

**San José State University**  
**Geography and Global Studies**  
**Geography 175 GIS Project Development, Section 1, Spring, 2015**

**Course and Contact Information**

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<b>Office Hours:</b>	M 3:00-4:30 PM, T 3:30-6:00 PM, and by appointment
<b>Class Days/Time:</b>	MW 10:30-11:45
<b>Classroom:</b>	WSQ 111

Course materials such as the syllabus, handouts, notes, assignment instructions, etc., can be found on the Canvas learning management system course website. You are responsible for regularly checking with Canvas to learn of any updates.

**Course Description**

Creation of geographic information system databases and application software to solve specific problems in such areas as resource and facilities management, demographic analysis and planning. Prerequisite: Geog 170 or instructor consent.

The objective for Geography 175 is for you to be able to design and construct a geographic information system project to solve problems in environmental management, business, or earth science research. You will gain an understanding the technical elements of a GIS project and become familiar with GIS application issues. We will also be addressing the construction of the databases and applications software required to solve a variety of application problems.

Eight laboratory exercises will develop your knowledge of GIS database design and application scripting, and prepare you for your final project. Database design issues will focus on the ArcGIS geodatabase. Application scripting will focus on mastering Python in the ArcGIS geoprocessing environment..

The final project may involve constructing or prototyping a geographic information system, designing and building a geodatabase, or creating a scripting tool to extend the GIS's functionality

**Learning Outcomes and Course Goals**

**Course Learning Outcomes (CLO)**

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

1. CLO 1 Understand the foundations of geodatabase design
2. CLO 2 Understand basic application scripting
3. CLO 3 Design an application-oriented geodatabase
4. CLO 4 Design and implement a script to automate common GIS operations

## Required Texts/Readings

### Textbook

Zeiler, M. (2010) *Modeling Our World: The ESRI Guide to Geodatabase Concepts*. Ingram Pub. ISBN: 9781589482784 (Text)

Arctur, D. and Zeiler, M. (2004) *Designing Geodatabases: Case Studies in GIS Data Modeling*. Ingram Pub. ISBN: 9781589480216 (Text)

Zandbergen, P.A. (2013) *Python Scripting for ArcGIS*. Ingram Pub. ISBN: 9781589482821 (Optional)

Dawson, M. (2003). *Python Programming for the Absolute Beginner*. Muska & Lipman. (Optional).

Lutz, M., and Ascher, D. (2003) *Learning Python*, 2nd ed. O'Reilly (Optional).

### Other Readings

Additional readings will be available in Canvas.

DeMers, M.N. (2000). *Fundamentals of Geographic Information Systems*. 2nd ed. Wiley. (selected pages)

Kent, W. (1983). "A simple guide to five normal forms in relational database theory." *Communications ACM*, 26, p. 120-125.

### Course Requirements and Assignments

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in [University Policy S12-3](http://www.sjsu.edu/senate/docs/S12-3.pdf) at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

The lectures and examinations will cover all learning outcomes. The Exercises 1-3 will address learning outcomes 1 and 3, and Exercise 4-8 will address learning outcomes 2 and 4. The final project will address learning outcomes 1-4 as appropriate for the selected project objective (it may be geodatabase design, scripting, or a combination of both).

Most exercises results should be uploaded to the assignment upload in Canvas. These will include exercise result files, writeups, and PDFs or image (JPEG) versions of all of your maps and diagrams. You should also keep a copy for future use in an electronic portfolio (esp. Geography majors).

You may occasionally be asked to submit some materials in a manila folder for an exercise. Label the folder with your name, the course name and semester, and exercise number on it, and only include the materials for one exercise in the folder. Examples of materials that may need to be submitted physically in a folder include hand drawn diagrams.

The following criteria will be the basis for exercise evaluation. You should keep them in mind when working on your exercises.

#### 1. *Data preparation*

Data should be properly processed. This means that your data classification and organization should be logical. You should use appropriate methods of data organization, generalization, and symbolization.

