South Dakota State University

GEOG 473/573 - S01, 3 credits
GIS Data Creation & Integration
Course Syllabus (Fall 2019)

Course Instructor:	Dapeng Li, Ph.D., GISP
Meeting Time:	Tue. 4:00 - 5:50 pm
Meeting Location:	Wecota Hall, Room 100
Office Hours:	Tue. 2:00 - 4:00 pm (or by appointment)
Office:	Wecota Hall 115D
Phone:	(605) 688-4620
Email:	dapeng.li@sdstate.edu (primary contact)

Lab Section

SECTION	LAB INSTRUCTOR	DAYS	LOCATION	MEETING TIME
473/573L S01	Marcus Haselhoff	Thur.	Wecota Hall 014	4:00 PM – 5:50 PM

Lab Instructor

Name	E-mail	Office
Marcus Haselhoff	marcus.haselhoff@sdstate.edu	Wecota Hall 200

Course Description

This course focuses on how to create, collect, process, manage, and analyze spatial data for a specific project. Specifically, the following topics are covered: basic concepts and principles of GIS, different types of spatial data, GIS data modeling, GIS Data collection, mapping, spatial data analysis, and spatial databases. Meanwhile, this course also aims to help students develop skills in ESRI ArcGIS Pro through the lab section and a final project.

Course Prerequisites

GEOG 372 Introduction to GIS or equivalent course/experience is preferred (but not required).

Instructional Methods

Lecture, discussion, demonstrations, lab assignments, final project, presentation, quizzes/exams.

Course Schedule

Date	Lecture Topic	Readings	Lab

8/27	Course Overview	L Ch. 1	Lab Overview
9/3	Introduction to GIS	L Ch. 1; P Ch.1	Lab 1: P Ch. 1
9/10	Geographic Data	L Ch. 2; P Ch.2	Lab 2: P Ch. 2
9/17	Maps and Representing Geography	L Ch. 3, 11; P Ch. 3	Lab 3: P Ch. 3
9/24	Georeferencing	L Ch. 4; P Ch. 4	Lab 4: P Ch. 4
10/1	Geographic Data Modeling	L Ch. 7; P Ch. 5	Lab 5: P Ch. 5
10/8	Geographic Data Modeling	L Ch. 7; P Ch. 6	No Lab (Conference)
10/15	Midterm Exam	Study Guide	Lab 6: P Ch. 6
10/22	No Class (Conference)	TBA	Project Time
10/29	Geographic Databases	L Ch. 9; P Ch. 7	Lab 7: P Ch. 7
11/3	Proposal due in D2L by midnight		
11/5	Data Collection & Editing	L Ch. 8; P Ch. 8	Lab 8: P Ch. 8
11/12	Spatial Queries	P Ch. 9	Lab 9: P Ch.9
11/19	Spatial Join and Overlay	P Ch. 10	Lab 10: P Ch. 10
11/26	Geocoding & Reverse Geocoding	TBA	No Lab (Thanksgiving)
12/3	The GeoWeb	L Ch. 10; P Ch. 12	Lab 11: P Ch. 11
12/10	Final Project Oral Presentation	Review Study Guide	No Lab
12/13	Final project Due on 12/13 @ 5:00 pm		
12/17	Final Exam	12/17 (Tue.), 4:00 – 6:00 pm @ Wecota Hall 100	

Abbr.: Longley (L), Price (P)

This schedule is subject to change. Students will be notified of any changes.

Course Requirements

Required Text

Lecture

Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2015). *Geographic information systems and science* (4th edition). John Wiley & Sons.

Lab

Price, M.H. (2020). *Mastering ArcGIS Pro* (1st edition). McGraw Hill Education.

Other Recommended Books

Bolstad, P. (2016). *GIS Fundamentals: A first text on geographic information systems* (5th edition). Eider Press, White Bear Lake, MN (ISBN: 978-0-9717647-3-6)

Burrough, Peter A., and Rachael A. McDonnell. 1998, *Principals of Geographical Information Systems*. New York: Oxford University Press.

DeMers, M. N., 2009. *Fundamentals of Geographic Information Systems*. 4th edition. New York, N.Y.: John Wiley & Sons, 443 pp.

Jensen, John R., and Ryan R. Jensen.2012. *Introductory geographic information systems*. Pearson Higher Ed (ISBN: 978-0136147763)

 (Other readings may also be assigned and will be provided accordingly.)

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 will be automatically wiped out when the computers are rebooted. SAVE YOUR FILES!!!

