Syllabus
GIS Programming (GISC 6364.005)
(Spring 2024)

Instructor: Dr. Yanli Zhang
Email: zhangy2@sfasu.edu
Office: Forestry 121
Phone: (936) 468-2157

Lecture: Tuesday, Thursday 11:00am – 11:50am at Forestry 108
Lab: Wednesday 3:00pm-5:50pmm at Forestry 102

Office Hours: Tuesday 1:00pm -3:00pm, Wednesday 9:00am-12:00pm

Class News/Notices, Lecture Handouts and Grades: All lecture handouts are available at D2L (https://d2l.sfasu.edu/). It is students’ responsibility to check handouts before coming to class. Grades for quizzes, labs, and exams are all available at D2L as well. Please regularly check D2L for course related news and notices.

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; use Python to automate data management, processing, analysis, and visualization. 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 Pro)

Program Learning Outcomes:
A. Demonstrate understanding and competency of object oriented programming;
B. Demonstrate understanding and competency of Python programming language;
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 ArcPy (PLO C);
D. Develop practical Python program for GIS/forestry research/application (PLO C).

Textbook

Main course references
Python  http://docs.python.org/tutorial/index.html
Other potential Python references for first time programmer:

Al Sweigart, 2024, Invent Your Own Computer Games with Python, 2nd edition, 978-0-98210-601-3 (Free PDF available online)

Software:
1. Python 3,* (open source and it is available at [https://www.python.org/downloads/](https://www.python.org/downloads/)).
2. ESRI ArcGIS Pro and there are 3 options accessing the software:
   A. GIS labs in the Forestry building (lab session hours or other labs when there is not class in session);
   B. [https://view.sfasu.edu/](https://view.sfasu.edu/). Your mySFA credential is needed to log in the VMware Horizon virtual machine. Select Forestry which has the same configuration as GIS labs in the Forestry building. components and analysis methods (PLO B C);
   C. Buy the software from ESRI ([https://www.esri.com/en-us/arcgis/products/arcgis-for-student-use/buy](https://www.esri.com/en-us/arcgis/products/arcgis-for-student-use/buy), $100/year). ArcGIS Pro is different than ArcGIS Desktop and it cannot be issued from the university at the current stage.

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.

Asynchronous instruction: students need to spend 150 minutes to read peer-reviewed research articles in the area of Python programming (for example: Google Scholar search for Python programming) throughout the semester.

Term Project:
The project is intended to provide a deeper understanding of GIS programming through experience. Graduate students will work individually 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. The final poster should cover:

1. **Title.**
2. **Introduction:** a brief description of the function(s), why the application is needed, the major problem it resolves, and the expected users and benefits.
3. **Methods:** especially the algorithms that have been used.
4. **Output:** the output(s) of the program.
5. **Code and sample data should be submitted.**
Peer Project Review:
Students are required to comment on at least 4 term project posters (instructor will put all the posters on D2L – Content after project submission). Please provide detailed and itemized Pros and Cons for each project. It will be graded based on how well professional knowledges are used to check other people’s work.

Grading Policy

<table>
<thead>
<tr>
<th>Course</th>
<th>Points</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>QUIZZES (20 x 5)</td>
<td>100</td>
<td>10%</td>
</tr>
<tr>
<td>LAB ASSIGNMENTS (40 x 10)</td>
<td>400</td>
<td>40%</td>
</tr>
<tr>
<td>MIDTERM EXAM</td>
<td>250</td>
<td>25%</td>
</tr>
<tr>
<td>TERM PROJECT</td>
<td>160</td>
<td>16%</td>
</tr>
<tr>
<td>PEER PROJECT REVIEW</td>
<td>50</td>
<td>5%</td>
</tr>
<tr>
<td>ATTENDANCE</td>
<td>40</td>
<td>4%</td>
</tr>
<tr>
<td><strong>TOTAL POINTS</strong></td>
<td><strong>1000</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Grading Scale:

- **A** 900 – 1000
- **B** 800 – 899
- **C** 700 – 799
- **D** 600 – 699
- **F** 599 or less

Questions regarding lab/homework/quiz/exam grading must be asked within one week after the lab/homework/quiz/exam is returned.

A class average will be computed 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 required throughout the semester and it is taken randomly.
2. Complete all lab assignments on specified dates. Late assignment will lose 20% of the credit each day late.
3. All students submitting identical lab assignments (in whole or in part) will receive a grade of zero for that lab.
4. Complete term project report and give presentation on time. No credit for late work as it is the end of the semester.
5. Quizzes are on D2L. No make-up quizzes unless there is a valid university excuse (consult student handbook for guidelines).
6. 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).
7. There is no exception for the grading policy and the grading scale.

