San José State University
College of Social Sciences/Geography & Global Studies
Geography 239: Geographic Information Technology Section 1 Fall, 2017

Course and Contact Information

Instructor:	Maureen Kelley, PhD
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Office Hours:	Mondays & Wednesdays 1400 to 1430 & by appointment
Class Days/Time:	Seminar: Mondays 1800 to 1845 Lab: Mondays 1900 to 2045
Classroom:	Seminar: WSQ111 Lab: WSQ113
Prerequisites:	Graduate level standing or instructor consent
GE/SJSU Studies Category:	

Course Format

This course will be taught as a seminar where active participation by all students is essential. Course readings, exercises, graded participation, research project, and final paper will be used as a basis for grading.

Course Description

Research in application of technology to the design and implementation of computer mapping, remote sensing, and geographic information systems. Includes spatial database design issues, spatial processing algorithms, and cartographic visualization. Research project and paper. May be repeated for credit when offered as a different technology.

This course is designed to research and implement methods to depict spatiotemporal data through static to dynamic techniques. Readings from peer-review articles and discussions are used to gain an understanding of the past and current techniques used to depict and model geographic phenomena. Students will develop their ability to think spatially and temporally, design and implement their own geographic information systems (GIS) project, and communicate their results graphically through a map or poster as well as written report.

Course Learning Outcomes (CLO) (Required)

At the end of the course students should be able to:

CLO1: Demonstrate the ability to define a research problem and design and execute a research project.

1. All exercises and the final project are designed such that students must follow the standard procedure of defining the research problem, identifying steps to manage the project, and producing a final product such as a map or report.

CLO2: Demonstrate the ability to communicate research results in verbal, graphic, and written format.

1. All exercises will be presented to class in verbal and graphic format. The final project will be presented in verbal and graphic form via a slide presentation at the end of the semester. The final project's report will utilize graphics and the written word.
2. Students must demonstrate their ability to understand and communicate research results from peer-reviewed journal articles.

CLO3: Demonstrate understanding how geospatial technologies may be applied to a variety of problems.

1. The course readings, all exercises, and the final project are designed to expose students to the varieties of methods used to depict and/or solve geospatial, in this case spatiotemporal, problems.

Required Readings

Textbooks

For ArcGIS Desktop:

Harder, C., Ormsby, T., & Balstrom, T. (2013). *Understanding GIS: An ArcGIS project workbook, 2nd ed.* Redlands, CA: ESRI Press.

The ISBN–13 number is 978–1589483460 and is available through third party sellers such as Amazon.

For ArcGIS Pro:

Smith, D., Strout, N., Harder, C., Moore, S., Ormsby, T., & Balstrom, T. (2017). *Understanding GIS: An ArcGIS Pro project workbook.* Redlands, CA: ESRI Press.

The ISBN–13 number is 978–1589484832 and will be available at Spartan Bookstore and ESRI Press by mid-September. A e-book is available (ISBN–13 978–1589484955) from ESRI Press and third party sellers.

Course Readings

DiBiase, D., MacEachren, A. M., Krygier, J. B., & Reeves, C. (1992). Animation and the role of map design in scientific visualization. *Cartography and Geographic Information Systems*, *19*, 201–214.

Harrower, M., & Fabrikant, S. (2008). The role of map animation in geographic visualization. In *Geographic visualization: Concepts, tools, and applications*. M. Dodge, M. McDerby, & M. Turner (Eds.). New York: Wiley & Sons.

Kraak, M. J. (2014). *Mapping time: Illustrated by Minard's map of Napolean's Russian campaign of 1812*. 1–44, 45–58, 77–126, 127–133. Redlands, CA: ESRI Press.

Students are also required to contribute to course readings where noted. Sign-ups will start first day of class and be posted on Canvas.

Other technology requirements/equipment/material

Computer Internet access is essential for accessing materials and uploading assignments on Canvas. All assignments must be submitted and uploaded to Canvas in Adobe portable document format (.pdf) or Microsoft Word Document format (.doc or .docx) only.

Access to ArcGIS desktop or ArcGIS Pro, an open source GIS application such as QGIS, as well as Python or the R spatial statistics programming language is essential for the class. An external storage device or access to a cloud computing service is required to save work in the geospatial lab.

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 such as readings, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3 at http://www.sjsu.edu/senate/docs/S12-3.pdf.

University policy F69–24 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."

Exercises

There will be five laboratory exercises based on the topics for each module. The following is a breakdown of each exercise:

Exercise	Points
1: Depicting spatiotemporal data with one graphic	25
2: Depicting spatiotemporal data with small multiples	25
3: Modeling spatiotemporal data with ArcGIS	50
4: Modeling spatiotemporal data with ArcScene	50
5: Modeling spatiotemporal data with Python or R	100
Total	**250**

Demonstration of each student's completed exercise is essential to receive full credit. Demonstrations will be performed at the beginning of each lab session as stated on the calendar. The points for all exercises is 250 and worth 31.25% of the final grade.

Class Participation

Class participation is mandatory for all graduate level courses and is a vital element of this course. Your class participation grade will include contributing to course-related readings, reading weekly

assignments prior to attending class, being an active participant on Canvas, and actively participating in class discussions.

The majority of the participation points are earned by responding on the appropriate Canvas Participation page the answers to questions posed each class session. The questions will be posted on the Canvas website on the Discussions web pages. Class participation is worth 250 points or 31.25% of your final grade.

Final Project

There is one project required for this course. The final project is to familiarize students with designing and implementing a GIS project from inception to final output. Students are free to select the appropriate GIS project directly related to depicting spatiotemporal data. A minimum of four time slices are required for the final project—there will be no exceptions.

