Advanced Spatial Analysis and Modeling (PSMA 6520)

GRADUATE CERTIFICATE IN GEOSPATIAL INFORMATION SYSTEM

DEPARTMENT OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES

TENNESSEE STATE UNIVERSITY

Course Syllabus

Course Number: AGSC 6520

Course Name: Advanced Spatial Analysis and Modeling (3cr hrs.)

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Course Description:

Spatial analysis and modeling is where all the hard work of digitizing, database design and development, geometric error correction, coordinate system and projections eventually pays off. It is the problem solving aspect of GIS, which encompasses the process by which GIS analysts reveal things about the data that one cannot see by simple graphic (map) display. Therefore, in this course the students will use existing data to discover or say new things, while not creating a new data. After completing, this course the students are expected to know the appropriate GIS tools to solve spatial problems and process of setting-up designs (i.e., orders of map combination) to solve the problem and support spatial decision making. Additionally, students will be able to: apply the terminology and concepts of spatial analysis and modeling; interpret the representation of spatial data through spatial analysis; and implement the planning used in the spatial analysis decision- making processes.

Prerequisites and Co-requisites:

Prerequisites: PSMA 6510 Geospatial Information Systems.
Corequisites: None.

Required Textbook(s), including ISBN:

Mitchell A., (1999). The ESRI Guide to GIS Analysis Volume 1: Geographic Patterns and Relationships, ESRI Press. ISBN: 9781879102064.

Allen, D. W., and Coffey, J. M. (2010). GIS Tutorial: Spatial Analysis Workbook 2, ESRI Press. ISBN: 9781589482586.

These books may be purchased from the Tennessee State University Bookstore or from any online bookseller.

Course Outline by Week:

Topics	Date	Reading Assignment Mitchell, 1999	Lab Assignments (Allen and Coffey., 2011) (Please complete before beginning of next week's class and hand in assignments (each map, such as 3-1, 3-2, 3-3, 4-1, 4-2… etc.), as emailed PDFs.
Mapping quantities, classes and densities	Week of Monday, January 20th	Chapter 1: Introducing GIS analysis	Buy the book (if you have not already done so)
	Week of Monday, January 27rd	Chapter 2: Mapping where things are	Tutorial. 1.1 – 1.3. Mapping where things are (Assignment is Due January 27th)
	Week of Monday, February 3th	Chapter 3: Mapping the Most and the Least	Tutorial 2.1 – 2.2 Mapping Quantities and Classes (Assign. is Due February 3th)
	Week of Monday, February 10th		Tutorial 2.3 – 2.4. Creating a map series and working charts (Assign. Due February 10th)
	Week of Monday, February 17th	Chapter 4: Mapping Density	Tutorial 3.1. – 3.3. Creating density map and surfaces (Assign Due February 24st)
zonal and neighborhood analysis and extraction	Week of Monday, February 24st	Chapter 5: Finding What is inside	Tutorial 4.1. – 4.2. Spatial Overlays (Assign. Due March 03)
	Week of Monday, March 3th	Chapter 6: Finding What is Nearby	Tutorial 5.1. – 5.2. Selecting features and creating buffer (Assign. Due March 24th)
	Week of Monday, March 10th	Spring Break	None
	Week of Monday, March 17th	Midterm Exam	None
	Week of Monday, March 24st	Chapter 6: Finding What is Nearby	Tutorial 5.3. – 5.4. Clipping features and buffer values (Assign. Due March 31th)
	Week of Monday, April 31st		Tutorial 5.5. – 5.6. Multiple buffer and quantifying nearness (Assign. Due March 07th)
	Week of Monday, April 7th		Tutorial 5.6. – 5.9. Creating distance surface and calculating cost (Assign. Due March 14th)
Spatial change detection	Week of Monday, April 14th	Chapter 7: Mapping Change	Tutorial 6.1. – 6.3. Data Fluctuation over time (Assign. Due October 14th)
measurement of spatial distribution	Week of Monday, April 21nd	Measuring Geographic Distribution	Tutorial 7.1. – 7.2. Calculating centers of geographic data (Assign. Due March 28th)
	Week of Monday, April 28th		Tutorial 7.3. – 7.5. Calculating mean and standard distance (Assign. Due April 31th)

Assignments and Participation:

The course is divided into weekly exercises and a final project. You must complete the exercises in the proper order so that you can build your understanding of advanced spatial database design and management. New exercises will be available on Monday evening (after 6:00 P.M. C.S.T) of each week. At the end of these exercises, there may be items that are due with attached dates and times. To receive credit for these items that are due, you must submit assigned work on or before the due date and time (see *Punctuality* below for more information). Assignment submissions for this course are large files and are most often too large for eLearn email to handle. Therefore, a drop box will not be available for this course. Instructions for preparing and submitting assignments will be included before any of these items are due.

Assessment and Grading

Testing:

There will be Midterm or Final exams administered within this course.

Grading Procedure:

Students will study advanced spatial database design and management through tutorial exercise activities and a final project. Tutorial exercise activities will contribute 45% to the final course grade, while a final project will contribute 55% to the final course grade. Students will have opportunities for discussion of content with faculty and other students via email and discussion forums.

Assigned chapter discussions and exercises- 45% of final grade (360 points)
Midterm exam – 27.5% of final grade (220 points)
Final exam project - 27.5% of final grade (220 points)

Grading Scale:

A =100 - 90
B = 89 - 80
C = 79 - 70
D = 69 - 60
F = 59 and below