#### 2. *Graphic design*

All of your maps and other graphics should demonstrate appropriate graphic design. Selection of symbolization, including line weights, symbol sizes, and text sizes, should reflect the overall objective for the map. You should use the different elements of graphic design appropriately in order to produce an effective

map presentation that is both interesting and readable.

### 3. *Quality of execution*

The final product should demonstrate a high degree of quality. Maps should include all appropriate information, such as scales, north arrows, grid markings, etc. (“appropriate” is based on the purpose of the map).

Scripts should execute completely without failure. Test your scripts before submission. The script source code should be formatted to be easily read, and should include appropriate comments to indicate what is being done. Extraneous code should be removed.

### 4. *Quality of Write-up*

Any write-up should be a brief, but complete description of the operations you performed and the decisions you made in solving an exercise or project problem. It should include a brief summary of the GIS problem and your approach to solving that problem. It should also include the results that you obtained. You should include documentation on how to use any scripts, buttons, or tools you developed for the activity. This documentation should include a brief description of the script, tool, or button, and a statement of how it is initiated, applicable contexts (when should it be used and with what other features), and limitations. Your write-ups should be limited to one-page, unless you are instructed otherwise.

### 5. *Demonstrations*

Any demonstrations should include all required tasks. These serve to show that you have completed the assigned exercises and are capable of reproducing the results. You should be prepared to go through the demonstration without interruption: practice beforehand.

Feb 10 Exercise 1 due

Mar 3 Exercise 2 due

17 Exercise 3 due

24 **Examination 1**

Exercise 4 due

31 Exercise 5 due

Apr 7 Exercise 6 due

14 Exercise 7 due

28 **Examination 2**

Exercise 8 due

May 19 **Final Project Presentations** (Tue, May 19 1715-1930)

These dates are subject to change with fair notice. Notice will be given in Canvas and via email to the address indicated in MYSJSU. You should make sure your email address is up-to-date.

NOTE that [University policy F69-24](http://www.sjsu.edu/senate/docs/F69-24.pdf) at <http://www.sjsu.edu/senate/docs/F69-24.pdf> states that “Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.”

## **Grading Policy**

You will be evaluated on 8 exercises, 2 examinations, and a final project. The exercises will be distributed and submitted via Canvas. Grades for late exercises will be reduced 5% of the total for that assignment, for each

week past the due date.

Examinations will cover materials from the lectures and readings and will consist of multiple-choice, short answer, and short essay questions. Make up examinations will be arranged as necessary, and may be based on different questions than those on the original examination.

No extra credit is available.

Grades will be based on total work completed successfully. The different materials will be weighted as follows:

Exercises	30% of course grade (Exer 1-3: 5% each; Exer 4-8: 3% each)
Examinations	50% of course grade (25% each)
Final Project	20% of course grade (20%)

Grades are determined as a total of the weighted scores, which will end up out of 100 possible points. Letter grades will initially be assigned based on those scores, with 90-100 being the A range, 80-89.99 being the B range, 70 to 79.99 being the C range, and 60 to 69.99 being the D range. A weighted score below 60 is a failing grade. Letter grades may be raised based on the difficulty of the examinations and other assignments. Grades will not be lowered below the ranges indicated here.

Note that “All students have the right, within a reasonable time, to know their academic scores, to review their grade-dependent work, and to be provided with explanations for the determination of their course grades.” See [University Policy F13-1](http://www.sjsu.edu/senate/docs/F13-1.pdf) at <http://www.sjsu.edu/senate/docs/F13-1.pdf> for more details.

## **Classroom Protocol**

### **Eating:**

Eating and drinking (including water) are prohibited in the Geography Laboratory. Eating is permitted in the Geography seminar room.

### **Cell Phones and pagers:**

You will turn your cell phones and pagers off or put them on vibrate mode while in class. You will not answer your phone in class. Students whose phones disrupt the course and do not stop when requested by the instructor will be referred to the Judicial Affairs Officer of the University.

