

**San José State University**  
**College of Social Science, Department of Urban and Regional Planning**  
**Geographic Information Technology 239, Spring 2020**

## **Course and Contact Information**

Instructor: Dr. Priyanka Vyas

Office Location: WSQ 113

Email: [Priyanka.Vyas@sjsu.edu](mailto:Priyanka.Vyas@sjsu.edu)

Office Hours: 4:30-5:30 pm on Monday; by appointment

Class Days/Time: Monday: 6:00-8:45 pm

Location: WSQ 113

Course materials such as syllabus, handouts, notes, assignment instructions, and so forth are found on the [Canvas Learning Management System course login website](http://sjsu.instructure.com) at <http://sjsu.instructure.com>. You are responsible for regularly checking with the messaging system through [MySJSU](http://my.sjsu.edu) at <http://my.sjsu.edu> and the Canvas website to learn of any updates.

## **Course Description**

Geography 239: This course focusses on applying spatial and statistical concepts by using appropriate GIS-based tools and technology. Since GIS programs offer a wide variety of tools to solve problems, it often presents a challenge to the GIS analyst or a programmer to use the appropriate methods, make judgements about using one measure versus other, and defend these choices. Sometimes the choice of the method used is based on the analyst's knowledge of the measure and method without careful consideration of the context to which the measure is being applied. This course will expose students to a variety of spatial concepts, various approaches to measure these concepts, and towards applying tools of both static and dynamic mapping using a suite of GIS-based tools and techniques. At the end of the course students will demonstrate application of appropriate concepts and methods using a variety of tools in the context of an urban problem.

## **Student learning outcomes:**

1. Demonstrate automation of geoprocessing tasks and application of tools using R packages
2. Apply web-based data visualization methods using languages like Shiny and Leaflet
3. Distinguish between geostatistical approaches for point versus area-based approaches

4. Demonstrate an understanding of the concept of spatial autocorrelation for point and area-based data
5. Apply geostatistical concepts using appropriate software and tools
6. Develop competence in a suite of mapping software and programs and evaluate the strengths and weakness of different software

By the end of the course students will develop proficiency in applying spatial and statistical methods using R and ArcGIS. In addition, students will be able to exposed to specialized GIS programs such as Geoda, CrimeStat, Maptitude, SaTScan that offer additional analytical functionalities for spatial analysis.

### Required Textbooks:

There is no required textbook for this course. Relevant course material, reading, and R scripts will be posted on a weekly basis on the online canvas system.

### Tentative course schedule

Week	Topic
Jan 27	Introduction: Syllabus and approaches to spatial thinking
Feb 3	Exploring GIS data sources and types: Sources of vector and raster data Types of spatial data
Feb 10	Spatial process: Part 1 Theoretical concepts and implementation in ArcGIS and R
Feb 17	Spatial process: Part 2 Theoretical concepts and implementation in ArcGIS and R
Feb 24	Area-based approaches to spatial and statistical analysis Concepts and implementation in ArcGIS and R
March 2	Spatial concepts and measurements relevant for urban planning and geography Defining neighborhoods: Theories and applications in R
March 9	Spatial concepts and measurements relevant for urban planning and geography Spatial equity: Theories and applications
March 16	Spatial concepts and measurements relevant for urban planning and geography: Residential segregation and income inequality: Theories and applications
March 23	Spatial concepts and measurements for urban planning and geography Assessing land use pattern and models Theories and applications
<b>March 30 – April 3</b>	<b>Spring Break – No class</b>
April 6	Spatial concepts and approaches relevant to urban planning and geography: Urban planning and public health Theories and applications

April 13	Spatial concepts and approaches relevant to urban planning and geography: Analysis of crime Software demo
April 20	Student's mini presentation of comparative software
April 27	Web-based visualization techniques Implementation in ArcGIS and R
May 4	Web-based visualization techniques Implementation in ArcGIS and R
May 11	Final presentation and report due

### Grade Distribution

Criterion	Grade Distribution	Points
Class participation	20%	200
Labs	30%	300
Student evaluation of comparative software programs	10%	100
Final project	30%	300
Final presentation	10%	100
<b>Total</b>	<b>100%</b>	<b>1000</b>

### Letter grade:

A+	A	A-	B+	B	B-
97-100%	94-96.99%	90-93.99%	87-89.99 %	84-86.99%	80-83.99%
C+	C	C-	D+	D	D-
77-79.99 %	74-76.99 %	70-73.99 %	67-69.99%	60-66.99 %	51-59.99 %
F					
0-50.99					

Class format and classroom citizenship	The class will be usually be a combination of a lecture and demonstration of a software application based on the material covered during the class. The lectures will be a combination of instructor-led presentation and a series of in-class active learning exercises aimed towards achieving the various student learning outcomes stated in the syllabus. Therefore, missed attendance will reflect in the grades towards class participation. Students are expected to arrive to the class
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	<p>in-time and stay until the class is over. If students need to leave early on a specific day for a valid reason, students must inform the instructor in advance via email or before the beginning of the class. Cell phones must be kept on a silent mode and must not be used during the class unless its use is a part of a classroom activity to enhance learning. Laptops may be used in the class. However, the usage is strictly limited to taking lecture notes and class related activities. No browsing on the internet or social media sites is allowed. The best way to contact the instructor is via SJSU email. Please send an email with your SJSU email and not from any other emails such as gmail. If you disagree with the instructor on the grade, please send an email to the instructor stating the reasons, within 48 hours after the grades have been assigned.</p>
Late work	<p>Late lab assignments will lead to a reduction of 2 points per day. There will be no points assigned if the lab is turned one week late.</p>
Make-up presentation	<p>There will be no make-up presentation that will be allowed without a legitimate reason (a medical reason or a personal/family emergency).</p>
University policy	<p>Per <a href="http://www.sjsu.edu/senate/docs/S16-9.pdf">University Policy S16-9</a> (<a href="http://www.sjsu.edu/senate/docs/S16-9.pdf">http://www.sjsu.edu/senate/docs/S16-9.pdf</a>), relevant information to all courses, such as academic integrity, accommodations, dropping and adding, consent for recording of class, etc. is available on Office of Graduate and Undergraduate Programs' <a href="http://www.sjsu.edu/gup/syllabusinfo/">Syllabus Information web page</a> at <a href="http://www.sjsu.edu/gup/syllabusinfo/">http://www.sjsu.edu/gup/syllabusinfo/</a>".</p>
Library liason	<p>You can seek assistance from Nyle Monday in the MLK library at <a href="mailto:nyle.monday@sjsu.edu">nyle.monday@sjsu.edu</a> or (408) 808-2041.</p>