Geospatial System III

Course Description
This is an advanced GIS course focusing on advanced spatial analysis and modeling in GIS. Topics covered include exploratory analysis of spatial data, network analysis, exploring spatial point patterns, area objects and spatial autocorrelation, and spatial interpolation. Also covers new approaches to spatial analysis. The course includes lecture and lab sessions. The lecture session focuses on the principles and concepts of geospatial analysis. The lab session focuses on the practical experience in the use of geospatial analysis.

Course Objectives
1). Understand the principles and concepts of geospatial analysis
2). Understand and apply various point pattern analysis
3). Examine linear features through path analysis and network analysis
4). Examine area objects through spatial autocorrelation measures
5). Describe and analyze fields using spatial interpolation techniques

Prerequisites
GISC 3301 and COSC 2438

Required or Recommended Readings
Textbooks

Recommended or Supplemental Reading:

Class BlackBoard Website
https://iol.tamucc.edu/ (check “BlackBoard 8”)
Major Course Requirements

Grade
The final grade for this course will be made up from the graded marks as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Labs</td>
<td>25%</td>
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<tr>
<td>Midterm</td>
<td>20%</td>
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<tr>
<td>Final Exam</td>
<td>20%</td>
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<tr>
<td>Project</td>
<td>20%</td>
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<tr>
<td>Article Review</td>
<td>5%</td>
</tr>
<tr>
<td>Participant &amp; In-Class Exercises</td>
<td>8%</td>
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<tr>
<td>Course portfolio</td>
<td>2%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

The following grading scale applies:

A   >90
B   80 and <90
C   70 and <80
D   60 and <70
F   <60

Labs
There are tentatively five (5) labs. The labs are designed in such a way that students will gain first-hand experience in understanding spatial analysis methods and applying spatial analysis methods to GIS applications.

Exams
There will be TWO exams, midterm and final exam. These exams are non-cumulative. Each one takes 20% of the total grade.

Projects
Each student is required to develop a project by the end of the semester. The project is expected to carry out an analysis on a data set of your choice. Each student must: 1) submit a one-page project proposal by the 10th week; 2) deliver a presentation to report the methods and major findings during a scheduled project presentation time; 3) complete a term paper to report the methodology and your findings.

The project proposal must include the objective of the project, GIS data and methods that will be used for the project.

Each student will have 15 minutes for presentation and 5 minutes for questions.

The term paper should follow the format of formal journal articles including, at least, Introduction/Problem, Methods, Results, Discussion, Conclusions, and References.
Article Review
Each student is expected to read five (5) spatial analysis articles and develop a review for each article. A digital copy of each article for review will be accessible on BlackBoard. Each article review should be typed in two pages (double spaced). Each review will be given a maximum of 10 points.
The review should include at least the following five components:
1) Introduce the topic of the article by summarizing the issue or problem discussed in the article
2) Summarize the main research presented in the article, including, for example, data/methods, results, conclusions
3) General evaluation/critique – your opinions of how well (or poorly) the authors did this study, such as what are the contributions of this study? What are the overall strengths? What might be missing? What are some next steps for this study?
4) The full bibliographic reference of the article.

Format of the Full Bibliographic Reference
Articles in Journals

Conference proceedings

Course Portfolio
Purpose - Being prepared to produce professional presentation of work conducted in order to meet the needs of industry
Requirement - Each student is required to prepare a professional course portfolio in a bound binder. The portfolio will be checked by the instructor by the end of the semester.

Format:

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Course summary (e.g. course summary, syllabus, etc)</td>
</tr>
<tr>
<td>2</td>
<td>Labs</td>
</tr>
<tr>
<td>3</td>
<td>Exams</td>
</tr>
<tr>
<td>4</td>
<td>Project report and PowerPoint slides</td>
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</tbody>
</table>
Course Policies

Due date and late policy
Each of the labs will have a due date clearly written under the title of the lab. All labs/article reviews must be completed on time. Any lab/article review that is turned in after the due date is considered late. Submission of a late lab/article review is accepted, but with a penalty of 10% of the grade per day (including weekends). Late lab/article review will only be accepted up to one week after they are due. Exceptions are possible only with prior permission and for exceptional cause (with written documentation). Please work well ahead of the deadlines!

Academic Advising
The College of Science and Technology requires that graduate students meet with their Graduate Advisor for assistance with initial course selection as soon as the students are accepted to a graduate program. By the end of the first year of graduate studies graduate students should meet with their Graduate Committees to set up a degree plan. Graduate students are also encouraged to contact the appropriate College Academic Advisor regarding any questions or problems with their program of study. The College of Science and Technology Academic Advising Center is located in Faculty Center 178, and can be reached at 825-6094.

Academic Integrity/Plagiarism
University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or exam will result in zero (0) points for the assignment or exam.

Dropping a Class
I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with me before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. November 5, Friday, 2010 is the last day to drop a class with an automatic grade of “W” this term.

