Geospatial System II

Course Description
GIS II is an intermediate level course in the concepts and applications of GIS, with a focus on GIS analysis methods and their applications. This course has a lecture and a lab component. Topics covered include spatial data processing and analysis, terrain mapping and analysis, spatial database design and management, and geodatabase. The technical focus of the course includes computer lab tutorials and group projects using the leading desktop GIS software, ArcGIS 10 from ESRI.

Learning Objectives
1. Extract spatial information from data using vector and raster data analysis
2. Understand basic 3D analysis methods and apply these methods to solve real world problems.
3. Understand fundamental concepts and principles for spatial database design and management
4. Design, create and work with Geodatabase
5. Understand the practical applications of GIS.

Prerequisites
GISC1470 and MATH 2413

Required Readings
Textbooks

Recommended or Supplemental Reading:
- ESRI Support Center: http://support.esri.com/
Class BlackBoard Website
https://iol.tamucc.edu/

Major Course Requirements

Grade

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

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>10%</td>
</tr>
<tr>
<td>Exam 2</td>
<td>10%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>18%</td>
</tr>
<tr>
<td>Labs</td>
<td>30%</td>
</tr>
<tr>
<td>Group project</td>
<td>15%</td>
</tr>
<tr>
<td>Article Review</td>
<td>5%</td>
</tr>
<tr>
<td>GIS applications: individual presentation</td>
<td>5%</td>
</tr>
<tr>
<td>Participation/In-class Exercises</td>
<td>5%</td>
</tr>
<tr>
<td>Course Portfolio</td>
<td>2%</td>
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<tr>
<td>TOTAL</td>
<td>100%</td>
</tr>
</tbody>
</table>

The following grading scale applies:

A  $\geq$ 90
B  $\geq$ 80 and <90
C  $\geq$ 70 and <80
D  $\geq$ 60 and <70
F  <60

Labs

There will be tentatively 14 labs to help students familiarize with basic and advanced GIS operations and applications. Most of labs are from ESRI GIS Tutorial books, and some labs build upon each other, so it is important to be up to date on your labs.

Exams

There will be tentatively THREE exams in this course. These exams are non-cumulative. There will be no make-up exams. Exceptions are possible only with documentation of a medical or family emergency.

Group Projects

We will do group projects during the last six weeks of class. There are about 2-3 people in a group, and I will form the groups with your input. I will assign a topic to each group and it is up to each group to figure out the best way to work together. Each group will create a Word document report that includes a detailed description of your project and maps inserted. The length of the report is 5-10 pages, 12pt Times New Roman font, double-spaced, 1" margins, and 8.5" by 11" paper space. During the last week of class, each group will also present your project. In addition to the group submission, each group member will have to turn in a (private) evaluation of each group member. The grade for
the group project is based on your report (1/3), the presentation of your project (1/3), and
the evaluation of group members (1/3).

Article Review and Presentation
Each student is expected to read five (5) GIS application articles and develop a bi-weekly
review for each article. The 5 articles should cover ONE topic of student’s interest.
At the end of the semester, each student is expected to summarize these reviews and give
a five minute presentation to the class.

The articles can be published journal literature, WWW, and other media. Each article
review should be typed in less than one double-space page. The review should briefly
describe: 1) the purpose of the study, 2) the data and GIS analysis used for the study, 3)
general critique – your opinions of how well (or poorly) the authors did their research in
the article, and 4) the full bibliographic reference of the article. The bi-weekly review is
due on Mondays. Each review will be given a maximum of 5 points.

Reference format of the Article

Articles in Journals
Gao X, Asami Y, Katsumata W, 2006, "Evaluating land-use restrictions concerning the
floor area ratio of lots" Environment and Planning C: Government and Policy 24 515-
532

Conference proceedings
rate video transmission over ADSL", in Proceedings of SPIE, The International Society
for Optical Engineering: Visual Communication and Image Processing number 4671,
1230-1239

Journals that cover GIS

Cartography and Geographic Information Systems
Computers and Geosciences
Computers, Environment and Urban Systems
Journal of Geographical Systems
Geoinformatica
International Journal of Geographical Information Science
Transactions in GIS
Environment and Planning B
International Journal of Health Geographics

* Interlibraryloan provided by our library is a good resource to request articles from other
libraries.

Websites for journal article search
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 at 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>Article reviews, summary, and presentation slides</td>
</tr>
<tr>
<td>5</td>
<td>Team Project</td>
</tr>
</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 must be completed on time. Any lab that is turned in after the due date is considered late. Submission of a late lab is accepted, but with a penalty of 10% of the grade per day (including weekends). **Late lab 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 Center for Instruction, Room 350, 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. April, Friday, 2013 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.

