

GEOG 430 1001 / GEOL 630 1001 – GIS: Theory and Applications
Spring 2019 T/TR 1-2:15 pm, Lilly Fong Geoscience (LFG) 102

Faculty: Dr. Gabriel Judkins
 116 LFG
 895-4302
 Email: gabriel.judkins@unlv.edu
<http://geoscience.unlv.edu/gabrielljudkins.html>

Graduate TA: Emily Beard
 Email: bearde1@unlv.nevada.edu
 Office Hours: Hour prior to lab time in TEC computer lab

Office Hours: Monday 12:00pm, Tuesday 2:30pm, and by appointment

Course Format: Traditional twice-weekly lectures (lab is required, graded separately and combined in the end)

Required Textbook: Geographic Information Systems and Science, 4rd edition by Longley et al. (Lecture text)

Prerequisites: MATH 127 or 128

Purpose of this class:

This course offers an advanced introduction to the field of Geographic Information Science (GISci), covering the basic geographic concepts of geospatial data, its manipulation, analysis and integration into a Geographic Information System (GIS). This course covers the foundational principles of GISci (representation, nature of geographic data, georeferencing and uncertainty), techniques (GIS software, geographic data modeling, GIS data collection, creating and maintaining geographic databases and the GeoWeb), analysis (cartography and map production, geovisualization, spatial data analysis and inference, and spatial modeling with GIS), and GIS management and policy. The lecture portion of the course will present topics in GIS manipulation and theory, while the required lab portion will focus on hands-on use of the industry-standard ArcGIS software.

Learning outcomes of this class:

- Demonstrate foundational understanding of the basic concepts of geospatial data and its manipulation as part of a GIS through exam assessments covering the entire semester of materials
- Be able to articulate the distributed sources as well as types of geospatial data and discuss their potential and inherent limitations as well as the most common means for manipulating and analyzing these types of data
- Quantify the error that is inherent in most maps and selecting the best methods for minimizing those errors
- Be able to articulate the necessary components of a fully operational GIS inclusive of hardware, software, geospatial data, trained personnel and the necessary components of any GIS project
- All students will be required to display their mastery of these topics through the production of a GIS research poster in conjunction with their work in their applied GIS lab

Grading Policy: (Final grades are rounded to nearest whole number)

<u>Grade</u>	<u>Semester average</u>	<u>Grade</u>	<u>Semester average</u>
A	≥93	C	73-76
A-	90-92	C-	70-72
B+	87-89	D+	67-69
B	83-86	D	63-66
B-	80-82	D-	60-62
C+	77-79	F	less than 60

Three exams (expectations and questions will vary for graduate students vs. undergraduates)

Exam 1	150 pts	%
Exam 2	150 pts	%
Exam 3	150 pts	%
Group research poster and presentation	250 pts	%
GIS Methods and Analysis	(125 pts)	
Poster Mechanics	(50 pts)	
Oral Presentation	(50 pts)	
Written Description	(25 pts)	
Total Points	700 pts	100%

GEOG 430 1001 / GEOL 630 1001 – GIS: Theory and Applications

Spring 2019 T/TR 1-2:15 pm, Lilly Fong Geoscience (LFG) 102

Lecture and Exams: Three non-cumulative exams will assess your understanding of the fundamental concepts and applications integral to the field of Geographic Information Sciences (GISci). Critical to your success on these exams will be consistent attendance and active participation in lecture. *These are complicated topics that you might find quite different from the rest of your coursework. It is important to make the intellectual connections necessary for later application in your projects.*

To assist you in preparing for these lectures, you will have textbook reading assignments to be completed prior to lecture. Additional personal materials, as well as those pulled from other sources including GIS Fundamentals (Boldstad), will round out the materials covered in this course. For this reason, your primary source of study materials will be your lecture notes. You are responsible for taking your own notes during lecture, as I will only provide digital pdf lecture handouts that might not fully display all the content covered in class but will provide a great basis for note taking.

Given that this is an upper-division lecture, you will need to prepare adequately for each exam. I will provide a study guide to assist you in these preparations but it is your responsibility to be familiar with all the content presented during the lectures for that exam. Please recall that this is a senior-level, capstone course.

Group Research Poster and Presentation: As part of this course, all undergraduate students must participate in a group research poster project that will be presented by **all** members during the Spring Geosymposium of the Geoscience Department (April 26th). Please clear your calendars of any conflicts that might keep you from participating in Geosymposium. Each student **must** register for this conference and be in attendance. All undergraduate students will be grouped into small groups of 3 students. Graduate students will each be required to develop their own research poster. The group aspect of this project is central to the course learning outcomes and while it might not always be convenient, it is critical for success. All group members need to commit themselves to the principles of:

- Accountability** (take responsibility for yourself and your group's success)
- Reliability** (be available to meet and do what you say you will do) and
- Communication** (be responsive and seek the advice and help of your group members).

