RENR 405 Geographic Information Systems for Environmental Problem Solving
Course Syllabus for Summer 2014

Credit Hours
3 credit hours

Class Time and Location
Online only

Instructor
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Co-Instructor
Ms. Sasathorn ‘Sasa’ Tapaneyakul, Ph. D. Candidate
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2138 TAMU (mail stop)
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E-mail: GISTAMU@gmail.com
Office Hours: Monday - Friday 8 a.m. to 5 p.m. by appointment

Contact Methods
Questions and comments must be submitted to GISTAMU@gmail.com. Expect 12-24 hour response time. **DO NOT SEND YOUR INQUIRIES TO ECAMPUS OR NEO EMAILS.** Important messages sent to the whole class will be delivered to your Neo Email. Do not reply to the Neo Email and inquire via GISTAMU@gmail.com instead.

Frequently asked questions will be posted on eCampus Discussion Board. Students are encouraged to communicate with each other and ask questions via the Discussion Board. Be sure to check this regularly.

Prerequisites
Basic knowledge of using computers and installation of software/data.

Computer Requirements
It is recommended that the computer used for the course meet the following requirements:

- Windows Operating System with:
  - Minimum 2.2 GHz processor
  - Minimum 2 GB RAM
  - Minimum 8 GB of free Hard Drive space
  - DVD-ROM drive
- A reliable high-bandwidth web connection (LAN, cable modem, or DSL)
- A reliable e-mail address that supports attachments
The following software:
- Microsoft Office: Word, Excel, and PowerPoint
  Available for $10 through Software Evaluation and Licensing Library (SELL) (http://software.tamu.edu)
- Adobe Acrobat Reader (http://get.adobe.com/reader/)
- ArcGIS software is not compatible with Mac (and there is no mac-compatible version of this software). If you have a Mac computer, please consult with the school’s Help Desk (http://hdc.tamu.edu/) for options and assistance to install Windows on your Mac.

Course Materials
No textbook is required for this class; reference materials will be provided via course packet, course website, and eCampus.

Within the first week of the course, students enrolled in Section 299 will be required to come by Animal Industries Building Room 225 to pick up the course packet between 8 a.m. to noon and 1 to 5 p.m. from Mrs. JoeAnna Brooks. Please bring a valid form of identification as you will be required to sign out for the packet. You will not be allowed to pick up the course packet for anyone other than yourself.

Students enrolled in Sections 700 or 720 need to send an email to GISTAMU@gmail.com with preferred mailing address so that the course packet can be mailed out promptly. The course packet will include: a copy of ArcGIS software, course DVD (containing all required datasets and course materials), course syllabus, and software installation instructions (Module 1).

Course Website and eCampus
The course will be delivered using the course website, eCampus, email, and course DVD. Materials for this course can be accessed from the course DVD (under “Learning_Materials” folder and “Module_Instructions” file) OR at http://agrilife.org/gis. The eCampus portion of this course will be used to complete weekly assessments, conduct class discussions, submit midterm examination and final project, and check grades. The course Schedule & Assignments and the Topic (under each week’s schedule) pages will guide you through the topic and assignments for each week.

To access the eCampus portion of the course: Go to http://ecampus.tamu.edu. Click “Log In.” Use the NetID and Password that you created for your Neo E-mail account to access the class. Once you are in eCampus, Select “14 SUMMER RENR 405 299,700,720: Gis Env Problem Solving” to enter the course.

Learning Outcomes
1. General Outcomes
   - Integrate data and information from a variety of sources, from both spatial and non-spatial databases.
   - Identify data needs and appropriate processing methods in the context of a GIS project.
   - Formulate and assess spatial models and their applicability for solving problems in natural resources.
   - Generate and organize a plan for geoprocessing that leads to a desired project outcome.
   - Interpret and discuss the principles of GPS technologies, combine that information in the
context of a GIS.
- Design maps as a form of visual communication according to cartographic principles.
- Display a recognition of the responsibility of adhering to ethical standards in decision-making on behalf of clients and the public, in the context of managing a project, collaborating within a project team.
- Prepare and deliver a technical presentation that outlines a natural resource problem of a spatial nature and justifies its solution as a series of steps using spatial technologies.

2. Specific Outcomes
In addition to the general course learning outcomes, students shall cultivate knowledge, skills, abilities and methodologies to conduct integrated Quality of Life (QOL) assessment. QOL is a hot-pursued subject matter in urban planning, city management and community development. Specific objectives include:
- Help students gain critical-thinking ability to structure problem-solving process in real world environment.
- Facilitate students’ gaining of spatial knowledge and analytic skills pertaining to the use of GIS tool for problem-solving in a spatial context.
- Enable students to apply critical-thinking abilities, spatial knowledge and problem-solving skills to conduct integrated assessment on QOL and on issues in their respective domains of interest.

Course Description
The class will be conducted as an online course.

