

South Dakota State University

GEOG 786, 3 Credits Geographic Information Systems Course Syllabus (Spring 2021)

Course Instructor: Dapeng Li, Ph.D., GISP
Meeting Time: Monday 1:00 - 3:50 PM
Meeting Location: Wecota Hall, Room 100
Office Hours: Tue. & Wed. 1:00 - 3:00 PM (or by appointment)
Office & Phone: Wecota Hall 115D
Phone: 1-605-688-4620
Email: dapeng.li@sdstate.edu (primary contact)
Zoom: <https://sdstate.zoom.us/my/lidapeng>

Lab Section

There is NOT a SEPARATE lab section for this course. The lab portion of this course will immediately follow the day's lecture material within the three-hour class period in Wecota Hall 100. Students are strongly encouraged to install git, and relevant Python IDEs (e.g., Visual Studio Code or PyCharm) on their own laptops and use their laptops in the classroom.

Course Description

Python programming has become a must for many GIS jobs (especially GIS Developer positions). This course aims to help students develop Python programming skills for open source GIS. Specifically, this course covers the following topics: open source GIS, Python libraries for open source GIS, and Python libraries for remote sensing.

Course Prerequisites

GEOG 372: Introduction to GIS (or equivalent course/experience) and an introductory-level Python programming course (or equivalent course/experience).

Instructional Methods

Lecture, discussion, lab exercises, assignments, training sessions, final project, and presentation.

Course Schedule

Date	Lecture Topic	Readings	Lab
1/11	Course Overview (Zoom)	Syllabus	No Lab
1/18	MLK Day Holiday (No Class)	L Ch. 1	No Lab (Training Session)
1/25	Learning about Geospatial Analysis with Python	L Ch. 1	Lab 1
2/1	Learning Geospatial Data	L Ch. 2	Lab 1
2/8	The Geospatial Technology Landscape	L Ch. 3	Lab 2
2/15	Presidents' Day Holiday (No Class)	L Ch. 4	No Lab
2/22	Geospatial Python Toolbox	L Ch. 4	Lab 2
3/1	Geospatial Python Toolbox	L Ch. 4	Lab 3
3/8	Spring Break (No Class)	T Ch. 5	No Lab
3/15	Python and GIS	L Ch. 5	Lab 4
3/22	Python and GIS	L Ch. 5	Lab 4
3/29	Python and Remote Sensing	L Ch. 6	Project Time
4/4	Final Project Proposal Due in D2L by Midnight		
4/5	Holiday (No Class)	N/A	No Lab
4/12	Python and Elevation Data	L Ch. 7	Project Time
4/19	Advanced Geospatial Python Modeling	L Ch. 8	Project Time
4/26	Real-Time Data	L Ch. 9	Project Time
5/6	Final Paper Due in D2L by Midnight (Thursday)		
5/7	Final Presentations (1:45 – 3:45 pm, Friday, Wecota Hall 100)		
Training Sessions			
1	1/11 ~ 1/25	Udacity: Version control with Git (about 9 hours, it is a free course) https://www.udacity.com/course/version-control-with-git--ud123	

Note: This schedule is subject to change. Other assignments may also be added throughout the semester. Please always check the newest syllabus in D2L.

Required Text

L: Lawhead, J. (2019). *Learning Geospatial Analysis with Python: Understand GIS fundamentals and perform remote sensing data analysis using Python 3.7*. (3rd edition). Packt Publishing. (ISBN-13 : 978-1789959277)

Note: You can access the electronic book for free via the SDSU library website. The GitHub site for this book is: <https://github.com/PacktPublishing/Learning-Geospatial-Analysis-with-Python-Third-Edition>

Important Dates:

- January 11, Monday First day of class
- January 18, Monday Martin Luther King Day Holiday
- January 20, Wednesday Last day to drop or add and adjust final fees
- January 21, Thursday “W” grade begins
- February 15, Monday Presidents’ Day Holiday
- March 8-12, Monday – Friday Spring Break (No Class)
- March 15, Monday First Half Spring Term ends
- April 2-4, Friday – Sunday Easter Recess
- April 6, Tuesday Last day to drop a course
- May 3-7, Monday - Friday**, Final exams
- May 12, Wednesday Grades due by midnight

Overall Course Goals

Upon completion of this course, students will be able to:

1. Develop a good understanding of the basic functionalities and potential applications of open source GIS Python libraries.
2. Master the basic principles of the design and implementation of Python programs.
3. Be able to apply the knowledge learned in the class and use Python and relevant open source libraries to implement a program for a specific GIS application.

