

**GEOL 430 1001 – GIS: Theory and Applications**  
**Spring 2016 T/TR 1-2:15 pm, Lilly Fong Building (LFG) 102**

**Office Hours:** Monday 1:00-2:00pm, Tuesday 11:00-12:00 PM, and by appointment

**Course Format:** Traditional twice-weekly lectures (lab is also required but graded separately)

**Required Textbook:** Geographic Information Systems and Science, 3<sup>rd</sup> 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 the 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+	87-90	D+	67-69
B	83-86	D	63-66
B-	80-82	D-	60-62
C+	77-79	F	less than 60

Three exams

Exam 1	150 pts	25%
Exam 2	150 pts	25%
Exam 3	150 pts	25%

Group research poster and presentation

Methods and analysis	(50 pts)
Poster	(50 pts)
Presentation	(50 pts)

Total Points

600 pts 100%

**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. To assist you in preparing for these lectures, you will have textbook reading assignments associated with each lecture. These reading assignments should be performed prior to lecture as the structure for the course follows the layout of the textbook and largely relies on the concepts presented in this text. 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 personal notes during lecture, as I will only provide pdf lecture handouts that frequently will not display all the content covered in class. Given that this is an upper-division lecture, a study guide will not be provided as you will be responsible for all materials covered in class or assigned outside of class.

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**Group Research Poster and Presentation:** As part of this course, all students must participate in a group research poster project that will be presented (by all members) during the Spring Geosymposium of the Geoscience Department. Students will be grouped into small groups of 3 students. The projects can be either exploratory or connected directly to ongoing research undertaken by the students and has as its focus the display of a few (more than one) different 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 as you will need all the time possible to develop and analyze your topic prior to actually making the poster. Please also note the deadlines for poster abstracts and study area maps on the syllabus.

**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 to be made available.

**CLASS SCHEDULE**

Date	Lecture
Week 1	
Jan. 19	Introduction to course and <i>Geospatial Revolution</i> (Episode 1)
Jan. 21	Chapter 1 & 2: Systems, Science and Study and App. <i>Geospatial Revolution</i> (Episodes 2-4)
Week 2	
Jan. 26	Chapter 3: Representing Geography
Jan. 28	Chapter 3: Representing Geography & Chapter 4: The Nature of Geographic Data
Week 3	
Feb. 2	Chapter 4: The Nature of Geographic Data & Chapter 5: Georeferencing
Feb. 4	Chapter 5: Georeferencing
Week 4	
Feb. 9	Chapter 6: Uncertainty
Feb. 11	Chapter 6: Uncertainty
Week 5	
Feb. 16	<b>Exam 1</b>
Feb. 18	Chapter 7: GIS Software
Week 6	
Feb. 23	Chapter 8: Geographic Data Modeling
Feb. 25	Chapter 9: GIS Data Collection
Week 7	
Mar. 1	Chapter 9: GIS Data Collection
Mar. 3	Chapter 9: GIS Data Collection
Week 8	
Mar. 8	<i>Guest Speaker: Lynn Fenstermaker</i>
Mar. 10	Global Navigation Satellite Systems and Coordinate Surveying
Week 9	
Mar. 15	Chapter 10: Creating and Maintaining Geographic Databases
Mar. 17	Chapter 11: The GeoWeb <span style="float: right;"><b>(Draft abstracts due Friday)</b></span>
Week 10	
Mar. 22	<b>Spring Break</b> (No Class)
Mar. 24	<b>Spring Break</b> (No Class) Production
Week 11	
Mar. 29	<b>Exam 2</b>
Mar. 31	Chapter 12: Cartography and Map
Week 12	
Apr. 5	Chapter 12/Chapter 13: Geovisualization <span style="float: right;"><b>(GIS "study area" map for poster is due)</b></span>
Apr. 7	Chapter 13: Geovisualization
Week 13	
Apr. 12	Chapter 14: Spatial Data Analysis
Apr. 14	Chapter 15: Spatial Analysis and Inference
Week 14	
Apr. 19	Chapter 16: Spatial Modeling with GIS
Apr. 21	Exam 3

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Week 15	
Apr. 26	Geosymposium Poster Work (No Class)
Apr. 28	Geosymposium Poster Work (No Class)
Week 16	
May 3	Chapter 18: Operating Safely with GIS
May 5	TBA
Week 17	
May 10	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 further explanation. You will not be alone in your confusion. There are many ways to present this material, and I will attempt to find one that works for you. If you do not feel comfortable asking questions in class, please contact me.

### 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 lectures and exams will not be given** without a medical, military, or university excuse. If a make-up exam is permissible, the nature of the make-up exam 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. 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: <https://www.unlv.edu/studentconduct/student-conduct>.

### 4. Administrative drops/Classroom conduct

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. Recording Lectures

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

### 6. Bringing children/guests to class

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

### 7. 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 maybe 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.

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**8. 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 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/>.

**9. 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.

**10. 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>.

**11. 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).

**12. 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.

**13. 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>.

**14. 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](mailto:@unlv.nevada.edu). **Emailing within WebCampus is acceptable.**

**15. Transparency in Learning and Teaching**

The University encourages application of the transparency method of constructing assignments for student success. Please see these two links for further information:  
<https://www.unlv.edu/provost/teachingandlearning>  
<https://www.unlv.edu/provost/transparency>

**14. Library Resources**

Students may consult with a librarian on research needs. For this class, the subject librarian is [https://www.library.unlv.edu/contact/librarians\\_by\\_subject](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/>.

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**15. 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.

**16. 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>.

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