Attendance Policy

Attendance and full participation in classes is expected of all students. Attendance will be checked periodically. The class participation credit is given based on class attendance and/or in-class/take-home exercises. If you do not show up, 5 points will be deducted each time.

Make-up Policy

If a student misses an exam, 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 exam.

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.
- If a laptop is used to take lecture notes, please sit in the back of the classroom.

Important Dates:

- August 27, Tuesday   First day of class
- August 29, Thursday   First day of lab
- September 5, Thursday   Last day to drop or add and adjust final fees
- September 6, Friday   "W" grade begins
- October 18, Friday   First Half Spring Term ends
- October 23, Wednesday   Deficiency reports due on WebAdvisor by midnight
- November 8, Friday   Last day to drop a course
- November 27-December 1   Thanksgiving recess
- December 11, Wednesday   No classes; Final exam preparation
- December 12-18, Thur. – Wed. Final exams

Overall Course Goals

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

1. Understand and recall the fundamental concepts and principles of GIS.
2. Understand the procedures in GIS data collection, creation, processing, management, analysis, and visualization.
3. Apply the knowledge learned in the class to accomplish a GIS project.
4. Be competent to use ArcGIS Pro in GIS projects.

Student Learning Outcomes

Knowledge Outcomes

Students will master the basic concepts and principles in GIS and learn how to use GIS to compile, process, manage, analyze and visualize spatial data for a specific real-world application.

Skills Outcomes

Students will **develop specific skills and competencies in GIS** and **learn to manipulate spatial data in real-world applications**. Students will use the methods learned 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)	Points	Percent Value
Participation	TBD	100	10%
Lab Assignments (11)	40	440	44%
Midterm Exam	100	100	10%
Final Exam	100	100	10%
Final Presentation	60	60	6%
Final Paper	200	200	20%
Total		1000	100%

Course Grade Scale

Grade	Final weighted points
A	90-100
B	80-89
C	70-79
D	60-69
F	< 60

Weekly Lab Exercises: In the labs, we will use ArcGIS Pro to reinforce the concepts covered in the lectures. We have one lab each week. Although class time has been allocated for lab tutorials and assignments, additional work may also be necessary. Lab assignments must be submitted electronically through the Dropbox on D2L. The TA will grade the assignments and post the grades in D2L. Points will be deducted each day for late submissions (Please check the lab syllabus for more details).

Exam: This course has two exams. Each exam will include true/false questions, multiple choice questions, matching questions, short answer questions, and comprehensive essay questions. The questions come from the key points covered in the lecture, and a study guide will be given before each exam.

Final Project: The students are expected to use what they have learned in the class to accomplish a final project. The project is about compiling relevant data, organizing the data in a geodatabase, performing some analysis, and mapping out the results for a specific application. The project must be original work. Thus, the students are STRONGLY encouraged to discuss with the instructor regarding project ideas as early as possible.

Specifically, the final project should include the following components:

1. A project proposal that includes introduction, background, data sources, GIS methods, and expected results. (within 8 pages (including figures), word count: 800~1,500 (undergraduate), 1,500~2,000 (graduate))
2. A PowerPoint presentation (about 15 minutes) that summarizes the key steps in the project.
3. A final report that consists of title, introduction, background, spatial data compilation, spatial processing/analysis, results, discussion, and conclusion (10 ~ 25 pages (double-spaced); word count: 2,000~3,000 (undergraduate), 3,000~4,000 (graduate)). APA format should be used in the final report, and students are strongly encouraged to use EndNote to manage the citations.

More details on each component will be provided during the semester. Please refer to D2L for specific due dates.

Class Participation: The course requires a regular attendance in BOTH lectures and labs. Student participation in class discussion and interaction is strongly encouraged. I will check attendance periodically. The class participation credit is given based on class attendance and in-class/take home exercises/quizzes.

Lab Section & Final Project

The lab section is designed to help students gain hands-on experience in spatial database design and management. There will be a number of weekly assignments for the students to enhance their skills in spatial databases. Upon the completion of these specially designed labs, the students will work on a final project to demonstrate their competency in using spatial databases in real-world applications. Please note:

- Attendance to all of the labs is required and lab attendance will be graded.
- The weekly lab assignments need to be completed and submitted on time; penalty will be applied for the late submissions (Please refer to the lab syllabus for more details).
- NEVER try to skip a lab or leave one unfinished before starting another one - the technical skills required for a latter lab are often based on previous ones.
- NEVER be too shy to ask. Feel free to ask me or your lab instructor if you have any questions.

- Memorize all the commands, the procedures, and the solutions you used to solve each of the problems or generate each of the maps.

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.