reasonable accommodation when appropriate. Please help us by identifying barriers and suggesting ways we can diminish or remove them.

Students with special learning needs, or who are in circumstances which necessitate special consideration, must contact the instructor at the beginning of the course or earlier. Students with a documented disability who wish to discuss academic accommodations should contact the instructor as soon as possible and immediately contact the DePaul University's Office of Students with Disability at http://studentaffairs.depaul.edu/studentswithdisabilities/. Please note: All university employees must report to the Title IX Coordinator all relevant details about any incidents of sex discrimination, including sexual harassment and sexual or relationship violence, of which they become aware. DePaul employees are also mandated reporters under the Illinois Abused and Neglected Child Reporting Act [325 ILCS 5/4]. If you need to speak directly with a Title IX Coordinator, email titleixcoordinator@depaul.edu.

Harvard Referencing Style:

(a) Reference Lists:

Reference lists must be in alphabetical order by author's last name. Items by the same author must be in chronological order. Indent all but the first line of the citation. Please use the following style:

> *When referencing a direct quotation:*
> Knox and Pinch (2000: p.172) argue that "social polarization has been taking place."
>
> *When referencing an idea:*
> According to Knox and Pinch (2000), there has been social polarization.

(b) Books:

Knox, Paul and Steven Pinch. 2000. *Urban Social Geography: An Introduction*.4th ed. Englewood Cliffs, NJ: Prentice Hall.

(c) Book chapters in an edited collection:

Beauregard, Robert A. 1986. The Chaos and Complexity of Gentrification. In Smith, Neil and Peter Williams, eds. *Gentrification in the City*. Boston: Allen and Unwin: 35-45.

(d) Journal articles:

Borchert, John R. 1967. American Metropolitan Evolution. *The Geographical Review* 57(3): 301-332.

(e) Internet articles:

Gray, Geoffrey. 2003. Bad for Business: Budget Cuts Threaten Small Manufacturers. *City Limits Sessionly* #411. www.citylimits.org. Accessed May 5, 2008.

University Center for Writing-Based Learning (Website Link):

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

IX. Use of Class Material (Students and Lab Assistant)

Course material is to be used only by the students in this class for this class purpose only, and cannot be used or redistributed in paper form or be distributed on the internet electronically or via websites. This includes course lecture slides, course videos, examples, lab activities and data files, assignments and data files, assignment answers, tips/tricks, reading materials, project documents and any articles presented in class or for homework.

X. Schedule

Session	Topics	What's Due
Session 1 Begins Sept.12	**Syllabus, Introductory GIS Concepts and Data Models** ≈ Discussions: Discussion 1 *(due next week)* ≈ Reading: Reading Session-1 ≈ Lecture: Session 1 Lectures ≈ Self-Assessment: Self-Assessment Quiz (W1) *(OPTIONAL)* ≈ Lab activity: Introduction to Lab, Lab 1 *(due next week)* ≈ Assignments: Assignment 1 *(due next week)* ≈ Quiz: Quiz 1 *(due next week)*	
Session 2 Begins Sept.19	**Cartography and Map Design** ≈ Reading: Reading Session-2 ≈ Lecture: Session 2 Lectures ≈ Self-Assessment: Self-Assessment Quiz (W2) *(OPTIONAL)* ≈ Lab activity: Lab 2 *(due next week)* ≈ Assignments: Assignment 2 *(due next week)* ≈ Quiz: Quiz 2 *(due next week)*	↘ Discussion 1 due 11:59 pm ↘ Lab Activity 1 due 11:59 pm ↘ Assignment 1 due 11.59 pm ↘ Quiz 1 due 11.59 pm
Session 3 Begins Sept.26	**Cartographic Principles** ≈ Reading: Reading Session-3 ≈ Lecture: Session 3 Lectures ≈ Self-Assessment: Self-Assessment Quiz (W3) *(OPTIONAL)* ≈ Lab activity: Lab 3 *(due next week)* ≈ Assignments: Assignment 3 *(due next week)* ≈ Quiz: Quiz 3 *(due next week)*	↘ Lab Activity 2 due 11:59 pm ↘ Assignment 2 due 11.59 pm ↘ Quiz 2 due 11.59 pm

