SYLLABUS

GIS Programming (GIS 400.001, 400.010/GIS 500.001 500.002)  
(Spring 2012)

Instructor:  
Dr. Yanli Zhang  
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Phone: (936) 468-2157  
Office: Forestry 122

Department: Arthur Temple College of Forestry and Agriculture

Lecture  
Tuesday 11:00am – 11:50am at Forestry 108  
Thursday 11:00am – 11:50am at Forestry 108

Lab  
Thursday 12:30pm-3:15pm at Forestry 108

Office hours:  
Tuesday 9:00am–11:00am  
Wednesday 9:00am-12:00pm, 1:00pm–4:00pm  
Thursday 9:00am-11:00am or by appointment

Course Description:

3 semester hours. GIS Programming and customization is about writing computer programs to perform GIS application which is either task specific or unavailable elsewhere. This course is designed to introduce students the basic structure and capabilities of object oriented programming (OOP) in a GIS environment. On completion of this course students are expected to be able to: understand software engineering concepts, good programming methods and practices; using Python to automate data management, processing, analysis, and visualization, and understand ArcObjects. The goal of the course is to help students not only to be a GIS user, but also to be a GIS developer. (*No previous programming experience is assumed, but must be familiar with ArcGIS*)

The course is designed:

A. for Spatial Sciences majors or GIS minors as part of their required curriculum;  
B. as an introduction to students of OOPs, Python, and ArcObjects;  
C. Instruct students to start GIS programming in ArcGIS; and  
D. as a 3 hour credit lecture class with a 0 credit hour lab required.

Program learning outcomes

A. Demonstrate understanding and competency of object oriented programming;
B. Demonstrate understanding and competency of Python programming;
C. Demonstrate understanding and competency of GIS programming;

**Student learning outcomes**
Upon successful completion of the course, the student will:
A. Understand basic theory of object oriented programming (PLO A);
B. Be familiar with Python (PLO B)
C. Be familiar with GIS programming and understand ArcObjects (PLO B);
D. Have demonstrated competency in oral and written communication skills.

**Textbook**

There is no ideal text as of now for addressing the subject matter. The Instructor has attempted to collate relevant materials into lectures from various sources. These lectures, as well as demonstrations and documents provided by the instructor, will form the majority of information that the student will be expected to learn. Occasionally readings from the internet might be assigned.

**Main references**

Python
http://docs.python.org/tutorial/index.html

ESRI, http://resources.arcgis.com/
  Desktop – help -- Professional Library – Geoprocessing – Geoprocessing
  with Python

**Tentative course calendar**

<table>
<thead>
<tr>
<th>week</th>
<th>date</th>
<th>topic</th>
<th>Lab</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>1.19.2012</td>
<td>Syllabus and course overview</td>
<td>Lab 1</td>
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<td>2</td>
<td>1.24.2012</td>
<td>Basic GIS customization</td>
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<td></td>
<td>1.26.2012</td>
<td>Python basics</td>
<td>Lab 2</td>
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<td>1.31.2012</td>
<td>Python basics</td>
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<td>2.2.2012</td>
<td>Python basics</td>
<td>Lab 3</td>
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<td>4</td>
<td>2.7.2012</td>
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<td>2.9.2012</td>
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<td>Lab 4</td>
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<td>2.16.2012</td>
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<td>2.23.2012</td>
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<td>7.2.2012</td>
<td>AAG conference, no class</td>
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<td>3.1.2012</td>
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<td>Lab 7</td>
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<td>8.3.2012</td>
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<td>5.3.2012</td>
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**Course Requirements:**
No previous programming experience is presumed. But students are expected to have had at least two GIS courses and have good knowledge and experience of ArcGIS.

There will be **one closed-book exam, ten labs (work individually), and a term project.** It will be required to give one short (15 minutes maximum) oral presentation about the term project and a report is also required.

**Term Project:**
The project is intended to provide a deeper understanding of GIS programming through experience. Students will work individually or in groups of 2 on projects. The project will take the form of Python program which incorporates at least several concepts (Python file handling, use of multiple variable types, use of at least one function, iteration, geoprocessing, map automation, etc.) that were introduced during the semester. The final Python script(s) should attempt to overcome a spatial data management, analysis, or presentation problem. *The project must be an original piece of work developed for this course.* Students are encouraged to freely discuss their project ideas with the instructor. During the last scheduled lecture period, students will present their
project to the class. The presentations can be no longer than fifteen (15) minutes and should use PowerPoint. It should cover:

1. **Title**: i.e., main function.
2. **Purpose**: a brief description of the function(s), why the application is needed, the major problem it resolves, and the expected users and benefits.
3. **Test data**: input data
4. **Particular algorithm**: Describe any particular algorithms that is implemented (e.g., sorting, random number generator, etc).
5. **Code demonstration**: demonstrate the function of the developed tool/command with input data, show the output(s).

The presentation file, the ArcGIS mxd file with source code, test data, and a brief report (5-10 pages double spaced brief description of the tool/command) are due right after presentation. A burned CD would be preferred.

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**Grading policy**

- **MIDTERM EXAM**: 250
- **QUIZZES** (20 x 5): 100
- **TERM PROJECT**: 250
- **LAB ASSIGNMENTS** (40 x 10): 400
- **TOTAL POINTS**: 1000

**Grading Scale**:

- **A = 90 - 100**
- **B = 80 - 89**
- **C = 70 - 79**
- **D = 60 - 69**
- **F = 0 – 59**

A class average will be calculated and if warranted, a curve will be applied if the curve will result in a higher grade.

**Class policy**

1. Attendance and class participation are expected throughout the semester.
2. **Turn in all required work on the day it is due.** Late assignment will lose 20% of the credit each day late.
3. Complete term project report and give presentation on specified date. No credit for late work as it is the end of the semester.
4. Quizzes are to be taken during class. No make-up quizzes unless there is a valid university excuse (health, family emergencies, or student participation in approved university-sponsored events) ([http://www.sfasu.edu/policies/classAttendance_excusedAbs.asp](http://www.sfasu.edu/policies/classAttendance_excusedAbs.asp)).

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5. Exams are to be taken during scheduled times. Make-up exams will be given to students with a valid university excuse (consult student handbook for guidelines).
6. There is no exception for the grading policy and the grading scale.
7. Treat everyone in the class with respect and courtesy.
8. All students are expected demonstrate professional behavior and use language appropriate for the classroom learning experience.

**COURSE COMPLAINTS:** Any college course complaints or problems should first be discussed with the course instructor for the particular course. Difficulties can usually be resolved there. If the complaint cannot be resolved, the next person to see is the appropriate department chairperson.

**Academic Integrity (A-9.I)**

Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

**Definition of Academic Dishonesty**

Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one’s own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one’s paper without giving the author due credit.

Please read the complete policy at [http://www.sfasu.edu/policies/academic_integrity.asp](http://www.sfasu.edu/policies/academic_integrity.asp)

**Withheld Grades Semester Grades Policy (A-54)**

Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

**Students with Disabilities**
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

Acceptable Student Behavior

Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy D-34.1). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program http://www.sfasu.edu/judicial/earlyalert.asp. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.

Responsible Use of Technology: It is expected that all students will only use cell phones, PDAs, laptop computers, MP3 players and other technology outside of class time or when appropriate in class. Answering a cell phone, texting, listening to music or using a laptop computer for matters unrelated to the course may be grounds for dismissal from class or other penalties.

Syllabus Changes:

The instructor reserves the right to make changes as necessary to this syllabus. If changes are necessitated during the term of the course, the instructor will immediately notify students of such changes by email.