

New course in Fall 15!

Geography 495

GIS for Environmental & Socioeconomic Applications

Meeting Time & Locations: 9:40 am – 10:55 am, Tuesday & Thursday – BGB 405

Credits: 03

Instructor: Dr. Liem Tran, Ph.D.; Associate Professor, Department of Geography; Adjunct Associate Professor; Department of Civil & Environmental Engineering.

Office: 306 Burchfiel Geography Building; Office Hours: 8:00 – 9:00 am, Tuesday & Thursday

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Course Description: This is an upper-level GIS course for senior undergraduate and graduate students in geography, earth sciences, economics, resource management, and other environmentally-related disciplines who are interested in GIS applications in environmental and/or socioeconomic studies.

The **course objectives** are two-fold: (1) to obtain a thorough understanding of the subject – GIS Applications – from a theoretical viewpoint (i.e., conceptual frameworks for spatial analysis, spatial relationships, analytical methodologies, geospatial analysis, spatial data models and methods, geometric and related operations, queries, distance operations, directional operations), and (2) to acquire practical GIS analytical skills for GIS applications.

Students who successfully complete this course will be able to:

- Understand how GIS can be used to address real-world (spatial) applications.
- Use various resources to address GIS software/tool questions.
- Identify and acquire available GIS datasets relevant to GIS applications.
- Display and customize GIS data and carry out spatial analysis.
- Design and conduct a work flow using various GIS tools to address specific questions in a common GIS environmental and/or socioeconomic application.
- Present results of GIS analysis in a professional format such as maps, tables, and interactive website.
- Utilize other resources to enhance a GIS application, e.g., ArcGIS Explore Online and Google Earth.

Course Design:

The course has three main components: lectures, labs, and projects. Graduate students will have an extra assignment of literature review.

Lectures: the lecture component is to provide students with both intellectual and practical knowledge on the subject. For this reason, topics to be covered range from theoretical ones as mentioned above to those on the technical side, such as GIS tools and techniques for GIS applications (see the tentative schedule for more detail on the covered topics)

Labs: the lab component is to provide students with hands-on experience on GIS analytical skills for real-world applications. A series of six lab exercises and assignments is designed to assist students experience various key spatial models and GIS.

Projects: the project component is to let students put their GIS analytical skills into practice (in real-world applications) and to create a collaborative learning environment among class participants. Although the project is individually-based, students will receive comments/technical assistance from their classmates while carrying out their projects. The project topics are flexible and chosen by the students with the instructor's consent. Projects which are related to students' potential thesis or dissertation, current job, GTA duties, or their research interests are strongly encouraged. Students will present their projects to the whole class and submit a written report to the instructor at the end of the semester.

Literature Review: graduate students are required to do a literature review on a topic related to GIS applications. The topics are chosen by the students with the instructor's consent.

Textbook & Reading Materials: There is no required textbook (to buy). The book used for this class is available online.

Michael John De Smith, Michael F Goodchild, and Paul Longley (2014). Geospatial analysis: a comprehensive guide to principles, techniques and software tools (fourth edition); Leicester: Matador. (online book available at <http://www.spatialanalysisonline.com/>)

Extra readings will be made available on the class' Blackboard website or hard copies. The reading load is two to three articles per week on the average. The reading list, which will be made available at the first class, might be changed during the course depending upon class progress and students' interests. Students are expected to read the assigned materials before classes so they can understand the lectures and actively participate in class discussion.

Prerequisite: Students are expected to have basic knowledge of GIS through completing at least an introductory level GIS course (e.g., GEOG 411).

Software: This course will utilize the ArcGIS™ suite of software and MatLab. Other common software/packages/toolkits for GIS modeling will be introduced as well during the course. Both ArcGIS and MatLab are available on the computers in BGB 206. Students are encouraged to install MatLab (free for UT students) on their own machine.

Computer/programming skills: working knowledge of ArcGIS version 10 is required. However knowledge of ModelBuilder, Python scripting, computer language (e.g., Java, VBScript), and/or computer programming skills are not required. On the other hand, GIS is a field that requires concentrated effort. Students will be expected to put in the time necessary (e.g., at least 6 to 8 hours per week) to master the topics and tasks covered in the class and to complete all labs in a timely manner.

Tasks & Grading:

Tasks	Undergraduate Students	Graduate Students
Lab Assignments (06 labs)	120 points	120 points
Project Implementation ¹	60 points	60 points
Project Presentation & Report	30 points	30 points
Class Participation & Project Buddy ²	20 points	20 points
Mid-Term Exam ³	30 points	30 points
Literature Review	Not available	40 points
Total	260 points	300 points

1. Project implementation: students need to report and discuss with the instructor on the progress of their project during the project implementation period (after the Fall break).

2. Class Participation includes class attendance and participation in class discussion (10 points). Project Buddy: Each student will do the QA&QC for a project of another student (10 points).

3. Mid-Term Exam: the mid-term exam (in short-answer format) covers the topics learnt in the first half of the semester. There is no final exam.

Grade Scale

Undergraduate Students:

A	240 points or higher
A-	between 235 and 239 points
B+	between 228 and 234 points
B	between 217 and 227 points
B-	between 210 and 216 points
C+	between 203 and 209 points
C	between 192 and 202 points
C-	between 185 and 191 points
D+	between 178 and 184 points
D	between 167 and 177 points
D-	between 160 and 166 points
F	159 points or below

Graduate Students:

A	276 points or higher
B+	between 261 and 275 points
B	between 246 and 260 points
C+	between 231 and 245 points
C	between 216 and 230 points
D	between 186 and 215 points
F	185 points or below

The instructors reserve the right to move this scale downward, but not upward to better reflect their assessment of the class's work as a whole.

ADDITIONAL INFORMATION

(1) **No extra-credit:** the Geography Department does not allow students to do extra work or resubmit work to improve their course grade either during or after completion of the course unless that option is made available to all students in the class.

(2) **Disability Statement:** If you require course adaptations or accommodations because of a documented disability, or if you have emergency information to share, please contact the Office of Disability Services at 2227 Dunford Hall or phone 974-6087. This will ensure that you are properly registered for services. It is the student's responsibility to alert the instructor and teaching assistants of documented special needs.

(3) **Academic integrity:** Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. All students should act with personal integrity, respect dignity, rights and property of others, and help create and maintain an environment in which all can succeed through the fruits of their efforts. This course adopts the UT Academic Standards of Conduct whose details can be found in the Hilltopics-Student Handbook 2012-2013 or at the following website:
<http://web.utk.edu/~homepage/hilltopics/>

(4) **Online@UT (Blackboard):** Students need to be familiar with **Online@UT** as course materials such as syllabi, schedules, announcements, lecture notes, multimedia resources, and grades will be made available on the BLACKBOARD system.

(5) **Tardiness:** Tardiness is not an exemplary trait, so please try to show up on time. If you have a strange schedule that might cause repeated tardiness, let your instructor know so we can work things out.

Tentative Schedule

TBA