Session	Topics	What's Due
Session 4 Begins Oct.3	**Data Creation - Non-Spatial Data: Database Concepts, Joins and Using Field Calculator** ≈ Reading: Reading Session-4 ≈ Lecture: Session 4 Lectures ≈ Self-Assessment: Self-Assessment Quiz (W4) *(OPTIONAL)* ≈ Lab activity: Lab 4 *(due next week)* ≈ Assignments: Assignment 4 *(due next week)*	↘ Lab Activity 3 due 11:59 pm ↘ Assignment 3 due 11.59 pm ↘ Quiz 3 due 11.59 pm
Session 5 Begins Oct.10	**Data Creation - Spatial Data: Data Collection, Creation and Editing** ≈ Reading: Reading Session-5 ≈ Lecture: Session 5 Lectures ≈ Self-Assessment: Self-Assessment Quiz (W5) *(OPTIONAL)* ≈ Lab activity: Lab 5 *(due next week)* ≈ Assignments: Assignment 5 *(due next week)*	↘ Lab Activity 4 due 11:59 pm ↘ Assignment 4 due 11.59 pm
Session 6 Begins Oct.17	**Raster Data Model** ≈ Reading: Reading Session-6 ≈ Lecture: Session 6 Lectures ≈ Self-Assessment: Self-Assessment Quiz (W6) *(OPTIONAL)* ≈ Lab activity: Lab 6 *(due next week)*	↘ Lab Activity 5 due 11:59 pm ↘ Assignment 5 due 11.59 pm
Session 7 Begins Oct.24	**Geographic Extent and Unit of Analysis, Data Sources** ≈ Reading: Reading Session-7 ≈ Lecture: Session 7 Lectures ≈ Self-Assessment: Self-Assessment Quiz (W7) *(OPTIONAL)* ≈ Lab activity: Lab 7 *(due next week)* ≈ Quiz: Quiz 4 includes session 6 & 7 *(due next week)*	↘ Lab Activity 6 due 11:59 pm
Session 8 Begins Oct.31	**Spatial Analysis** ≈ Reading: Reading Session-8 ≈ Lecture: Session 8 Lectures ≈ Lab activity: Lab 8 *(due next week)*	↘ Lab Activity 7 due 11:59 pm ↘ Quiz 4 due 11.59 pm
Session 9 Begins Nov.7	**Review all Materials** **Do/Re-do all Optional Ungraded Quizzes**	↘ Lab Activity 8 due 11:59 pm
Session 10 Begins Nov.14	**Start Working on Final Exam** *(due next week)*	
Session 11 Begins Nov.21	**Final Exam Due**	↘ Final Exam due 11:59 pm

XI. Learning Domains, Outcomes and Writing Expectations

Learning Domain: SCIENTIFIC INQUIRY

Courses in the Scientific Inquiry (SI) domain are designed to provide students with an opportunity to learn the methods of modern science and its impact on the world around us. Courses are designed to help students develop a more complete perspective about science and the scientific process, including: an understanding of the major principles guiding modern scientific thought; a comprehension of the varying approaches and aspects of science;

an appreciation of the connection among the sciences; the fundamental role of mathematics in practicing science; an awareness of the roles and limitations of theories and models in interpreting, understanding, and predicting natural phenomena; and a realization of how these theories and models change or are supplanted as our knowledge increases.

Learning Outcomes:

1. Students will understand the major principles guiding modern scientific thought. Students will demonstrate a mastery of the science content knowledge of their SID courses.
2. Students will know that science, technology, and math serve as mechanisms for inquiry into the nature of the universe. Students will:
    a. Identify questions that can be answered through scientific investigations
    b. Design and conduct a scientific investigation to test a scientific hypothesis
    c. Use appropriate tools and techniques to gather, analyze, and interpret data to support or refute a scientific hypothesis.
    d. Develop descriptions, explanations, predictions, and models using evidence.
    e. Describe relationships between evidence and explanations using critical and logical thinking.
    f. Recognize and analyze alternative explanations and predictions
    g. Communicate scientific procedures and explanations.
    h. Use mathematics in all aspects of scientific inquiry.
3. Students will understand and appreciate the interrelationships among science, technology and math. Students will:
    a. Use technology and mathematics to identify a problem or design a solution to a problem.
    b. Give examples of how science and technology inform and influence each other.
4. Students will understand and appreciate the role of science in society and in their lives. Students will:
    a. Provide examples of how science and technology impact our lives, and how social needs and concerns impact our development of technology and scientific investigation.
    b. Develop positive attitudes towards science, technology, and mathematics.
    c. Establish an ongoing experiential/service-learning interest in science, technology, and mathematics.
5. Students will understand the nature of science, technology, and mathematics. Students will:
    a. Provide examples of the abuse of science, including the representation of unfalsifiable claims as science and other forms of pseudoscience.
    b. Explain the strengths and limits of scientific inquiry.
    c. Explain the difference between evidence and inference, and the provisional nature of scientific explanations by providing examples of how our understanding of the workings of the world has changed in the past.
    d. Explain the difference between probability and certainty, and describe what is meant by uncertainty in the context of science, technology, and mathematics.

Writing Expectations:

Writing is integral for communicating ideas and progress in science, mathematics and technology. The form of writing in these disciplines is different from most other fields and includes, for example, mathematical equations, computer code, figures and graphs, lab reports and journals. Courses in the SI domain must include a writing component where that component takes on the form appropriate for that course (*e.g. lab reports, technical reports, etc.)*

This course strives to meet learning goals 1-4 and 5 partially.

XII. 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.