Note: it is your responsibility to keep ALL graded material.
Course Outline *(subject to change)*

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture</th>
<th>Reading</th>
<th>Labs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/23</td>
<td>Course Introduction Review: Spatial data models</td>
<td>[Bolstad] Chapter 2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1/28</td>
<td>Raster data analysis</td>
<td>[Bolstad] Chapter 10</td>
<td>Lab 1: Raster data analysis</td>
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<tr>
<td></td>
<td>1/30</td>
<td>Raster data analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2/4</td>
<td>Geoprocessing in ArcGIS 10 <em>(Article review topic due)</em></td>
<td>Handouts</td>
<td>Lab 2: Geoprocessing</td>
</tr>
<tr>
<td></td>
<td>2/6</td>
<td>Descriptive summary and Inference</td>
<td>Handouts</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2/11</td>
<td>Automating processes –ModelBuilder <em>(First article review due)</em></td>
<td>[Allen] Chapter 7</td>
<td>Lab 3: ModelBuilder</td>
</tr>
<tr>
<td></td>
<td>2/13</td>
<td>US Census data – TIGER data and attributes</td>
<td>Handouts</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>2/18</td>
<td>Using US Census data</td>
<td>Handouts</td>
<td>Lab 4: Geocoding</td>
</tr>
<tr>
<td></td>
<td>2/20</td>
<td><strong>Exam 1– covers Week 1-6</strong></td>
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<tr>
<td>6</td>
<td>2/25</td>
<td>Representation of terrain <em>(Article review 2 due)</em></td>
<td>[Bolstad] Chapter 11</td>
<td>Lab 5: Using census data</td>
</tr>
<tr>
<td></td>
<td>2/27</td>
<td>Terrain mapping</td>
<td>Handouts</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>3/4</td>
<td>3D surface analysis (slope and aspects)</td>
<td>Handouts</td>
<td>Lab 6: Terrain mapping and analysis</td>
</tr>
<tr>
<td></td>
<td>3/6</td>
<td>3D surface analysis – Viewsheds</td>
<td>Handouts</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>3/5</td>
<td>3D surface analysis - Watersheds</td>
<td>Handouts</td>
<td>Lab 7: Viewsheds and watersheds</td>
</tr>
<tr>
<td></td>
<td>3/7</td>
<td>Surface Interpolation application</td>
<td>Handouts</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>3/11-15</td>
<td><strong>Spring break, No Class</strong></td>
<td></td>
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<tr>
<td>10</td>
<td>3/18</td>
<td>3D visualization</td>
<td>Handouts</td>
<td>Lab 8: 3D visualization</td>
</tr>
</tbody>
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Section 1: GIS data source and analysis

Section 2: Terrain mapping and analysis
3/20  Exam 2 – covers Week 7-11  

**Section 3: Spatial Database Management and Design**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Resource(s)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3/27  Relational Database design (<strong>Article review 4 due</strong>)</td>
<td>[Allen] Chapter 1</td>
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</tr>
<tr>
<td>12</td>
<td>4/1   Relational Database design</td>
<td>Handout</td>
<td>Lab 10: Creating a geodatabase [Allen, Tutorial 1-2]</td>
</tr>
<tr>
<td></td>
<td>4/3   Introduction to SQL, Spatial Database Management and Design</td>
<td>Handout</td>
<td></td>
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<tr>
<td></td>
<td>4/10  Creating and populating geodatabases (<strong>Last article review due</strong>)</td>
<td>[Allen] Chapter 3</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>4/15  Working with features</td>
<td>[Allen] Chapter 4</td>
<td>Lab 12: Populating a geodatabase [Allen, Tutorial 3-1, 3-2]</td>
</tr>
<tr>
<td></td>
<td>4/17  Working with topology <strong>Review Session</strong></td>
<td>[Allen] Chapter 5</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>4/22  Exam III – Covers Week 12-16</td>
<td></td>
<td>Lab 13: Working with features [Allen, Tutorial 4-1, 4-2, 4-3]</td>
</tr>
</tbody>
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**Section 4: GIS Applications**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Resource(s)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>4/29  GIS Applications: Students Presentation</td>
<td></td>
<td>Lab 14: Working with topology [Allen, Tutorial 5-1, 5-2, 5-3]</td>
</tr>
<tr>
<td>17</td>
<td>5/1   GIS Applications: Students Presentation</td>
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<tr>
<td></td>
<td>5/6   GIS Applications: Students Presentation</td>
<td></td>
<td><strong>Work on Project</strong></td>
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<td></td>
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<td></td>
<td>(Course Portfolio due)</td>
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<tr>
<td></td>
<td><strong>Monday,5/13, 8:00-10:30am</strong></td>
<td><strong>Group Project Presentation</strong></td>
<td>Group project report due</td>
</tr>
</tbody>
</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, in 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
comeplete 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.