

San José State University Department of Geography
Geog239: GEOGRAPHIC INFORMATION TECHNOLOGY Spring 2015

Classroom:	Washington Square Hall 111
Class Days/Time:	Monday, 6:00PM - 8:45PM
Instructor:	Gary M. Pereira
Email:	gary.pereira@sjsu.edu
Office Location:	Washington Square Hall 111
Office Hours:	Monday 2:00 - 5:00, Thursday 4:00 – 5:00

Course Description

In general, this seminar covers research into the application of existing **technologies** to problems of **geography**. Included are discussions of spatial (and temporal) representation, database and decision system design issues, data fusion, feature selection, feature extraction, knowledge-based analysis and decision making, distributed processing, visualization, etc.

This semester we will focus on the possibilities offered by recent advances in **distributed intelligence**. Interdisciplinary investigations of dynamic, autonomous, distributed agency provide important insights into a great number of technological and conceptual challenges facing workers in geography and related disciplines. For example, **neural networks** can be used to extract important features, patterns and parameters for any domain-specific decision from the wealth of information that may be available in the form of both quantitative and qualitative 'data'. **Neuro-fuzzy networks** and distributed **knowledge-based systems** can provide an improved basis for human comprehension complex systems. The growth of cities, the spread of pests and diseases, and other forms of spatial propagation, diffusion and contagion involving changes in the attributes of locations in response to changes taking place nearby might be modeled using **cellular automata**. Distributed nodes of cooperative interactive search can be modeled using **swarm** methodologies. Proactive sources of mobile or non-spatial systems of distributed agency like pedestrian and vehicular traffic and the influence of non-spatial economic or governmental agents can be represented with the use of **agent based simulations** and **multi-agent systems**. All of these technological innovations involving distributed intelligence or distributed processing will enter into our discussion, accompanied by an examination of selected internet sources and demonstrations.

Course Goals and Student Learning Objectives

In general, the objective is to understand the topics listed above well enough to generate conceptual designs and eventually implement one or more of them using whatever technological tools (both hardware and software) the student cares to use. Although the details of specific software products will be a significant part of the discussion, the use of any specific system or language is not required. The objective is to learn how to consider now these new concepts may improve our ability to apply existing technologies to outstanding problems of geography. The instructor intends to work with each student to match specific goals to individual needs.

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drops, academic renewal, etc. Information on add/drops are available at <http://info.sjsu.edu/web-dbgen/narr/soc-fall/rec-324.html>
Information about late drop is available at <http://www.sjsu.edu/sac/advising/latedrops/policy/>
Students should be aware of the current deadlines and penalties for adding and dropping classes.

Assignments and Grading Policy

1. **Periodic informal presentations:** Each student shall be asked periodically over the course of the semester to discuss, demonstrate, and help guide discussion in selected topics in geographical technologies. These shall not be limited to the topics listed above. The instructor shall provide instruction into those topics and lead discussions into how they may relate to the variety of topics students shall bring up. This open plan is intended to broaden our understanding of the issues in ways that cannot always be anticipated. These presentations and discussions shall be evaluated individually on the basis of the student's willingness to engage in the sharing of ideas. These presentations form 80% of the grade, and feedback and advice shall be provided in private to any student whose work at any point falls below what the instructor considers to merit an 'A'.

2. **Final assignment:** In a short document of three or four pages, due near the end of the semester, each student shall provide a list or diagram describing the technologies (hardware, software, field and remote instrumentation, etc.) needed to successfully run a shop tasked to solve a specific set of problems in geography (for example, GIS and CAD for city planning and construction; sensor webs, remote sensing, GIS and robotics for precision agriculture, etc.). The only requirement is that consideration be given of how implementations of distributed processing, distributed representation, distributed intelligence and distributed agency may enhance the effectiveness of such a shop. For example, it would seem likely that the ability to simulate and visualize the dynamics of vehicular traffic in various scenarios would enhance the effectiveness of a transportation planning agency. Individualized discussions over the second half of the course are fully expected to yield a satisfactory grade.

Presentations and discussions	80%
Final assignment	20%
Total	100%

Grading information:

98% and above	A+
94% - 97%	A
93% - 90%	A-
89% - 87%	B+
86% - 84%	B
83% - 80%	B-
79% - 77%	C+
76% - 74%	C
73% - 70%	C-
69% - 67%	D+
66% - 64%	D
63% - 60%	D-
below 60%	F

University Policies

Academic integrity

Students should know that the University's Academic Integrity Policy is available at http://www.sa.sjsu.edu/download/judicial_affairs/Academic_Integrity_Policy_S07-2.pdf

Your own commitment to learning, as evidenced by your enrollment at San Jose State University and the University's integrity policy, require 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 website for Student Conduct and Ethical Development is available at http://www.sa.sjsu.edu/judicial_affairs/index.html

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person's ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you

would like to include in your assignment any material you have submitted, or plan to submit for another class, please note that SJSU's Academic Policy F06-1 requires approval of instructors.

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 requires that students with disabilities requesting accommodations must register with the DRC (Disability Resource Center) to establish a record of their disability.

Student Technology Resources

Computer labs for student use are available in the Academic Success Center located on the 1st floor of Clark Hall and 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 digital and VHS camcorders, VHS and Beta video players, 16 mm, slide, overhead, DVD, CD, and audiotape players, sound systems, wireless microphones, projection screens and monitors.

Learning Assistance Resource Center

The Learning Assistance Resource Center (LARC) is located in Room 600 in the Student Services Center. It is designed to assist students in the development of their full academic potential and to motivate them to become self-directed learners. The center provides support services, such as skills assessment, individual or group tutorials, subject advising, learning assistance, summer academic preparation and basic skills development. The LARC website is located at

<http://www.sjsu.edu/larc/>

SJSU Writing Center

The SJSU Writing Center is located in Room 126 in Clark Hall. It is staffed by professional instructors and upper-division or graduate-level writing specialists from each of the seven SJSU colleges. Our writing specialists have met a rigorous GPA requirement, and they are well trained to assist all students at all levels within all disciplines to become better writers. The Writing Center website is located at <http://www.sjsu.edu/writingcenter/about/staff/>

Peer Mentor Center

The Peer Mentor Center is located on the 1st floor of Clark Hall in the Academic Success Center. The Peer Mentor Center is staffed with Peer Mentors who excel in helping students manage university life, tackling problems that range from academic challenges to interpersonal struggles. On the road to graduation, Peer Mentors are navigators, offering "roadside assistance" to peers who feel a bit lost or simply need help mapping out the locations of campus resources. Peer Mentor services are free and available on a drop –in basis, no reservation required. The Peer Mentor Center website is located at

<http://www.sjsu.edu/muse/peermmentor/>

Geog239 Spring 2015 Course Schedule

Please note that the course calendar is subject to change with fair notice, as announced in class and by email.

Week	Date	Topics, Assignments, Deadlines
1	1/26	Introduction to distributed intelligence
2	2/2	Agent based simulations and multi-agent systems; NetLogo
3	2/9	CA, networks, etc.
4	2/16	Student-led discussions (Python)
5	2/23	Student-led discussions
6	3/2	Representation; Idrisi
7	3/9	Student-led discussions
8	3/16	Swarm intelligence
9	3/23	SPRING BREAK
10	3/30	Networks in geography and their representation with relational systems
11	4/6	Student-led discussions
12	4/13	Neuro-fuzzy methodologies and knowledge-based systems
13	4/20	Student-led discussions
14	4/27	Knowledge-based systems; model building
15	5/4	Student-led discussions
16	5/11	Discussion of results