Student Learning Outcomes

Knowledge Outcomes

Students will master the basic concepts and principles of Python programming and learn how to use Python and relevant libraries to design and implement a computer program for a specific real-world GIS application (or workflow).

Skills Outcomes

Students will develop specific skills and competencies in Python programming and learn to use Python in real-world GIS applications. Students will use the methods covered in the class to complete a final project. Other skill outcomes include: written communication, interpersonal communication, professional presentation, and planning and organization.

Grade Evaluation

Evaluation Components	Points (each)	Total Points	Percent Value
Participation	TBD	100	10%
Lab Assignments (4)	50	200	20%
Final Project Presentation	200	200	20%
Final Project Paper	500	500	50%
Total		1000	100%

Course Grade Scale

Grade	Final weighted points
A	90-100

B	80-89
C	70-79
D	60-69
F	< 60

Course Policies

Lab Assignments: Students will need to accomplish six required lab assignments to reinforce the concepts covered in the lectures. Although class time has been allocated for each assignment, additional work may also be necessary. Lab assignments should be submitted electronically in D2L on time. The students are expected to memorize all the commands, procedures, and solutions they have used and develop their proficiency in Python programming.

Final Project: Students are expected to use what they have learned in the class to accomplish a final project. Students can use either ArcGIS or open-source GIS libraries to design and implement a **Python** program for a specific application. The project must be original work. Thus, students are **STRONGLY** encouraged to discuss with the instructor and determine their topics as early as possible. I also strongly encourage students to do a project based on their thesis topics (e.g., this project could be a part of the thesis/dissertation).

Specifically, the final project should include the following components:

1. A brief project proposal that includes introduction, data, system design, and expected results. Students are encouraged to use LucidChart to draw the diagrams in the final paper. It should be within 5 pages (including figures). Word count: 500 ~ 1,000.
2. A PowerPoint presentation (about 15 minutes) that summarizes the key steps in designing and implementing the program and the applications of the GIS program.
3. A final report that consists of title, introduction, data, system design, system implementation, results, discussion, and conclusion (within 20 pages (double-spaced); word count: 2,000 ~ 2,500).

More details on the final project will be provided during the semester. Please refer to the course calendar for specific due dates.

Class Participation: Students are strongly encouraged to participate in different activities in the class. The class participation credit is given based on class attendance and in-class/take home exercises/quizzes.

Lab Materials: Students will also need (at least) an 8 GB Flash Drive to store their lab and final project materials. All the data on the lab computers could be automatically wiped out when the computers are rebooted. **SAVE YOUR FILES!!!**

Make-up Policy: If a student misses a quiz, points can only be made up if the student has an excused absence. To be considered an excused absence, the student must contact the instructor with a legitimate excuse prior to the day of the quiz.

Classroom Policies:

- All cell phones need to be turned off during the class/lab.
- No recording (photos, audio, etc.) without permission.
- Using computers/smartphones to surf the internet or work on other tasks is not allowed.

ADA Statement:

Any student who feels s/he may need an accommodation based on the impact of a disability should contact Nancy Hartenhoff-Crooks (or successor) Coordinator of Disability Services (605-688-4504 or Fax, 605-688-4987) to privately discuss your specific needs. The Office of Disability Services is located in room 065 at the University Student Union.

Freedom in Learning Statement:

Students are responsible for learning the content of any course of study in which they are enrolled. Under Board of Regents and University policy, student academic performance shall be evaluated solely on an academic basis and students should be free to take reasoned exception to the data or views offered in any courses of study. Students who believe that an academic evaluation is unrelated to academic standards but is related instead to judgment of their personal opinion or conduct should first contact the instructor of the course. If the student remains unsatisfied, the student may contact the Department Head, Dean, or both, of the college which offers the class to initiate a review of the evaluation.

