

ERSC 4422/5522

Applied GIS (Geospatial Information Science & Systems)

Official Course Description:

Prerequisites: BIOL/ERSC 4421 or consent of instructor. This course builds on the fundamental concepts of Geographic Information Systems (GIS) from ERSC 4421 Introduction to GIS. It focuses on advanced applications in GIS with an emphasis on problem-solving, advanced analysis techniques, and database management. Dual listed as ERSC 5422. Three hours lecture, two hours laboratory per week. Four credit hours.

Contact:

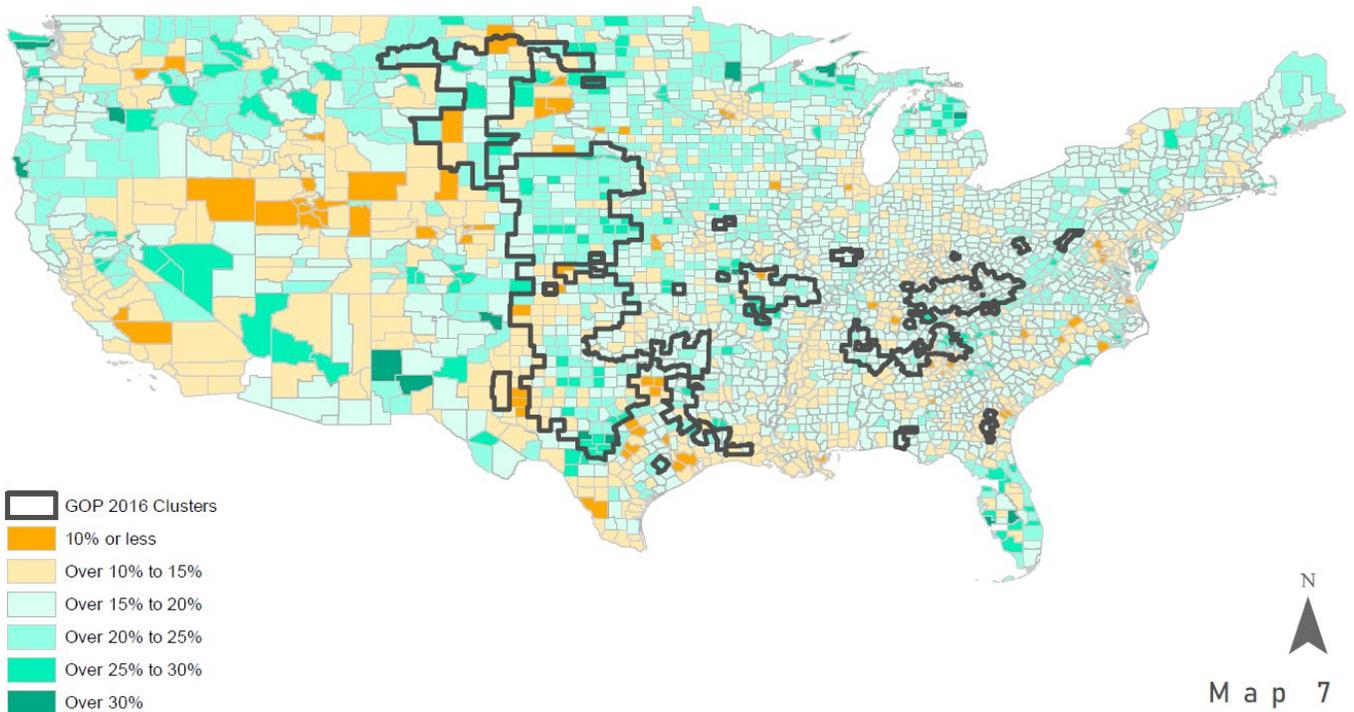
Dr. David Lee Baylis

Email: dbaylis@ualr.edu

Office: Stabler Hall, Department of History, Room #604I

Office Hours: Library GIS Room (Wednesdays in Library 101B, 9am-11am and 12pm-2pm or by appointment).