Grade Appeals
As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to
first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule 13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules Web site at http://www.tamucc.edu/provost/university_rules/index.html. For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

**Disabilities Accommodations**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Driftwood 101.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.
# Course Outline (subject to modifications)

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topics</th>
<th>Text</th>
<th>Due</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>August 25</td>
<td>Introduction</td>
<td>Chapter 1</td>
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<tr>
<td>2</td>
<td>August 30</td>
<td>Pitfalls and potential of spatial data</td>
<td>Chapter 2</td>
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<td></td>
<td>September 1</td>
<td>Pitfalls and potential of spatial data</td>
<td>Chapter 2</td>
<td></td>
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<td>3</td>
<td>September 6</td>
<td>Fundamentals: maps as outcomes of processes</td>
<td>Chapter 4</td>
<td>Article review 1</td>
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<td></td>
<td>September 8</td>
<td><strong>Lab 1</strong>: Familiar with geostatistic analysis</td>
<td>Chapter 5</td>
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<td>4</td>
<td>September 13</td>
<td>Point pattern analysis</td>
<td>Chapter 5</td>
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<td></td>
<td>September 15</td>
<td>Point pattern analysis</td>
<td>Chapter 5</td>
<td></td>
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<td>5</td>
<td>September 20</td>
<td><strong>Lab 2</strong>: Point pattern analysis</td>
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<td></td>
<td>September 22</td>
<td>ESRI Web Course- Distance Analysis Using ArcGIS 10</td>
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<td>6</td>
<td>September 27</td>
<td>Point pattern analysis</td>
<td>Chapter 6</td>
<td>Article review 2</td>
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<td></td>
<td>September 29</td>
<td>Practical point pattern analysis</td>
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<td>7</td>
<td>October 4</td>
<td>Path analysis</td>
<td>Handout</td>
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<td></td>
<td>October 6</td>
<td>Network analysis</td>
<td>Handout</td>
<td></td>
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<td>8</td>
<td>October 11</td>
<td><strong>Lab 3</strong>: Path and network analysis</td>
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<td>Article review 3</td>
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<td></td>
<td>October 13</td>
<td>Summary and Review</td>
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<td>9</td>
<td>October 18</td>
<td><strong>Mid-term Exam</strong></td>
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<td>October 20</td>
<td>Project</td>
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<tr>
<td>10</td>
<td>October 25</td>
<td>Area objects and spatial autocorrelation</td>
<td>Chapter 7</td>
<td>Article review 4</td>
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<tr>
<td></td>
<td>October 27</td>
<td>Area objects and spatial autocorrelation</td>
<td>Chapter 7</td>
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<td><strong>(Project Proposal Due)</strong></td>
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<td>11</td>
<td>November 1</td>
<td>Area objects and spatial autocorrelation, Local statistics</td>
<td>Chapter 7,8</td>
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<td></td>
<td>November 3</td>
<td><strong>Lab 4</strong>: Measuring spatial autocorrelation</td>
<td></td>
<td>Project proposal</td>
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<td>12</td>
<td>November 8</td>
<td>Spatial interoperation</td>
<td>Chapter 9</td>
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<td>November 10</td>
<td>Spatial interoperation</td>
<td>Chapter 10</td>
<td></td>
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<tr>
<td>13</td>
<td>November 15</td>
<td>Spatial interoperation</td>
<td>Chapter 10</td>
<td>Article review 5</td>
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<td></td>
<td>November 17</td>
<td>Spatial interoperation</td>
<td>Chapter 10</td>
<td></td>
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<td>14</td>
<td>November 22</td>
<td><strong>Lab 5</strong>: Spatial interoperation</td>
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<td></td>
<td>November 24</td>
<td>Thanksgiving holiday (no class)</td>
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<tr>
<td>15</td>
<td>November 29</td>
<td>Agent-based modeling</td>
<td>Chapter 12</td>
<td>Handout</td>
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<td></td>
<td>December 1</td>
<td>Summary and Review</td>
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<td>16</td>
<td>December 6</td>
<td>Project presentation</td>
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<tr>
<td>Date</td>
<td>Event</td>
<td>Description</td>
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<tr>
<td>December 8</td>
<td>Final Exam (8:00-10:30am)</td>
<td>Project report due</td>
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</table>
GENERAL GUIDELINES FOR COURSES AND LABS
IN THE GISC PROGRAM
CULTURE, REGULATIONS, MODES OF OPERATION AND PROCEDURES

These guidelines are designed to inform scholars of their responsibilities and of the course requirements in order to make this course a positive experience. The instructor is always available for consultation and discussion with students on any aspect of a course and of these general guidelines.

CLASS CULTURE

1. Consider yourself as a scholar rather than a student. The term “student” may imply some passivity, whereas the term “scholar” implies active participation, understanding and searching. We will use these terms interchangeably with the meaning of “scholar” implied. Osmosis does not work in a learning environment! A good scholar takes NOTES at every class meeting.