The projects selected can be either exploratory or connected to ongoing research but must focus on the display of several GIS skills and processes learned during the semester. Please consult with the lab TA and professor in the selection and planning of the research poster project and get to work ASAP. In addition, you will need to **submit a brief written description** of your project. The document should be around **five pages** and focused on the GIS aspect (not the topic) of your project. Please describe your use of ArcGIS in completion of your project, including your data sources, georeferencing, data manipulations, and all analysis/display techniques employed. Explain your final data analysis and conclusions, and offer reflective thoughts on what could have been improved and any major challenges to your success.

This project will be challenging and does require you to learn to work effectively in small groups and learn additional GIS techniques on the fly as you work to complete your project. Please use your textbook, lecture notes, lab book and the help menu of ArcGIS as resources. Additionally, I have small library of other GIS references for your short-term use.

Syllabus: Should there need to be changes in the timing, order or subject of materials, I will do my best to use the announcement function to notify all the students of changes. Significant changes may require a revised syllabus.

CLASS SCHEDULE

Date	Lecture
Week 1	
Jan. 22	Introduction to course and <i>Geospatial Revolution</i> (Episode 1) [Read <i>Introduction</i> , Price]
Jan. 24	Chapter 1: Science and Study and App. <i>Geospatial Revolution</i> (Episodes 2-4)
Week 2	
Jan. 29	Chapter 3: Representing Geography
Jan. 31	Chapter 3/Chapter 2: The Nature of Geographic Data
Week 3	
Feb. 5	Chapter 2/Chapter 4: Georeferencing
Feb. 7	Chapter 4: Georeferencing
Week 4	
Feb. 12	Chapter 5: Uncertainty
Feb. 14	Chapter 5: Uncertainty
Week 5	
Feb. 19	Exam 1
Feb. 21	Chapter 8: GIS Data Collection

GEOG 430 1001 / GEOL 630 1001 – GIS: Theory and Applications
Spring 2019 T/TR 1-2:15 pm, Lilly Fong Geoscience (LFG) 102

Week 6	
Feb. 26 Feb. 28	Chapter 8: GIS Data Collection
Week 7	
Mar. 5 Mar. 7	Global Navigation Satellite Systems and Coordinate Surveying In class GPS Field Exercise
Week 8	
Mar. 12 Mar. 14	Chapter 6: GIS System Software
Week 9	
Mar. 19 Mar. 21	Spring Break (No Class) Spring Break (No Class)
Week 10	
Mar. 26 Mar. 28	Chapter 7: Geographic Data Modeling Chapter 9: Creating and Maintaining Geographic Databases (Draft abstracts due Friday)
Week 11	
Apr. 2 Apr. 4	Chapter 10: The GeoWeb Exam 2
Week 12	
Apr. 9 Apr. 11	Chapter 11: Cartography and Map Production (GIS “study area” map for poster is due) Chapter 12: Geovisualization
Week 13	
Apr. 16 Apr. 18	Chapter 12: Geovisualization Chapter 13: Spatial Data Analysis
Week 14	
Apr. 23 Apr. 25	Geosymposium Poster Work (No Class) Geosymposium Poster Work (No Class)
Week 15	
Apr. 30 May 2	Poster Submission and class discussions Chapter 14: Spatial Analysis and Inference
Week 16	
May 7 May 9	Chapter 15: Spatial Modeling with GIS Exam 3
Week 17	No Final Exam

Logistics and policies

1. Participation

Students in this class will have different backgrounds and levels of educational training. As a result, you may find some material difficult, feel that you are already familiar with some concepts, or have personal experiences that can inform us all. Whatever your situation, please share your position with us through class participation. Most importantly, however, if you are confused about a concept, **please ask questions** in class for clarification and explanation. There are many ways to present this material, and I will attempt to find one that works for you.

2. Attendance

It is important that you attend class daily because we cover a lot of material, and I will provide guidance for exam questions during class. You are responsible for all material covered in lectures and assigned for readings. Topics covered may vary from the schedule somewhat, but the exam dates will remain fixed. Consult the posted lecture materials and fellow classmates to review missed material and then see me with specific questions. **Make-up exams will not be given** without a medical, military, or university excuse and then its nature will be at my discretion.

3. Academic Misconduct

Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution.

GEOG 430 1001 / GEOL 630 1001 – GIS: Theory and Applications

Spring 2019 T/TR 1-2:15 pm, Lilly Fong Geoscience (LFG) 102

An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the *Student Academic Misconduct Policy* (approved December 9, 2005) located at: <http://studentconduct.unlv.edu/misconduct/policy.html>.