Percent Population Over 65

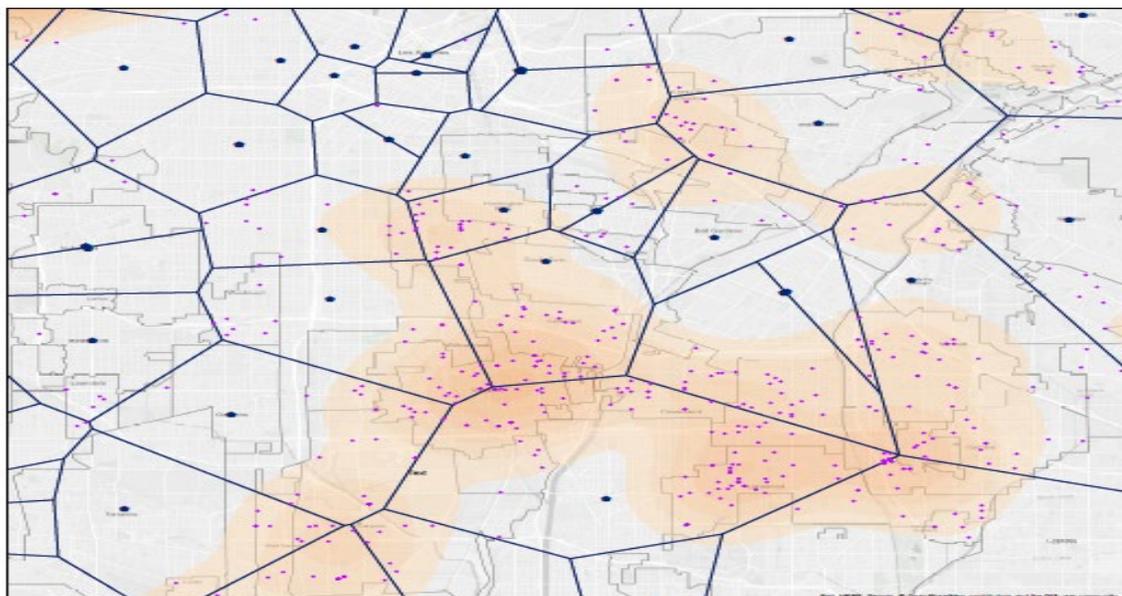


Map by Dr. David Baylis (Produced in ArcGIS and GeoDa)

Course specific student learning outcomes:

- work in a variety of mapping programs both proprietary and FOSS (free and open-source software);
- build web-mapping projects for a variety of clients and settings;
- georeference and edit primary source paper and digital maps;
- correctly select and apply geoprocessing techniques learned in intro GIS to real-world problems (hazard mitigation and response);
- use map algebra (raster) and SQL queries to develop a site selection protocol;
- use proximity and density tools to analyze spatial phenomena (predictive policing);
- demonstrate critical thinking, quantitative reasoning and problem solving through data collection, data analysis, interpretation of results, hypothesis testing and making conclusions;
- apply spatial statistics to socioeconomic and political phenomena to look for spatial patterns (election analysis);
- develop intermediate level spatial analytical skills (network analysis, automation, modeling);
- apply technical knowledge of relevant computer applications, laboratory methods, and field methods to solve spatial problems;
- avoid plagiarism, cite correctly from reference sources, and follow the UALR policies on academic integrity;
- demonstrate an awareness of the ethical guidelines for conducting and communicating scientific research;
- demonstrate awareness of the ethical obligations of communicating uncertainty;

Theft Density and Limited Police Department Coverage
Compton and Inglewood, LA County



- Police Departments
- Nearest Neighbor Analysis Coverage Areas for Police Departments
- Reported Thefts, November 2018

0 1.75 3.5 7 Miles



Textbook:

- A. GIS 20 3rd Edition by Clemmer (Recommended)*
- B. GIS Fundamentals by Bolstad (Recommended)*
- C. Designing Better Maps by Brewer (Recommended)*
- D. Applied GIS journal articles from your field or discipline of interest*

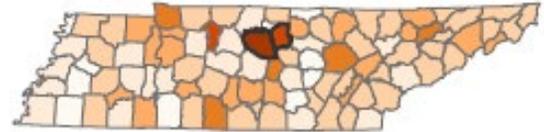
Software:

To complete the Introduction to GIS class, you will need access to ArcGIS Desktop software. We will begin using this software immediately you will need to get your hands on the software **As Soon As Possible**. There are three ways to get access at UA Little Rock:

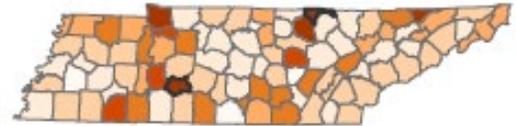
1. Come to campus and use one of our computers in the Department of Earth Sciences student computer lab (SCLB 386 or SCLB 165) – [your student ID card should allow you this access if a student in any of the affiliated departments];
2. Use the small GIS lab space in the main library. Instructions below on use of the library GIS lab. Additionally, I will hold my office hours in the library GIS lab.
3. Obtain a student version of the software from ESRI. To get your copy of the software, use authorization code sent to you in Blackboard. Follow directions sent with the code. If you obtain a student license, make sure that your personal computer is compatible with the software requirements. We will mostly be using version 10.5-10.6.1. ArcGIS Pro is a much more power-hungry program. <https://www.esri.com/en-us/store/arcgis-student-use/arcgis-for-student-use>

NOTE: I have put in a request for multiple student licenses from ESRI. As soon as these are available, I will let you know.