### **Computer Use:**

You may use computers in the classroom only for class-related activities. These include activities such as taking notes on the lecture underway, following the lecture on electronic materials that the instructor has posted, and finding Web sites to which the instructor directs students at the time of the lecture. Students using their computers for other activities or who abuse the equipment in any way at a minimum, will be asked to leave the class and, at a maximum, will be referred to the Judicial Affairs Officer of the University for disrupting the course (such referral can lead to suspension from the University). Students are urged to report to their instructors computer use that they regard as inappropriate (i.e., used for activities that are not class related).

## **University Policies**

### **Dropping and Adding**

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester’s [Catalog Policies](http://info.sjsu.edu/static/catalog/policies.html) section at <http://info.sjsu.edu/static/catalog/policies.html>. Add/

drop deadlines can be found on the current academic year calendars document on the [Academic Calendars web-page](http://www.sjsu.edu/provost/services/academic_calendars/) at [http://www.sjsu.edu/provost/services/academic\\_calendars/](http://www.sjsu.edu/provost/services/academic_calendars/). The [Late Drop Policy](http://www.sjsu.edu/aars/policies/latedrops/policy/) is available at <http://www.sjsu.edu/aars/policies/latedrops/policy/>. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the [Advising Hub](http://www.sjsu.edu/advising/) at <http://www.sjsu.edu/advising/>.

### **Consent for Recording of Class and Public Sharing of Instructor Material**

[University Policy S12-7](http://www.sjsu.edu/senate/docs/S12-7.pdf), <http://www.sjsu.edu/senate/docs/S12-7.pdf>, requires students to obtain instructor's permission to record the course and the following items to be included in the syllabus:

- *“Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor's permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.”*
  - *It is suggested that the greensheet include the instructor's process for granting permission, whether in writing or orally and whether for the whole semester or on a class by class basis.*
  - *In classes where active participation of students or guests may be on the recording, permission of those students or guests should be obtained as well.*
- *“Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.”*

### **Academic integrity**

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The [University Academic Integrity Policy S07-2](http://www.sjsu.edu/senate/docs/S07-2.pdf) at <http://www.sjsu.edu/senate/docs/S07-2.pdf> requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The [Student Conduct and Ethical Development website](http://www.sjsu.edu/studentconduct/) is available at <http://www.sjsu.edu/studentconduct/>.

### **Campus Policy in Compliance with the American Disabilities Act**

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. [Presidential Directive 97-03](http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf) at [http://www.sjsu.edu/president/docs/directives/PD\\_1997-03.pdf](http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf) requires that students with disabilities requesting accommodations must register with the [Accessible Education Center](http://www.sjsu.edu/aec) (AEC) at <http://www.sjsu.edu/aec> to establish a record of their disability.

### **Accommodation to Students' Religious Holidays**

San José State University shall provide accommodation on any graded class work or activities for students wishing to observe religious holidays when such observances require students to be absent from class. It is the responsibility of the student to inform the instructor, in writing, about such holidays before the add deadline at the start of each semester. If such holidays occur before the add deadline, the student must notify the instructor, in writing, at least three days before the date that he/she will be absent. It is the responsibility of the instructor to make every reasonable effort to honor the student request without penalty, and of the student to make up the work missed. See [University Policy S14-7](http://www.sjsu.edu/senate/docs/S14-7.pdf) at <http://www.sjsu.edu/senate/docs/S14-7.pdf>.

## Student Technology Resources

Computer labs for student use are available in the [Academic Success Center](http://www.sjsu.edu/at/asc/) at <http://www.sjsu.edu/at/asc/> located on the 1st floor of Clark Hall and in the Associated Students Lab on the 2nd floor of the Student Union. Additional computer labs may be available in your department/college. Computers are also available in the Martin Luther King Library. A wide variety of audio-visual equipment is available for student checkout from Media Services located in IRC 112. These items include DV and HD digital camcorders; digital still cameras; video, slide and overhead projectors; DVD, CD, and audiotape players; sound systems, wireless microphones, projection screens and monitors.

