

**GEOG 6328**  
**SPATIAL ANALYSIS AND MODELING**  
Department of Geography  
University of Central Arkansas  
**Spring 2008**

**Instructor**

**Rajrani Kalra, PhD**

Office: 302 B Irby Hall

Office Phone: 501 852 2640

**Email:** rkalra@uca.edu

**Office hours**

Mondays and Wednesday: 12.00- 1.00 and 2.30-3.30

Tuesdays and Thursday: 11.30-1.30

You can always contact me by email and telephone.

**Course Conduct**

ONLINE on WEBCT

**Class Description**

This course journey will lead you to develop an understanding of a basic set of statistical and data analysis techniques and the ways in which these techniques can be applied to various geographic and spatial problems. We will focus on the impact of spatial data, spatial truth and spatial thinking on descriptive methods, statistical inferences and basic spatial modeling. The applied aspect of the course will enable us to use spatial data to develop answers to geographical enquiries, and will provide practical experiences in the use of computer based statistical packages apart from GIS. The tenor of the course emphasizes applications over statistical theory and the logic of the techniques are presented, and you will be given a chance to solve problems using spatial data and how you could implement in your present or future research endeavors.

**Course Goals and Objectives:** Students should have the following knowledge and skills upon completion of the course.

1. What is Spatial Analysis and Spatial Thinking?
2. Familiarity with Spatial and Geo-Spatial techniques
3. Ability to conduct data queries, and analysis in the GIS framework
4. Ability to produce graphic output (maps, tables and charts) of GIS data analysis
5. Ability to use GEO DA
6. Ability to use the spatial techniques and apply in the any research project

## **Course Requirements and Expectations**

### **Required Text Books:**

1) *Quantitative Geography* by Fotheringham, A. Brunsdon, C. et al. Sage Publications. ISBN: 076195948-3

2) *Exploring the Urban Community: A GIS Approach* by Greene, R and Pick, James. Prentice Hall. ISBN: 0-13-107576-5 (for Exercises)

### **Required Software**

You will be required to purchase ESRI's Arc View 9.2 software, one year software license with extensions Arc GIS Spatial analyst or 3-D Analyst. This software is timed for one year only. It costs around \$100. Each of you should contact ESRI's regional office in St.Charles, Missouri (1-636-949-6620). They would also require the proof of enrollment and would provide the information needed to buy the software. As you receive the software please install it and make sure it is in working order prior to beginning the course. Those who have the software from the previous class i.e. 5310 from fall 2007 should be fine.

### **Web CT and Email**

This course is completely based on ONLINE lectures and Exercise assignment on WebCT. If you need help navigating the WebCT, go to <http://webct.uca.edu:8900/webct/public/home.pl> or let me know. I will be using the **UCA email ONLY** i.e. [rkalra@uca.edu](mailto:rkalra@uca.edu) . It is **your responsibility** to regularly check your email and browse WEBCT pages in order to get most updated information about this class. I will be posting a copy of syllabus, exercises, and any other assignments, announcements on WebCT and WebCT calendar. Please send me the **email** which you would be regularly checking.

### **Exercises, Discussion and Project**

1. **TEN** exercises will be given during the semester and **due dates** will be mentioned on the exercise. The exercises will mostly due by the next week. PLEASE CHECK THE WEBCT CALENDAR also for the DUE DATES for the exercises.
2. You will think of a project of your choice and send me a one page proposal of what you plan to do and how you plan to do by week 9 i.e. by March 3, 2008. Not getting the instructor's approval will lead to a deduction of 25 points.
3. This project will be due at the end of the semester. In the project you will be applying at least 3 techniques learnt during the semester (if you wish to discuss more techniques you are most welcome but discuss in advance with me). Your project will be submitted in a power point presentation format and uploaded on Web CT. Please email me a copy if you can't upload and I will upload it for you (guidelines for power point presentation will be uploaded soon). The project presentation should include the

- research question, data sources, literature review, methodology, results, conclusion and references.
4. You will then REVIEW and CRITIQUE any TWO presentations of your choice of your fellow class mates and email me the comments (guidelines will be posted)
  5. There will be one EXAM posted on WebCT and emailed on 10<sup>th</sup> March 2008.

### Course Readings

You are expected to complete the required readings every week i.e. by Monday morning by 11.00 am. You will email me **TWO QUESTIONS** from the given readings or additional readings, and I will collate and post on the Web CT discussion board the compiled questions. Each one of you in the class will answer/comment on at least two questions of their choice. Points will be given for the quality and answer to the questions and discussion posted on the board.

### Exercise Schedule

You will do the exercises which will be from Greene et al. *Exploring the Urban Community: A GIS approach* and I will also be posting others a week before. The exercise discussion board will be where you will ask questions if you have during solving of exercises. You all are expected to read it and help fellow class mates if you had similar problem/s. If you have any other questions please email me.