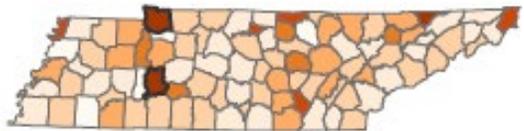
To check to see if your computer is compatible see the following system requirements: <http://desktop.arcgis.com/en/arcmap/latest/get-started/setup/arcgis-desktop-system-requirements.htm>



2012 Highest: Wilson Co. (121.6), Smith Co. (41.9)



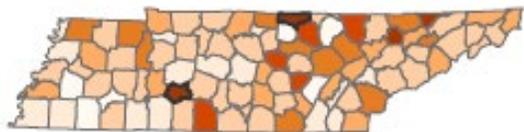
2013 Highest: Pickett Co. (59.1), Lewis Co. (50.2)



2014 Highest: Perry Co. (64), Stewart Co. (52.7)



2015 Highest: Clay Co. (51.4), Bledsoe Co. (48.4)



2016 Highest: Lewis Co. (67.2), Clay Co. (51.7)

Maps by Dr. David Baylis (Suicide Rates by County in TN)

Hardware:

You will need a USB flash drive or a portable external hard drive in order to create back-up copies of your work. If you are using ERSC on-campus computers, then you will need portable storage in order to transfer your files between computers. During the second week of class we will go into detail about appropriate file structures in a spatial database. Any early “lab” will require you to build out your database infrastructure in advance.

ESRI Training Access:

Most professional fields require practitioners to maintain their skillset via Continuing Education Credits (CECS). Many of these trainings provide certificates (and sometimes certifications) which can be applied to your resume. For example, I am working on additional online training in GIS programming and advanced analytic techniques during the course of the semester.

You are advised to complete frequent training (continuing education credits) via ESRI’s training catalog outside of class time. ESRI offers numerous online training modules that may be of interest to you. You are not being graded on these trainings and are not required to turn anything in.

That training is accessible via the following link:

<https://www.esri.com/training/>

Prior to being able to enroll in any of the FREE courses (you will not be required to complete any courses that have a fee attached) you will need to create an ESRI account [here](#). Those of you who took ERSC 4421 with me have already done this.

Grading:

- Lab Quizzes

There are 4 lab quizzes during the term. The lab quizzes will be completed online.

- Practical Midterm

There is 1 practical midterm in the course. The practical midterm involves using skills learned in class up until that point to solve a project and create a mini-project.

- Labs

There are 10 lab exercises in the course.

Lab submission requirements will be included in each separate set of lab instructions.

- All labs must be completed by the due date or they will be assessed a 25% late deduction (automatically).

- GIS Project:

There is one GIS final project. The project includes a series of produced maps, a formal written report, and an oral presentation. Students who don’t show up for the final

presentation will not receive a grade on the final project. Final projects can range from advanced tool application to problem solving in the community. Your ability to problem solve independently or as a group is paramount here. As such, even a project that leads to more questions than answers but that is designed well will be graded more favorably than a poorly planned out and structured yet “safe” project that yields an answer known in advance.

- **Attendance Policy with respect to Grades:**

I will take daily attendance. Each student is one absence with no direct grade penalty. After that first absence, each additional absence will result in a 5% final grade reduction. Weekly attendance is expected and students who attend regularly and actively engage in the course tend to do better in the class. It is as simple as that. The only valid excuse beyond the initial absence is a medical emergency. I will require proof of the emergency. No reason is required for the grace absence (e.g. there is no need to message me to tell me).