Student Academic Integrity and Appeals:

The university has a clear expectation for academic integrity and does not tolerate academic dishonesty. University Policy 2:4 sets forth the definitions of academic dishonesty, which includes but is not limited to, cheating, plagiarism, fabrication, facilitating academic dishonesty, misrepresentation, and other forms of dishonesty relating to academics. The policy and its procedures also set forth how charges of academic dishonesty are handled at the University. Academic Dishonesty is strictly proscribed and if found may result in student discipline up to and including dismissal from the University.

TurnItIn

All written assignments in D2L will be automatically submitted to TurnItIn for plagiarism detection. Students should make sure that the assignments are their original work before they submit them in D2L. Students should check the similarity score of their submitted documents to ensure that the assignments pass the test.

Veterans and Active Duty Military Personnel

Veterans and Active Duty Military Personnel with special circumstances (e.g., upcoming deployments, drill requirements, disabilities, and other qualifying needs) are welcome and encouraged to communicate these, in advance if possible, to the instructor in order to address attendance requirements or other actions in accordance with SDBOR and University policies and procedures.

Late to Class statement

All members of the class should make every effort to arrive on time. In the event that I am going to be late, due to circumstances beyond my control, I will, if possible, notify the department and ask that someone be sent to apprise you of the situation. If such notification is not possible, please remain in the class for 15 minutes beyond the scheduled start time. If I have not yet arrived, and if no emissary of the department has informed you otherwise, class will be cancelled and you will be free to leave.

General Statement on COVID-19 Pandemic

Participants in this course are subject to, and expected to comply with, the policies, procedures, rules, and regulations of the SDBOR and SDSU as modified throughout the duration of the course. Due to the current COVID-19 Pandemic, the SDBOR and SDSU have adopted provisions to minimize COVID-19 exposure to the SDSU community that are compliant with changing CDC and SD DOH guidelines. These guidelines apply to all classes and activities held by SDSU. Anyone who does not comply with these important provisions may be subject to the SDSU Student Conduct Code 3:1 and other applicable policy provisions found in SDBOR and SDSU policies. Current information concerning SDSU updates to the provisions applicable during the COVID-19 Pandemic may be viewed online at the <https://www.sdstate.edu/jacksrback> and <https://www.sdstate.edu/covid-19> webpages. Please check these sites frequently for updates.

Temporary COVID-19 Class Attendance Policy for Spring 2021

Please note: This temporary policy is provided by the Office of the Provost pursuant to the SDSU policy giving authority for exceptions to the comprehensive SDSU Class Attendance Policy (SDSU Policy 2:5). These policies rely in part on the honor system, but nonetheless are subject to the Student Conduct Code (SDSU Policy 3:1): Students are trusted to provide accurate information regarding the reason(s) for their absences.

Students who are experiencing symptoms of COVID-19, engaging in self-quarantine, or are in isolation based on a positive COVID-19 test, should not attend in-person classes. For those absences, students shall not be required to provide formal documentation, nor shall they be penalized, but they must confer with their instructors to determine whether remote participation, an Incomplete grade, or withdrawal is most appropriate.

Students who are absent due to experiencing COVID-19 symptoms, engaging in self-quarantine, or in isolation due to a positive test, shall

- notify instructors of their absence in a timely manner, in advance if possible;
- participate in synchronous and asynchronous online learning activities, as able;
- keep up with coursework, as able; and
- work with instructors to reschedule online or on-campus exams, labs, assignments, and other academic activities, as needed.

For more details regarding attendance policies, see the SDSU Class Attendance Policy (SDSU Policy 2:5) and the Student Conduct Code (SDSU Policy 3:1). For details regarding what to do in case of a suspected or known COVID-19 infection, visit the What if I Get Sick? page located on the JacksRBack Students page: Please note that a student must notify the Office of the Vice

President of Student Affairs upon experiencing symptoms or having a presumptive or confirmed COVID-19 test.