2. Further, define yourself as a “thinking explorer”. You are responsible for your education; an instructor can only be a guide and a facilitator. An instructor cannot learn for you. If you come across something that really interests you, explore it further.

3. Your experience at this University should not consist of passing a series of courses to earn a degree. Your experience should rather be a series of activities that will give you an education.

4. Concentrate on “learning to learn”. You will have to be a life-long learner to survive in your chosen career.

5. There is no such thing as a stupid question; there is such a thing as a stupid answer. So ask questions, the instructor is taking all the risks! Ask questions of your instructor and of your fellow scholars. Many times questions are more important than answers.

6. Keep copious notes of all that is going on in all the meetings related to your course. Make a note of what the instructor is stressing. At the end of each lecture you should be able to answer two questions: What did I learn from this lecture? and What was not clear to me? At the beginning of each lecture, if the instructor does not ask for questions, you need to ask if there is something you did not understand from the last lecture. Review, consolidate, annotate and organize your lecture/lab notes on a regular basis, at least once a week. The Internet is a tremendous resource and also a great danger. When you find information on the Internet, you have no idea if it is correct. View such information with caution. But, use the Internet to explore topics that interest you. Do not only prepare for the exam in a course – learn as much as you can on the topics introduced to you by the course material. You are responsible for the extent of your education! READ MINDFULLY !!!!!

7. In addition to details of the syllabus given in class, the syllabus for the course
includes all the chapters of the required textbook/s unless indicated otherwise by
the instructor. The student is responsible for all materials/topics covered in class,
handouts, in assignments, in labs, and in outings or field trips. The instructor is
NOT responsible for informing absent students exactly what was covered in
previous classes, meetings, etc.

PROCEDURES & REGULATIONS

8. The final letter grade for the class will be based on the raw composite numerical
score obtained from the weighted average of the tests, quizzes, exams, labs, etc. as
indicated by the instructor. The raw composite numerical score may be adjusted
(curved) based on the highest score, the statistical profile of the scores and other
academic standards or other considerations. Generally the letter grade of A is 90%
and over of the adjusted score, a B is between 80% and 89% (inclusive) of the
adjusted score, a C is between 70% and 79% (inclusive) of the adjusted score, a D
is below 70% of the adjusted score and an F is below 60% of the adjusted score.
An incomplete (I) will only be given in very unusual circumstances. The
University regulations on incomplete grades state: “An incomplete notation may
be given to a student who is passing but has not completed a term paper,
examination, or other required work for reasons beyond the student’s control
other than the lack of time”. Students are expected to take ALL tests, quizzes,
exams, etc., and to complete and hand in all labs and other assignments. There is
no provision for “extra credit”. No final grades will be given via the telephone, e-
mail, etc.

9. All University rules, regulations and expected student conduct apply to this
course. Students are held responsible for the information given in the current
Catalog and Student Handbook. Make yourself aware of the University security
regulations.

10. All labs, assignments, etc. must be handed in on the assigned due
date. Scholars
having problems must notify the instructor well before the due date. Marks
will be deducted for poor and sloppily presented work.

11. Labs, etc. handed in after the due date may be subject to a penalty of loss of
marks. Labs, etc. handed in after the graded labs, etc. have been returned to
students will get zero marks but must be handed in to the instructor. Labs will be
returned to students, after they have been graded, at a class meeting. Students who
miss this meeting will be able to collect graded work in the marked box outside
the instructor’s office.

12. Scholars are asked to take special note of the penalties, which the University
attaches to Academic Dishonesty. Consult the Student Handbook.

13. All work handed in to the instructor must be the student's own work. Extracts,
excerpts, etc. from the work of others must be suitably noted, acknowledged and
properly referenced. Any Group Work will be judged in the same way. That is, it
is the work of the group and the extracts, excerpts, etc. of others must be
acknowledged.

14. All written and graphical work handed in must be presented neatly printed and
bound (staples are adequate). Students’ written work will be judged on written communication skills, critical thinking and problem solving ability.

15. Students are expected to be present at all meetings (lectures, labs, etc.) of the class. Students are expected to be present at the date and time assigned for all tests, exams, quizzes, etc. There are NO provisions for making up missed exams except in cases where prior arrangements have been made and agreed to by the instructor. During the assigned lab session, ONLY assigned labs are to be done. All other work must be done in other rooms.

16. All cellular phones and other similar devices MUST BE TURNED OFF during lectures, labs and other class meetings.

17. All students must keep their university e-mail addresses (firstname.lastname@islander.tamucc.edu). This will be the means of communication between the instructor and the class.

18. The instructor reserves the right to make changes to the above with due notice to the students. These changes will be announced in class and each student is responsible for keeping herself/himself informed of such changes.