### Course Evaluation

Course Evaluation	Breakup of Points	Total Points Assigned
Class participation and discussion/Questions	14 weeks*20	280
Project Proposal	25	25
Final Project Presentation (power point)	100	100
Exercises	10 Exercises *30	300
Review of 2 peer project evaluation	2*25	50
Exam	100	100
<b>Total</b>		<b>855</b>

## Grade Scale

90-100	A
80-89	B
70-79	C
60-69	D
<60	F

## Important Information

1. Please follow the guidelines given for the HOW TO SUBMIT the EXERCISES(will be given with exercise)
2. Lectures will be posted on various topics every week.
3. Every week exercise detail will be posted on the webct (so check frequently and will notify via email too).
4. ALL EXERCISES, EXAMS, PROJECT will be emailed to me at ONLY [rkalra@uca.edu](mailto:rkalra@uca.edu).
5. Please keep yourself updated with submission dates and exercises due dates on Web CT calendar.
6. This class is an ONLINE CLASS, basically on WEBCT, but please don't hesitate in contacting me via telephone or in person as I always look forward to meeting you in person as well apart from telecommuting regarding questions, comments related to the course.
7. I Can be reached by phone on 501-852-2640 or email i.e. [rkalra@uca.edu](mailto:rkalra@uca.edu).

### Tentative Course Schedule (Subject to Change)

WEEK	TOPICS	READINGS (The Chapters are from Fotheringham et al)	EXERCISES	Due Dates for Exercises
WEEK:1 Jan -10-11	Introduction/Spatial Thinking?		Have Fun!	
WEEK: 2 Jan 14-18	Why is Spatial Special and What is Spatial Thinking?	Chapter 1/Web CT article	Exercise-1(14th Jan)	22nd January
WEEK: 3 Jan 22-25	Fundamentals of Spatial Analysis	Chapter 2	Exercise-2(22nd Jan)	28th January
WEEK: 4 Jan 28- 1 Feb	Challenges in Spatial data Analysis	Chapter 10	Exercise-3(29th Jan)	6th Feb
WEEK: 5 Feb 4- 8	Exploring Spatial Data Visually	Chapter 4 and GEODA	Exercise-4( 7th Feb)	14th Feb
WEEK: 6 Feb 11 -15	Location Quotient	WebCT articles	Exercise-5(18th feb)	25th Feb
WEEK: 7 Feb 18-22	Dissimilarity Index	WebCT articles	Exercise-6(25th feb)	3rd March
WEEK: 8 Feb 25-29	Point Pattern Descriptors: Mean center, weighted mean center, Standard deviational ellipse, Standard distance	Chapter 6 and WebCT articles	Exercise-7(3rd March)	10th March
<b>March 3, 2008</b>	<b>PROPOSAL DUE</b>	<b>PROPOSAL DUE</b>	<b>PROPOSAL DUE</b>	<b>PROPOSAL DUE</b>
WEEK: 9 Mar 3-7	Specialization Index, Shift Share	Lecture and WebCT	Exercise-8(10th March)	17th March
WEEK: 10 Mar 10-14	<b>EXAM</b>	<b>EXAM</b>		<b>EXAM</b>
WEEK: 11 Mar 17-21	Spatial Autocorrelation: Global Moran's I and LISA	Chapter 5 and Articles on WebCT, GEODA	Exercise-9(17th March)	31st March
WEEK: 12 Mar 24-28	<b>SPRING BREAK</b>	<b>SPRING BREAK</b>	<b>SPRING BREAK</b>	<b>SPRING BREAK</b>
WEEK: 13 Mar 31- Apr 4	Point Pattern Analyzers: Quadrat Analysis	Lectures and WebCT		
WEEK: 14 Apr 7- 11	Nearest Neighbor	WebCT articles	Exercise-10(31st March)	9th April
WEEK: 15 Apr 14-18	Spatial Modeling, Spatial Interaction, Spatial Regression and GWR	Lectures and WebCT, Ch-9		
WEEK: 16 Apr 21-25	<b>Student PROJECT Presentations upload</b>	<b>April 21<sup>ST</sup> Monday Upload</b>		
<b>28TH APRIL 2008, MONDAY</b>	<b>TWO PEER REVIEW CRITIQUES DUE</b>			

**Note:** I reserve the right to change the syllabus, exercises and points assigned to it.

### Policies

#### **Late Policy /Make Up and Excused Absences**

You are responsible for reading all lectures and working through all exercises during this semester. No due dates will be changed unless there is an extreme emergency and a written excuse will be required by a doctor or professional in case of emergency situations. Turning in assignments promptly is important both

for keeping current with the subject matter of the class and to keep all students on level playing fields. All assignments must be submitted on the assigned due date in order to receive credit. Exercises which are turned late one day will have one point deducted, two days late two points and so on and ten points deducted after 5 days unless a doctor's note is obtained.

**Americans with Disabilities statement:**

The University of Central Arkansas adheres to the requirements of the Americans with Disabilities Act. If you need accommodation under this act due to a disability, contact the Office of Disability Support Services at 450-3135." For information or advice on the services available, go to <http://www.uca.edu/divisions/student/disability/index.htm>.

**Attendance Policy:** If you consecutively missed a class assignment or exams without notifying me for an excused reason, without dropping the class, I will according to the undergraduate bulletin submit a 'withdrawal' to the student service office. The undergraduate bulletin writes: "If a student discontinues attendance without officially withdrawing, an instructor may drop the student for non attendance and report a withdrawal grade of WF".

**Academic Dishonesty:** Cheating and Plagiarism will not be tolerated. Please be familiarized with all the rules and the full text of the UCA Student Handbook can be found at: <http://www.uca.edu/divisions/student/handbook/> regarding academic policies, and sexual harassment policy.

\*\*\*\*\*