The class is self-paced with deadlines for assessments, midterm examination, and final project. Each week, students will read the materials from the course DVD (or course website) AND complete weekly assessments and/or other assignments as suggested by the schedule.

Students should send an email message to GISTAMU@gmail.com as soon as they are able to complete Module 1, i.e., successfully install and open ArcGIS on the computer. Students who are unable to complete Modules 1-3 by the end of week 1 should contact Sasa immediately.

As deemed necessary, ad hoc meetings will be held at Centeq 253 on the A&M campus. Off-campus students may request a conference call.

Questions submitted to GISTAMU@gmail.com will be answered promptly. Relevant questions and answers, with identifying information removed, will be posted on eCampus Discussion Board and/or send to the whole class via Neo Email.

Course assignments must be completed and submitted by the assigned due dates through eCampus (for weekly assessments, midterm examination, final project, and additional project) and via email to GISTAMU@gmail.com (for midterm examination, final project, and additional project).

Assessments
Students complete one assessment for each module (9 assessments in total). The assessments are located on eCampus under the “Assessments” tab.
Midterm Examination
Students complete one midterm examination that can be founded on eCampus under “Midterm Examination” tab. The exam will be submitted as an attachment to GISTAMU@gmail.com AND on eCampus by clicking on the “Midterm Examination” tab. The exam must be submitted in the form of an Adobe Acrobat (.pdf) or Word Document (.doc or .docx).

Final Project
Students complete one final examination in the form of a final project that integrates the knowledge and skills derived from prior learning materials and modules. Students will develop a map-based Quality of Life (QOL) report with pertinent parameters set by each individual student. Final projects are to be completed individually. No collaboration. Specific requirements for the final project can be founded on the course website or in the course DVD under “Final Project Requirements.” Instructions for the project are covered in Modules 6-9 in the Module_Instructions file. The final project will be submitted as attachments to GISTAMU@gmail.com AND through eCampus by clicking on the “Final Project” tab. The Final Project must be submitted in the forms of an Adobe Acrobat (.pdf) or Microsoft PowerPoint (.ppt or .pptx) presentation AND an ArcMap Document (.mxd).

Grading

<table>
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<tr>
<th>Category</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Completion of 9 assessments @ 5% per assessment</td>
<td>45%</td>
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<tr>
<td>Midterm Examination</td>
<td>25%</td>
</tr>
<tr>
<td>Final Project</td>
<td>30%</td>
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<tr>
<td>Total</td>
<td>100%</td>
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Student Participation
You are expected to complete one assessment for each module (9 assessments in total), a midterm examination, and a final project, and communicate with the instructors regarding your progress, especially if you are unable to complete the coursework.

Additionally, we ask that you record the amount of time you spend completing each module and report that information to Sasa at the end of the semester. This information will only be used to guide the efforts of future students.

Course Policies
Online course is a different learning experience for many. Your active participation and time management are keys to succeed in an online class. You need to keep up with the schedule and deadlines as if you were attending class on campus. Plan ahead, manage your time wisely, and allow sufficient amount of time to complete course assignments. Especially for a 5-week session, the course will move at a fast pace. Do not procrastinate! Go through the materials and submit work in a timely manner. Make use of the provided materials in the course packet, course website, and eCampus session. Log on to eCampus frequently to keep track of the courses and
communicate with others. If you have questions, check the eCampus Discussion Board first and do not hesitate to ask if such questions have not been raised.

**Deadlines**
Assignments are due by 4:00 a.m. (Central Time) on the day specified on the schedule, unless stated otherwise. You are accountable for staying on the semester schedule should technological or other problems arise. You should immediately contact us if an emergency may affect your ability to meet course deadlines.

**Late Work**
Late work will not be accepted, unless it is university excused.

**Make-up Assessments, Assignments, or Exams**
No make-up assessments, assignments, or exams will be given.

**Technical Issues**
It is imperative that you strictly follow the steps in the Module Instructions. Save and back up the data files frequently. Loss of data, corrupted files, or related technical issues are not acceptable grounds for an assignment extension.

**Working Ahead**
Since the course is self-paced, you may work ahead on assignments and complete the course earlier than scheduled.

**Collaborations**
Students are encouraged to communicate via eCampus Discussions and work together. However, each has to produce and submit his or her original work. If similarities are found, a grade of zero will be assigned.

**Navigate the Course**
Each week, you are required to:
1. Read course materials
   - Available on the course website under each week’s topic on Schedule & Assignment page OR on the course DVD under the folder “Learning_Materials”
2. Go through the Module Instructions
   - Available on the course website under each week’s topic on Schedule & Assignment page OR on the course DVD under the file “Module_Instructions”
   - And concurrently work on ArcGIS following the steps in the Module Instructions
3. Complete any assessments (approximately three assessments per week) that may be due that week located on eCampus under the “Assessments” tab.
4. Complete midterm examination and final project located on eCampus under the “Midterm Examination” and “Final Project” tabs according to the schedule and deadlines.
American Disability Act (ADA) Policy Statement
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 contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit http://disability.tamu.edu.

