COURSE NAME: GSEN 5355.001: Design and Analysis of GIS Applications – 3 sem. hrs.
GSEN 5355.W01: Design and Analysis of GIS Applications - 3 sem. hrs.

INSTRUCTOR: Mr. Richard Smith
Office: CBI 113, Phone: (361) 825-2750
Email: Richard.Smith@tamucc.edu

CONSULTATION: 9:00 AM – 11:00 AM Tuesday,
2:30 PM – 3:30 PM Thursday or by appointment.
Available during these times on Skype as richardsmith-gsen
Virtual Office Hours: http://vyou.com/RickSmith

LECTURE TIMES: Monday 2:30PM – 3:45PM and Wednesday 2:30PM – 3:45PM
Lecture is recorded and posted on IOL immediately after lecture ends

LECTURE LOCATION: CI 229 and on the Island Online (IOL) using Blackboard 8
http://iol.tamucc.edu

COURSE WEBSITE: The Island Online (IOL) at: http://iol.tamucc.edu

COURSE DESCRIPTION:
Introduction to the design and development of desktop and web GIS software to solve spatial problems. Topics covered include programming basics, customization of the user interface for GIS applications, and scripting of common tasks in desktop GIS applications.

LEARNING OBJECTIVES:
1. Understand object oriented programming concepts.
2. Develop VB.NET applications to solve geospatial problems.
3. Develop Python programs to script cartographic models.
4. Utilize APIs, modules, and libraries to develop new GIS applications and extend existing applications.
5. Understand and utilize Object Model Diagrams.

REQUIRED TEXTS:
Gauld, Alan. Learning to Program.
Available free online: http://www.freenetpages.co.uk/hp/alan.gauld/
REQUIRED SOFTWARE & HARDWARE:
- ArcGIS 10 or higher with 3D Analyst and Spatial Analyst.
- PythonWin - available on IOL course website and ArcGIS 10 Installation DVD.
- Visual Studio .NET 2010 – Download link provided in course.
- Adobe PDF viewer. (e.g. Adobe Acrobat Reader).
- Video player able to play MPEG-4 video (Quicktime, VLC, Windows Media Player).
- Speakers or headphones connected to computer with video player.
- High-speed internet access highly recommended.

COURSE REQUIREMENTS:
Course requirements include the following:
1. Attendance at lecture and participation in class discussion.
2. Download and watch weekly video lectures.
3. Completion and hand in of assignments by the due dates.
4. Completion of exams by the scheduled due dates.

EVALUATION:
1. Final Examination: 15%
2. Assignments: 60%
3. Semester Project: 25%
   TOTAL: 100%

GRADE COMPUTATION:
A ≥90
B ≥80 and <90
C ≥70 and <80
D ≥65 and <70
F <65

DUE DATES:
All assignments must be completed on time. Submission of an assignment after the due date is accepted, but with a penalty of 30% of the grade for the first 24 hours late, and 10% each additional 24 hours.

SEMESTER PROJECT:
Each student is required to develop a project by semester end. This project must use VB.NET and/or Python to develop a program which addresses a geospatial problem.

Each student must 1) submit a one-page project proposal by the 8th week, 2) provide all necessary code, datasets, etc… to execute project and 3) submit a final project report, including project description and your code by semester end.

The project proposal must include the objective of the project, programming language(s) and GIS data that will be used for the project. You may use existing code, but you must acknowledge the source of any code that you borrow in your application. The majority of the code submitted for the project must be of your own work.
COURSE OUTLINE:

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<th>Week</th>
<th>Topic</th>
<th>Reading</th>
<th>Assignment</th>
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<tr>
<td>1</td>
<td>Introduction to Programming</td>
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<td>2</td>
<td>Introduction to Python</td>
<td>[Gauld] Simple Sequences - Loops</td>
<td>Assignment 1</td>
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<td>3</td>
<td>Introduction to Model Builder</td>
<td>[Gauld] Add a little style – Modules and Functions</td>
<td>Assignment 2</td>
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<td>4</td>
<td>Python scripting for geoprocessing</td>
<td>[Gauld] Handling Files–Error Handling</td>
<td>Assignment 3</td>
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<td>5</td>
<td>Python scripting for geoprocessing</td>
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<td>Assignment 4</td>
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<td>Introduction to Visual Studio and VB.NET</td>
<td>Handouts</td>
<td>Assignment 5</td>
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<td>Introduction to ArcObjects and VB.NET</td>
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<td>Assignment 6</td>
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<td>Customizing ArcGIS with ArcObjects</td>
<td>Handouts</td>
<td>Assignment 7</td>
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<td>Project Proposal Due</td>
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<td>Customizing ArcGIS with ArcObjects</td>
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<td>Assignment 8</td>
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<td>Customizing ArcGIS with ArcObjects</td>
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<td>Customizing ArcGIS with ArcObjects</td>
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<td>Work on project</td>
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<td>Work on project</td>
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<td>Projects Due</td>
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<td>Final Examination</td>
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**Note:** This course outline is a general plan for the course; deviations announced to the class by the Instructor may be necessary. The assignments that are given are related to Student Learning Outcomes stated above.

**Technological Excuses:**
Hard drive crashes and other computer woes will not be accepted as excuses for late submission. Students should, given the complexity of the tasks they will pursue, be sure that they maintain adequate backup copies of all aspects of their work. You may not consider an e-mailed paper/assignment to be submitted until you have received a reply from me confirming that I have received it.
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.

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 Honesty:
Cheating and plagiarism will automatically earn zero (0) points for the assignment or exam. All academic work must meet the standards contained in the 2009-2010 Graduate Catalog, pages 28-29, sections titled "Academic Integrity" and "Academic Honesty" available at http://catalog.tamucc.edu/catalog10/graduate/policies.pdf and Undergraduate Catalog, pages 40-41, sections titled "Academic Integrity" and "Academic Honesty" available at http://catalog.tamucc.edu/catalog10/undergraduate/policies.pdf

Each student is responsible to inform themselves about those standards before performing academic work.

Grade Appeal Process:
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.
GENERAL GUIDELINES FOR COURSES AND LABS
IN THE GSEN 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.

This course will be conducted mainly via the internet and/or e-mail. So the definition of “meetings” given below refers to the first set of meetings during the first week of the semester AND any other time that you spend studying and working on labs/projects etc.

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!
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. 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.
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 65% 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.

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.

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. Student’s written work will be judged on written communication skills, critical thinking and problem solving ability.

15. There are NO provisions for making up missed exams except in cases where prior arrangements have been made and agreed to by the instructor.

16. Students must keep their given university e-mail address (i.e. firstname.lastname@islander.tamu.edu ). This will be the means of the instructor communicating with students.

17. All work submitted to the instructor (via e-mail or other means) must be clearly marked with the student’s name and the name and number of the course – this is especially important when work is submitted as an attachment to an e-mail.

18. The instructor reserves the right to make changes to the above with due notice to the students. These changes will be announced to the class (see 16 above) and each student is responsible for keeping herself/himself informed of such changes.