4. Administrative Drops

You are required to be familiar with university policies and procedures in the current UNLV Undergraduate Catalog. Importantly, we follow the policies on Cheating, Plagiarism, and Academic Dishonesty that are stated in the most recent UNLV Undergraduate Catalog. Any student that does not comply with these requirements and conducts themselves in a manner that is disruptive and interferes with the right of other students to learn or of the instructor to teach will be administratively dropped from the course.

5. Classroom Conduct

Students have a responsibility to conduct themselves in class and in the libraries in ways that do not interfere with the rights of other students to learn or of instructors to teach. Use of electronic devices such as pagers, cellular phones, or recording devices, or potentially disruptive devices or activities, are permitted only with the prior explicit consent of the instructor. The instructor may rescind permission at any time during the class. If a student does not comply with established requirements or obstructs the functioning of the class, the instructor may initiate an administrative drop.

6. Classroom Surveillance

Nevada Revised Statutes (State Law) 396.970 Surreptitious electronic surveillance on campus; exceptions. [Effective January 1, 2017.]

1. Except as otherwise provided in subsection 2, it is unlawful for a person to engage in any kind of surreptitious electronic surveillance on a campus of the System without the knowledge of the person being observed.
 2. Subsection 1 does not apply to any electronic surveillance:
 - (a) Authorized by a court order issued to a public officer, based upon a showing of probable cause to believe that criminal activity is occurring on the property under surveillance;
 - (b) By a law enforcement agency pursuant to a criminal investigation;
 - (c) By a peace officer pursuant to NRS 289.830;
 - (d) By a uniformed peace officer of the Nevada Highway Patrol Division of the Department of Public Safety pursuant to NRS 480.365;
 - (e) Which is necessary as part of a system of security used to protect and ensure the safety of persons on the campus; or
 - (f) Of a class or laboratory when authorized by the teacher of the class or laboratory.
- (Added to NRS by 1993, 2138; A 2015, 575, 3668, effective January 1, 2017)

7. Recording Lectures

Absolutely **no electronic recording or posting** of lectures or other materials will be allowed without my prior approval.

8. Bringing children/guests to class

Students are not generally allowed to bring guests, including children to lecture. Please see me with any questions.

9. Disability Resource Center (DRC)

The UNLV Disability Resource Center (SSC-A 143, <http://drc.unlv.edu/>, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you.

If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

10. Library Resources

Students may consult with a librarian on research needs. Subject librarians for various classes can be found here: https://www.library.unlv.edu/contact/librarians_by_subject. UNLV Libraries provides resources to support students' access to information. Discovery, access, and use of information are vital skills for academic work and for successful post-college life. Access library resources and ask questions at <https://www.library.unlv.edu/>.

11. UNLV Writing Center

One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive

GEOG 430 1001 / GEOL 630 1001 – GIS: Theory and Applications

Spring 2019 T/TR 1-2:15 pm, Lilly Fong Geoscience (LFG) 102

priority assistance. Appointments may be made in person or by calling 702-895-3908. The student's Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: <http://writingcenter.unlv.edu/>.

12. Tutoring and Coaching

The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit <http://www.unlv.edu/asc> or call 702-895-3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of the SSC (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TEB second floor.

13. Religious Holiday Policy

Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor **within the first 14 calendar days of the course for fall and spring courses (excepting modular courses), or within the first 7 calendar days of the course for summer and modular courses**, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit: <http://catalog.unlv.edu/content.php?catoid=6&navoid=531>.

14. Transparency in Learning and Teaching

The University encourages students to use a transparency template to discuss with their instructors how assignments and course activities benefit student success: https://www.unlv.edu/sites/default/files/page_files/27/TILT-Framework-Students.pdf.

15. Official extracurricular activity

All students who represent UNLV at any official extracurricular activity have the opportunity to make up an assignment. However, you must provide written notification to me at least 1 week prior to the missed class(es).

16. Nondiscrimination

The University of Nevada Las Vegas does not discriminate on the basis of race, color, creed, religion, national or ethnic origin, gender, age, sexual orientation, disability, or veteran status.

17. Copyright

The University requires all members of the University Community to familiarize themselves **with** and to follow copyright and fair use requirements. **You are individually and solely responsible for violations of copyright and fair use laws. The university will neither protect nor defend you nor assume any responsibility for employee or student violations of fair use laws.** Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional information can be found at: <http://www.unlv.edu/provost/copyright>.

18. Rebelmail

By policy, faculty and staff should e-mail students' Rebelmail accounts only. Rebelmail is UNLV's official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students' e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu. **Emailing within WebCampus is acceptable.**

19. Incomplete Grades

The grade of I – Incomplete – can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student's control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving "I" grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

20. Final Examinations

The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: <http://www.unlv.edu/registrar/calendars>.