D2L

For D2L technical support, contact student support at d2l@sfasu.edu or 936-468-1919. Please visit https://www.sfasu.edu/d2lsupport/students for more information.

Academic Integrity (4.1)

The Code of Student Conduct and Academic Integrity outlines the prohibited conduct by any student enrolled in a course at SFA. It is the responsibility of all members of all faculty, staff, and students to adhere to and uphold this policy.

Articles IV, VI, and VII of the new Code of Student Conduct and Academic Integrity outline the violations and procedures concerning academic conduct, including cheating, plagiarism, collusion, and
misrepresentation. Cheating includes, but is not limited to: (1) Copying from the test paper (or other assignment) of another student, (2) Possession and/or use during a test of materials that are not authorized by the person giving the test, (3) Using, obtaining, or attempting to obtain by any means the whole or any part of a non-administered test, test key, homework solution, or computer program, or using a test that has been administered in prior classes or semesters without permission of the Faculty member, (4) Substituting for another person, or permitting another person to substitute for one’s self, to take a test, (5) Falsifying research data, laboratory reports, and/or other records or academic work offered for credit, (6) Using any sort of unauthorized resources or technology in completion of educational activities.

Plagiarism is the appropriation of material that is attributable in whole or in part to another source or the use of one’s own previous work in another context without citing that it was used previously, without any indication of the original source, including words, ideas, illustrations, structure, computer code, and other expression or media, and presenting that material as one’s own academic work being offered for credit or in conjunction with a program course or degree requirements.

Collusion is the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any provision of the rules on academic dishonesty, including disclosing and/or distributing the contents of an exam.

Misrepresentation is providing false grades or résumés; providing false or misleading information in an effort to receive a postponement or an extension on a test, quiz, or other assignment for the purpose of obtaining an academic or financial benefit for oneself or another individual or to injure another student academically or financially.

**Withheld Grades Semester Grades Policy (5.5)**

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 coursework 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 to compute the grade point average. For additional information, go to [https://www.sfasu.edu/policies/course-grades-5.5.pdf](https://www.sfasu.edu/policies/course-grades-5.5.pdf).

**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 promptly may delay your accommodations. For additional information, go to [http://www.sfasu.edu/disabilityservices/](http://www.sfasu.edu/disabilityservices/).

**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.

**Student Wellness and Well-Being**

SFA values students’ overall well-being, mental health and the role it plays in academic and overall student success. Students may experience stressors that can impact both their academic experience and
their personal well-being. These may include academic pressure and challenges associated with relationships, emotional well-being, alcohol and other drugs, identities, finances, etc.

If you are experiencing concerns, seeking help, SFA provides a variety of resources to support students’ mental health and wellness. Many of these resources are free, and all of them are confidential.

**On-campus Resources:**

**The Dean of Students Office** (Rusk Building, 3rd floor lobby)

[www.sfasu.edu/deanofstudents](http://www.sfasu.edu/deanofstudents)

936.468.7249

dos@sfasu.edu

**SFA Human Services Counseling Clinic** Human Services, Room 202

[www.sfasu.edu/humanservices/139.asp](http://www.sfasu.edu/humanservices/139.asp)

936.468.1041

**The Health and Wellness Hub** “The Hub”

Location: corner of E. College and Raguet St.

To support the health and well-being of every Lumberjack, the Health and Wellness Hub offers comprehensive services that treat the whole person – mind, body and spirit. Services include:

- Health Services
- Counseling Services
- Student Outreach and Support
- Food Pantry
- Wellness Coaching
- Alcohol and Other Drug Education

[www.sfasu.edu/thehub](http://www.sfasu.edu/thehub)

936.468.4008

thehub@sfasu.edu

**Crisis Resources:**

- Burke 24-hour crisis line: 1.800.392.8343
- National Suicide Crisis Prevention: 9-8-8
- Suicide Prevention Lifeline: 1.800.273.TALK (8255)
- johCrisis Text Line: Text HELLO to 741-741

**Syllabus Changes:**

The instructor reserves the right to make changes as necessary to this syllabus.
## Tentative Course Calendar

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<th>week</th>
<th>date</th>
<th>topic</th>
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<td>1.16.2024</td>
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<tr>
<td></td>
<td>1.18.2024</td>
<td>Syllabus and course overview</td>
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<td>1.23.2024</td>
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<td>1.25.2024</td>
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<td>3</td>
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<td>Executable files</td>
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<td>4.25.2024</td>
<td>Web GIS and course review/term project</td>
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<td>16</td>
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<td>5.2.2024</td>
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