- **Applied Weekly Discussions:**

Each week, students will select at least one article of interest that demonstrates the use of geospatial technologies in a way that interests them. These articles should be scholarly/peer-reviewed. Students will be placed in rotating discussion groups and will be responsible for sharing their article and a summary discussion paper (about 1 page max of substantive commentary and questions) with their classmates prior to discussion that week. These will be posted on an ungraded discussion board but discussed in-class in small groups. While these assignments are ungraded, students should use this as an opportunity to build the literature review for their final project. **An submitted article and discussion will be treated as an absence.**

Course points breakdown:

Lab Exercises	40 %	200 points
Practical Midterm	10 %	50 points
Lab Quizzes	20 %	100 points
Project Proposal	5 %*	25 points
Project Presentation	10 %*	50 points
Final Project Portfolio	15 %*	75 points
TOTAL	100%	500 points

* *Graduate students enrolled in ERSC 5422* will be required to teach a short (30 minute) segment on an applied topic of interest. Meet with me to discuss. In addition, research project requirements are more advanced.

Total: 500 points:

A	450-500 pts	B	400-449 pts
C	350-399 pts	D	300-349 pts
F	< 500 pts		

COURSE POLICIES:

To avoid incidents that will affect your grade:

- Do not miss class.
- Take notes in class.
- Download lab exercises/data as soon as lab opens
- read all of the instruction information on homework assignments
- report problems to me immediately (NOT right before due date/time)
- complete your work well in advance of the deadlines
- DO NOT fall behind the schedule

Computer problems:

This is a computer intensive course. You must be prepared to deal with computer related problems. You most likely will experience problems related to the software, internet access, or Blackboard access at some point during the term. IT services can assist with basic troubleshooting. ESRI has various support services for technical questions as well. Finally, as a burgeoning GIS professional you need to learn how to problem solve on your own – this means seeking out training and advice to assist with your specific research problems and areas of interest.

Library GIS Space:

GIS Availability:

Monday-Thursday	9 am -10 pm
Friday	9 am-4 pm
Saturday	9 am-4 pm
Sunday	2 pm-10 pm

****times set to accommodate building opening/closing routines****

Access to 101B (main floor of the library in the back)

Key to 101B available for checkout at the Operations desk; only UA Little Rock students/faculty. Computer use only for GIS-related assignments.

Late Assignments:

Please keep track of due dates and try not to fall behind. I will assist you in whatever ways I can but ultimately **this is your responsibility**. Late assignments will automatically be assessed a 25% late penalty. Beyond that, for each week they are late they are subject to an additional 5% penalty per week.

Email Policy:

Before contacting the course instructor, students should check the syllabus first and make sure that any questions they intend to ask are not addressed in the syllabus. Students should not use email (for example) to ask: what is on the next test, will I “miss anything important if I don’t come to class,” questions that require detailed or more personal responses, etc. Students should use discretion and be courteous. In general, I encourage students to use email “netiquette”.

Name and Pronoun Policy:

Students should feel completely comfortable contacting me prior to the start of class to let me know what name and gender pronouns they would like to be identified by. Presently, Registrar only provides instructors with students’ legal names and identifying characteristics.

Attendance Policy:

As discussed above in the grading section, attendance in this course is mandatory. Students are allowed two automatically excused absences during the semester. Beyond that, an automatic 5% reduction of the final grade will be applied for each additional absence without proof of a medical emergency.

Plagiarism:

See university policies. Don't plagiarize – I will automatically fail the first plagiarized assignment and initiate the university procedures for academic probation in the event of a second event of plagiarism.

Classroom Decorum:

People don't always agree, and that is ok. However, at all times use respect and professional decorum in this course. Disagree but don't be rude and avoid all ad hominem attacks. In addition, if you make an argument, have facts to support it and be prepared to share sources. Everyone is entitled to an opinion but that does not mean that all opinions are equally valid. Statements and arguments without factual support and empirical evidence to back it up are useless, at least in this classroom.

UNIVERSITY POLICIES:

Academic Integrity: For the full University Academic Integrity Statement, see policy 501.13: <https://ualr.edu/policy/home/student/academic-integrity-and-grievance/>

As UALR student, you should make sure to review the student handbook to make sure that you understand both your rights and responsibilities at UALR. For this class, let me emphasize one key academic integrity matter: plagiarism (see below). (UA Little Rock Policy 510.13)

Attendance: Each faculty member has the prerogative of setting specific attendance requirements for classes. In some courses, active student participation is an integral part of the course, and the instructor may base a portion of the students' grades on attendance and participation. In general, students are expected to attend class regularly. Students who miss class are responsible for finding out about the material covered, homework assignments, and any announcements or examinations.