Graduate students are required to submit an eight to ten page formal academic paper (2,500 words) at the end of the term. Undergraduate students may opt for a formal academic poster presentation but the minimum word count must be 2,000 words.

Task	Points
Preliminary proposal (Proposal 1)	10
Annotated bibliography	25
Final proposal, project timeline, & bibliography (Proposal 2)	40
Data dictionary & data management schema	50
Analysis & accuracy assessment	25
First draft of final report	25
Results in the form of a final report & GIS project	100
Results as 5-minute slide presentation	25
Total	**300**

The final project is worth 300 points, 37.5%, of the final grade.

Grading Information

Correct use of English is a fundamental requirement for your assignments to be graded. If errors in English make it difficult for a grader to understand your sentences, or excessively slow down the grader to mark your technical errors; then your assignment will be returned to you for further work on its English and formatting, and your grade for the paper will be deferred until it is resubmitted.

If your assignments are returned for an excessive number of grammatical and technical errors, (10 errors) then you will be allowed to rewrite and resubmit it within two weeks from the original due date. After the two weeks of the my initial grading period, all assignments will be considered final. If you did

not take advantage of the redo, then the final grading stands—all detected errors will be downgraded accordingly. Please conform to the American Psychological Association (APA) style guidelines. See the Canvas webpage for more information.

Determination of Grades

A strong performance in all areas of assessment is necessary to achieve the highest grade in this course. You will not be graded on attendance. However, it is not possible to do well if you are not present in class to join in discussions and to complete assignments and exercises.

It is your responsibility to inform me in advance if you know you must miss a class for a valid reason. Excused absences refer to illness, family responsibilities, and similar necessities. Exceptions to these policies will be made only in the case of officially documented emergencies. Contact me regarding emergencies as soon as possible—before an assignment is due rather than after it is already late—so special arrangements may be made.

Grade Breakdown

Assignments	Points	Percent
Exercises (5)	250	31.25
Participation	250	31.25
Final Project	300	37.50
Total	**800**	**100.00**

Letter Grades: Percentage Ranges & Point Ranges

Letter Grade	Percent Range	Points Range	Letter Grade	Percent Range	Points Range
A+	97.00 to 100.00	776.0 to 800.0	C+	77.00 to 79.99	616.0 to 639.9
A	93.00 to 96.99	744.0 to 775.9	C	73.00 to 76.99	584.0 to 615.9
A−	90.00 to 92.99	720.0 to 743.9	C−	70.00 to 72.99	560.0 to 583.9
B+	87.00 to 89.99	696.0 to 719.9	D+	67.00 to 69.99	536.0 to 559.9
B	83.00 to 86.99	664.0 to 695.9	D	63.00 to 66.99	504.0 to 535.9
B−	80.00 to 82.99	640.0 to 663.9	D−	60.00 to 62.99	480.0 to 503.9
			F	0.00 to 59.99	0.00 to 479.9

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 at http://www.sjsu.edu/senate/docs/F13-1.pdf for more details.

Penalty for Late or Missed Work

Assignments not submitted on the due date and assigned time will be marked down. There will be a 2% reduction in grade for each calendar day that your assignment is late. Any assignment that is overdue by two weeks (four class meetings, 14 calendar days) is considered late and will receive a zero (0).

Extra Credit

There will be one extra credit assignment worth 50 points related to presenting at San Jose State's GIS day.

Classroom Protocol

We all want to be in a positive learning environment. Course content can be challenging. I expect everyone to be respectful of opinions, other students, and the instructor. I will make every effort to be prepared for class, start and end class on time, and be available during my office hours for help.

I expect my students to be prepared for class, come to class on time, and turn in assignments on time. I expect all students to refrain from reading non-course-related materials during class, no passing notes, no cross talking, no sleeping, etc. The use of any personal communication devices during class time is not allowed other than for course related work only.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs'Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/"

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(Schedule is subject to change with fair notice. Review Canvas Home Page for more information)

Week	Date	Topics	Readings	Activities	Due
2	08/28	Introductions		Proposal 1	
3	09/04	LABOR DAY			
4	09/11	Depicting spatiotemporal data with flow data: Minard's map	(Kraak, 2014) p. 1–44	Exercise 1 Annotated bibliography	Proposal 1
5	09/18	Depicting time	(Kraak, 2014) p. 45–58 Student-led	Lab time	
6	09/25	Depicting spatiotemporal data with flow data	(Kraak, 2014) p. 77–103	Exercise 1 demonstrations Exercise 2	Exer. 1
7	10/02		Student-led	Proposal 2 Lab time	Annotated bibliography
8	10/09	Modeling spatiotemporal data with GIS	(Kraak, 2014) p. 104–133	Exercise 2 demonstrations Exercise 3	Exer. 2
9	10/16		Student-led	Lab time	Proposal 2
10	10/23		Student-led	Data Dictionary & Data Management (DD&DM) Analysis & Accuracy Assessment (A&A) Lab time	
11	10/30	Modeling spatiotemporal data with data animation tools	(DiBiase, et al., 1992 (Harrower & Fabrikant, 2008)	Exercise 3 demonstrations Exercise 4	Exer. 3
12	11/06		Student-led	Lab time	DD&DM/ A&A
13	11/13		Student-led	Lab time	
14	11/20	Modeling spatiotemporal data with scripts		Exercise 4 demonstrations Exercise 5	Exer. 4 First Draft
15	11/27		Student-led	Lab time	
16	12/04		Student-led	Lab time	
17	12/11	Wrap-up & review		Lab time	Exer. 5 Results--report
FINAL EXAM	12/18	**FINAL EXAM (1715 to 1930, WSQ113)**			Results—slide presentation