Academic Integrity Statement
“An Aggie does not lie, cheat, or steal, or tolerate those who do.” For more information, read the Honor Council Rules and Procedures at http://aggiehonor.tamu.edu./

Schedule & Assignments
Weekly assessments are due at 4:00 a.m. (Central Time) of the corresponding Monday the assessments are assigned. For example, an assessment assigned on Wednesday is due the following Monday at 4:00 a.m. Central. Midterm examination and final project are due Wednesday at 4:00 a.m. (Central Time) on the dates specified below.

<table>
<thead>
<tr>
<th>WEEK</th>
<th>MODULES</th>
<th>TOPICS</th>
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| 1    | Module 1 | Installation of Course Materials and Introduction  
• Install ArcGIS software  
• Upload datasets  
• System operability test  
**Assessment 1 due Monday, July 14 at 4:00 a.m. (Central Time)** |
| 1    | Module 2 | Fundamentals of GIS operations  
• Learn the basic operations of:  
  1. ArcCatalog  
  2. ArcMap  
  3. Applicable Extensions  
• Be able to give an example of an environmental problem  
• Understand the basic problem solving steps  
**Assessment 2 due Monday, July 14 at 4:00 a.m. (Central Time)** |
|      | Module 3 | Data Manipulation and Extraction  
• Acquisition, importing and processing of Census data  
• Overlay of shapefiles: the integrated use of Census and flood data  
• Spatial-attribute analysis for damage assessment  
**Assessment 3 due Monday, July 14 at 4:00 a.m. (Central Time)** |
<table>
<thead>
<tr>
<th>Module</th>
<th>Content</th>
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</table>
| 4      | **Editing Spatial Data**  
|        | - Create new features  
|        | - Modify features  
|        | - Cut polygons  
|        | - Extending the basic skills, e.g. Clipping  
|        | **Assessment 4 due Monday, July 21 at 4:00 a.m. (Central Time)** |
| 5      | **Automate the Address Locating Process**  
|        | - Basic use of Address Locator function in GIS  
|        | - Automation of address locating process  
|        | - Creating new GIS layer from results of address locating process  
|        | - Creating attribute data in a database management system and link it to the newly created GIS layer  
|        | **Assessment 5 due Monday, July 21 at 4:00 a.m. (Central Time)** |
| Midterm| Midterm Exam due Wednesday, July 23 at 4:00 a.m. (Central Time)  
|        | - Refer to previous Course Materials from Modules 1-5  |
| 6      | **Framing the Problem and Identifying Data Needs for QOL Analysis**  
|        | - Framing the problem and identifying factors and associated data sets that contribute to QOL of a city/community  
|        | - Conversions between vector and raster data and their integrated use for subsequent QOL analysis  
|        | **Assessment 6 due Monday, July 28 at 4:00 a.m. (Central Time)** |
| 7      | **Support tools, Data Assembly, and Preliminary Processing**  
|        | - Basics of raster data manipulation  
|        | - Flow directions and flow paths  
|        | - Distance functions  
|        | - Geo-statistical analysis  
|        | - Normalizing Data  
|        | **Assessment 7 due Monday, July 28 at 4:00 a.m. (Central Time)** |
| Midterm| Midterm Exam due Wednesday, July 23 at 4:00 a.m. Central  |
| 8      | **Map Algebra and Emycin Equation**  
|        | - The use of Map Algebra in the Raster Calculator  
|        | - Encoding the fuzzy logic algorithm of Emycin as Map Algebra for use in the Raster Calculator  
<p>|        | <strong>Assessment 8 due Monday, July 28 at 4:00 a.m. (Central Time)</strong> |</p>
<table>
<thead>
<tr>
<th>Date</th>
<th>Module</th>
<th>Activity</th>
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<tbody>
<tr>
<td>July 28-</td>
<td>Module 9</td>
<td>Creation of a Final Report for QOL Analysis</td>
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<td>August 1</td>
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<td>- Iterative process of combining indices by the use of Map Algebra/Emycin in the Raster Calculator</td>
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<td>- Manipulation of the final result, including its conversion from raster to vector</td>
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<td>- Spatial overlays and queries for the depictions of locale-specific and city-wide QOL indicators</td>
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<td>- Design of map-based documents</td>
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<td>- Integration of spatial, graphic, attribute data into a cohesive reporting document</td>
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<td><strong>Assessment 9 due Monday, August 4 at 4:00 a.m. (Central Time)</strong></td>
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<td>5</td>
<td>Final Project</td>
<td>Work on Final Project</td>
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<td>August 4-8</td>
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<td>6</td>
<td>Final Project</td>
<td>Final Project due Wednesday, August 13 at 4:00 a.m. (Central Time)</td>
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