On the 10th day of classes, students who have not attended in class will be administratively withdrawn by the instructor. Students may be administratively withdrawn from a class by the instructor for excessive absences during the semester (UA Little Rock Policy 404.4).

Inclement Weather Policy: During inclement weather, UA Little Rock will decide whether or not to close based on all available information:

1. The chancellor will decide whether conditions warrant canceling classes and activities and closing the campus or whether classes and activities will be canceled but with specified campus offices open. Online or web-enhanced classes will continue as scheduled at the discretion of the faculty member.
2. The [UA Little Rock website](#), UA Little Rock email, the university's main telephone number (501.569.3000), and the Rave campus alert notification system are the official means of communicating information concerning weather-related closings.
3. When necessary, the university will announce a separate decision about canceling night classes (those classes starting at 4:20 p.m. or later) by 2 p.m., if possible.
4. Ordinarily, sites remote from campus such as the the Bowen Law School, the Arkansas Studies Institute, and the Benton Center will close or cancel classes and activities

whenever the university does so. In some circumstances, however, a separate decision may be made whether or not a site remote from campus will be open or closed, and this decision will be announced through the university's official means of communicating weather-related closings. Vice chancellors are responsible for seeing that necessary services are provided in their respective areas when the university is closed. Employees required to provide such services will be identified by their supervisors. Classified employees who must report to work when the university is closed due to inclement weather will be allowed compensation time of 1.5 hours for one hour worked. Persons who are not required to work when the university is closed will be granted authorized absence. Employees who do not report to work when the campus is open will be charged annual/compensatory leave or leave without pay. The Payroll Department will prescribe payroll reporting and timekeeping.

5. The Policy Advisory Council of the University Assembly will recommend to the chancellor if and when missed undergraduate and graduate class days should be made up. In the event that the university is closed during a final examination day, the provost, in consultation with the Faculty Senate president, will reschedule any missed graduate or undergraduate final examinations with the exception of online exams which will continue as scheduled.
6. Weather and road conditions vary from place to place. Employees and students are expected to exercise good judgment regarding the safety of travel when road conditions are affected by the weather. (UA Little Rock Policy 215.1)

Non-Discrimination:

UA Little Rock adheres to a policy that enables all individuals, regardless of race, color, gender, national origin, age, religion, sexual orientation, veteran's status, or disability, to work and study in an environment unfettered by discriminatory behavior or acts. Harassment of an individual or group will not be condoned, and any person (student, faculty, or staff member) who violates this policy will be subject to disciplinary action.

Harassment that is considered discriminatory includes actions or conduct (verbal, graphic, gestural, or written) directed against any person or group with the intent to demean or create a hostile or threatening environment. It is not the intent of this policy to infringe upon or limit educational, scholarly, or artistic expression. Any person who believes he or she has been discriminated against should contact the Office of Human Relations to obtain assistance and information concerning the filing of a complaint.

At the same time the university prohibits discriminatory practices, it promotes equal opportunity through affirmative action. Non-discriminatory affirmative action equal opportunity policies apply to recruitment, hiring, job classification and placement, work conditions, promotional opportunities, demotions/transfers, terminations, training, compensation, choice of contractors and suppliers of goods and services, educational opportunities, disciplinary action, recreational and social activities, use of facilities, housing and university-sponsored programs.

Plagiarism: Plagiarism has various forms but is essentially the unattributed use of someone else's ideas (in writing or otherwise): <https://ualr.edu/writingcenter/plagiarism/>

Passing off someone else's work as one's own is a serious academic offense. In addition, it is the fastest way to lose my respect. I want to see each individual student's own ideas. As such, avoid plagiarism at all costs or face the consequences (starting with an automatic zero on that

assignment and ending with the filing of an official report). If you have questions about what does or does not constitute plagiarism, the University Writing Center is a great place to start: <https://ualr.edu/writingcenter/>

Students with Disabilities: If you have a documented disability (or need to document a disability) and need an accommodation, please contact me privately as soon as possible so that we can discuss with the Disability Resource Center (DRC) how to meet your specific needs and the requirements of the course. The DRC offers resources and coordinates reasonable accommodations for students with disabilities. Reasonable accommodations are established through an interactive process among you, your instructor(s) and the DRC. Thus, if you have a disability, please contact me and/or the DRC, at 501-5693143 (V/TTY) or 501-683-7629 (VP). For more information, please visit the DRC website at ualr.edu/disability. (UA Little Rock Policy 404.9)