

Spring 2016: GEOG 5367- GIS Programming-online

January 17, 2018- May 10, 2018

(3 Credit Hours)

[SHSU Blackboard](#)

CONTACT INFORMATION

Instructor: Dr. Samuel Adu-Prah

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Office: Lee Drain Building Room 00324

Office Hours: **Online:** **[SHSU Blackboard](#)**

COURSE DESCRIPTION

This course provides an introduction to computer programming principles and the application in Geographic Information Systems. Principles will be introduced using a GIS scripting language. Once programming principles are understood, students begin to learn Python programming language for working with ArcGIS software and Python IDLE (Python GUI). Students master the use of Python scripts to manipulate basic mapping objects and complete geoprocessing tasks. The coursework involves Python fundamentals, map scripting, debugging and error handling, and creating custom tools using Python scripts.

OBJECTIVES:

Upon completion of this course, students will:

1. Understand Python language fundamentals
2. Complete geoprocessing tasks using Python
3. Carry out specialized tasks such as map scripting, debugging and error handling, and creating Python functions and classes
4. Create and share custom tools using Python scripts
5. Develop a geoprocessing project using Python programming language in ArcGIS Environment

REQUIRED COURSE MATERIALS

Required:

Python Scripting for ArcGIS, Zandbergen, P.A., (Current Edition). ISBN 978-1-58948-282-1. ESRI Press, 380 New York St., Redlands, California.

Reference:

Object –Oriented Programming in Python, Goldwasser M.H., and Letscher, D. 2008. ISBN 978-0-13-601383-9. Pearson Prentice Hall Upper Saddle River, New Jersey 07458

COURSE PREREQUISITES

Required: Prior class taken in GIS or consent of Instructor

Recommended: Students will have a higher sense of achievement if they have had any of the following: GIS courses, computer related courses, or programming language

Software Requirements:

This course requires the use of ArcGIS software with Python IDLE.

Instructor Availability and Response Time

Your class interaction with your instructor and your classmates will take place in Blackboard on a regular, ongoing basis. Your instructor will be active in Blackboard at least five days a week, and you will normally communicate with your instructor in the open Blackboard discussion forum so that your questions and the instructor's answers benefit the entire class. You should send emails directly to your instructor only when you need to discuss something of a personal or sensitive nature, and in those cases your instructor will generally provide a response within 24 hours.

Grade Distribution

Assignment Category	Number of Grade Items	Point Value per Item	Total Points
Discussions	6	20	120
Scripting Projects	7	60	420
Custom Tool Project	1	80	80
Debugging Project	1	60	60
Lab Exercises	5	30	150
Final Project	1 & II	170	170
		Total Course Points:	1,000

This course may also contain practice activities. The purpose of these non-graded activities is to assist you in mastering the learning outcomes in the graded activity items listed above.

Course Grading

Grading will be on the scale:

- 88 - 100% - A Range
- 78 - 87% - B Range
- 68 - 77% - C Range
- 58 - 67% - D Range
- 0 - 57% - F Range

Weekly Assignment Schedule

The Course Content area in Blackboard contains one module folder for each week of the course. All reading and assignment information can be found in the folders. All assignments are due by 11:59 p.m. Central Time on the last day of the module week.

In addition to the textbook readings that are listed, there may be additional required resources within each module in Blackboard.

Weekly Course Content	Topics and Assignments
Week 1: Jan 17-21	1-1 Discussion: Getting Started
Week 2: Jan 22-28	Introduction to Scripting and Python <i>Python Scripting for ArcGIS</i> Chapters 1 and 3 2-1 Discussion: Initial Impression of Python 2-2 Scripting Project One
Week 3: Jan 29-Feb 4	3-1 Lab Exercise: Learning Python Language Fundamentals
Week 4: Feb 5-11	Loops and Data structures <i>Python Scripting for ArcGIS</i> Chapters 4, 5, and 6 4-1 Discussion: Data structures and Loops 4-2 Scripting Project Two
Week 5: Feb 12-18	5-1 Lab Exercise: Geoprocessing using Python
Week 6: Feb 19-25	Debugging, Flow Control, Error Handling, and Functions <i>Python Scripting for ArcGIS</i> Chapters 11 and 12 6-1 Discussion: Python Revisited 6-2 Scripting Project Three
Week 7: Feb 26-Mar 4	7-1 Debugging Project 7-2 Lab Exercise: Debugging and error Handling
Week 8: Mar 5 - 11	The ArcPy Module, Cursors, and Working with Spatial Data <i>Python Scripting for ArcGIS</i> , Chapters 5, 7.1–7.3, and 9 8-1 Discussion: Spatial Data 8-2 Scripting Project Four
Week 9: Mar 12-18	Spring Break
Week 10: Mar 19-25	10-1 Lab Exercise: Exploring Spatial Data
Week 11: Mar 26-April 1	Geoprocessing Using Python and Model Builder <i>Python Scripting for ArcGIS</i> , Chapter 2 11-1 Discussion: Comparing Scripting Methods 11-2 Scripting Project Five
Week 12: April 2- 8	Building Custom Tools <i>Python Scripting for ArcGIS</i> , Chapters 13 and 14 12-1 Custom Tool Project
Week 13: April 9-15	13-1 Lab Exercise: Creating Custom Tools
Week 14: April 16-22	Working with Text Files and Spreadsheets <i>Python Scripting for ArcGIS</i> , Chapter 7.4–end of chapter and Chapter 8 14-1 Scripting Project Six 14-2 Final Project Submission: Part I – Custom Tool and Script
Week 15: April 23-29	Working with Maps <i>Python Scripting for ArcGIS</i> , Chapter 10 15-1 Scripting Project Seven 15-2 Final Project Submission: Part II – Narrative
Week 16: April 30-May 6	All Assignments Due
Week 17: May 7-10	EXAMS WEEK- No Exams Schedule

ATTENDANCE POLICY

Online students are required to post to the Blackboard discussion board during the first week of class. If a student does not submit a posting to the discussion board during the first week of class, the student may be automatically withdrawn from the course for non-participation.

ADDITIONAL COMMENTS:

This class represents a commitment of time and energy for both the faculty and student. It is expected that the student put in full time for this course. Work schedules or other responsibilities do not represent acceptable exceptions to this obligation. If you have problems, please send me an email as soon as possible. Waiting until the end of the semester may be too late.

Absences: Since this an online class student are expected to complete all assignments on time.

Late Policy:

The Late Policy is 10% off as of the deadline

Academic Integrity: The Student Code of Conduct (*section 5.3*) states that the University expects all students to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. Furthermore, the University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including, but not limited to cheating on an examinations or other academic work which is to be submitted, plagiarism, unauthorized collusion, and the abuse of resource materials. All students must fully develop their own solutions. You are not allowed to work together on any assignment. Do not copy anyone else's assignment and do not allow your assignments to be copied. Cheating on any portion of an assignment will result in a grade of zero for the entire assignment.

STUDENTS WITH DISABILITIES POLICY:

It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance should register with the Office of Services for Students with Disabilities located in the Lee Drain Annex (telephone 936-294-3512, TDD 936-294-3786, and e-mail disability@shsu.edu). They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired.

SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I encourage you to register with the SHSU Services for Students with Disabilities and to talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: No accommodation can be made until you register with the Services for Students with Disabilities. For a complete listing of the university policy, see:

<http://www.shsu.edu/dept/academic-affairs/documents/aps/students/811006.pdf>