## SJSU Peer Connections

Peer Connections, a campus-wide resource for mentoring and tutoring, strives to inspire students to develop their potential as independent learners while they learn to successfully navigate through their university experience. You are encouraged to take advantage of their services which include course-content based tutoring, enhanced study and time management skills, more effective critical thinking strategies, decision making and problem-solving abilities, and campus resource referrals.

In addition to offering small group, individual, and drop-in tutoring for a number of undergraduate courses, consultation with mentors is available on a drop-in or by appointment basis. Workshops are offered on a wide variety of topics including preparing for the Writing Skills Test (WST), improving your learning and memory, alleviating procrastination, surviving your first semester at SJSU, and other related topics. A computer lab and study space are also available for student use in Room 600 of Student Services Center (SSC).

Peer Connections is located in three locations: SSC, Room 600 (10th Street Garage on the corner of 10<sup>th</sup> and San Fernando Street), at the 1st floor entrance of Clark Hall, and in the Living Learning Center (LLC) in Campus Village Housing Building B. Visit [Peer Connections website](http://peerconnections.sjsu.edu) at <http://peerconnections.sjsu.edu> for more information.

## SJSU Writing Center

The SJSU Writing Center is located in Clark Hall, Suite 126. All Writing Specialists have gone through a rigorous hiring process, and they are well trained to assist all students at all levels within all disciplines to become better writers. In addition to one-on-one tutoring services, the Writing Center also offers workshops every semester on a variety of writing topics. To make an appointment or to refer to the numerous online resources offered through the Writing Center, visit the [Writing Center website](http://www.sjsu.edu/writingcenter) at <http://www.sjsu.edu/writingcenter>. For additional resources and updated information, follow the Writing Center on Twitter and become a fan of the



SJSU Writing Center on Facebook. (Note: You need to have a QR Reader to scan this code.)

## SJSU Counseling Services

The SJSU Counseling Services is located on the corner of 7<sup>th</sup> Street and San Fernando Street, in Room 201, Administration Building. Professional psychologists, social workers, and counselors are available to provide consultations on issues of student mental health, campus climate or psychological and academic issues on an individual, couple, or group basis. To schedule an appointment or learn more information, visit [Counseling Services website](http://www.sjsu.edu/counseling) at <http://www.sjsu.edu/counseling>.



# Geography 175 GIS Project Development, Section 1, Spring, 2015, Course Schedule

Date	Lecture / Discussion	Reading	Laboratory
Jan 27	Introduction	Zeiler 1–Inside the geodatabase, 2–Coordinate systems and map projections DeMers 431–460	Ex 1: Thematic data structuring
Feb 3	Modeling geographic features, GIS actions & Geographic database design	Zeiler 3: Vector modeling with features, 4: Linear modeling with networks, 5: Linear referencing with routes, 6: Finding places with locators, 7: Imagery and cell modeling with rasters and mosaics DeMers 92-98, 128–156.	"
10	"	Zeiler 8: Surface modeling with terrains, 9: Temporal modeling with time-enabled layers, 10: Multiuser editing with versioning	Ex 2: Geodatabase structuring
17	"	Arctur & Zeiler, 1, 9; Student chapter discussions	"
24	<b>Spring Recess</b>		
Mar 3	Modeling structures	Handout: Class Diagrams	Ex 3: Geodatabase design
10	"	"	"
17	Modeling processes	Handout: Use cases, Interaction diagrams, Activity diagrams	Ex 4: GIS scripting 1
24	<b>Examination 1</b>		Ex 5: GIS scripting 2
31	GIS scripting	Guide to Programming; Handout: UML and programming (Optional: Zandbergen, Lutz & Ascher, or Dawson)	Ex 6: GIS scripting 3
Apr 7	"	"	Ex 7: GIS scripting 4
14	"	"	Ex 8: GIS scripting 5
21	"	"	"
28	<b>Examination 2</b>		GIS Project
May 5	GIS Project		"
12	"		"
19	"		"
26	<b>Project presentations</b>		

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