

San José State University
College of Science/Geology Department
Geology 137
Introduction to GPS/GIS for Geologic Applications,
Section 1 (Lecture); Section 2 (Lab), Spring 2011

Instructor: Paula Messina

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Office Hours: Mon., 1:30 - 3:00 PM; Wed., 1:30–2:30 PM, by appointment and on-line

Class Days/Time: Sec. 1 (Lecture), code 24151: Wed. 3:00 - 4:15 PM
Sec. 2, (Lab) code 24152: W 4:30 - 7:00 PM

Classroom: Lecture: DH 221 (may be changed)
Lab: DH 221/210

Prerequisites: GEOL 3, GEOL 4L, and GEOL 7, or instructor consent.
Computer literacy assumed.

Course Website

We will be utilizing a D2L shell for communicating between our Wednesday class sessions. Please check in to <http://sjsu.desire2learn.com> *at least twice a week* for announcements or other information from me and your classmates.

SJSU Catalog's Course Description

Introduction to digital geologic mapping and analysis using Trimble GPS and ArcGIS v 9.3.

Course Goals and Logistics

This course is intended to provide students with practical knowledge of the basics of Geographic Information Systems, as they are applied to scientific research projects. Students will apply knowledge by completing lab assignments using ESRI's ArcGIS version 9.3, the recent release of the industry standard GIS software package. It is assumed that students have no prior knowledge of GIS or GPS mapping techniques.

Most of the hands-on work will be done during either of two lab sections in DH 210, but you will need more time than is scheduled to complete the assignments. To facilitate

this fact, enrolled students will be able to obtain the complete ESRI's ArcGIS (ver 9.3) software suite for free.¹ This software will time out one year from installation. A significant time-commitment is required to learn these techniques, and to complete assignments. Computer literacy is *assumed*. It is the responsibility of the student to know basic computer functions, and to have familiarity with the Windows Operating System.

Course Content Learning Outcomes

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

- Locate, download, convert, and import raster and vector spatial datasets into the ArcGIS interface;
- Conduct spatial analyses of natural phenomena;
- Construct maps showing the results of spatial analyses using standard cartographic conventions;
- Utilize GPS (Global Positioning System) receivers and GIS dataloggers to collect spatial and attribute data in the field;
- Differentially correct and export GPS data to ArcGIS-readable spatial databases.

Required Texts/Readings

Textbook

Keith C. Clarke, *Getting Started with Geographic Information Systems*, 4th Ed. Prentice Hall, 2003.

Other Readings

The GPS section of this course will require readings that are available on-line.

Other equipment / material requirements

You will receive a full version of ArcGIS version 9.3 as a member of this class, for installation on your own PC. This application will time-out one year from the date of registration. Though not required, use of your own laptop computer will greatly facilitate your laboratory work in this class. It is strongly advised that you bring your own computer to class every time your lab section meets. See footnote 1 (below) for minimum system specifications. As an alternative, our computer lab, DH 210, has the program already installed. You will be given a passcode to enter the lab, and a username/ID to log in to our department network. A jump drive is also recommended for data and project transport.

¹ Your own laptop computer must meet these minimum requirements: Windows XP or Vista operating system; Pentium chip with an ≥ 800 MHz processor; ≥ 256 MB RAM; and approximately 700 MB of free disk space. The **recommended** requirements are a Pentium chip with a ≥ 1 GHz processor, ≥ 512 MB RAM, and approximately 700 MB of free disk space. Note that ESRI does not support Mac O/S. For more information, go to the following Web page: http://www.esri.com/industries/university/education/student_faqs.html#system

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/> . It is the policy of the University and this Department that a course may not be dropped after February. 7, 2011. After Feb. 7, dropping a course is permissible only for serious and compelling reasons. Students should be aware of the current deadlines and penalties for adding and dropping classes.

Assignments and Grading Policy

Final grades in this course will be based on the following components:

| | | |
|----------------------------|--|------------|
| Participation | Includes timely completion of ungraded labs (Lab #s 0, 1, 3, 5 [GPS Tutorial], 6 [GPS Practicum], and Final Project (Lab 7) updates; all in-class and on-line participation; homework; and a <u>required field trip (TBA)</u> . Consideration will be given to those who assist others, particularly in the lab. There is no T.A. for this course, so please get used to asking each other for assistance if you need it! If you ask/answer classmates' questions, post useful tips or links to datasets, or enhance the course Website in any way, you will be rewarded generously. <i>Though I will check in to the Website several times a week, there's no guarantee that I will be available to answer a question posted to the discussion board before a classmate will!</i> | 20% |
| Lab 2 | Due (<i>fill in</i>) : _____ | 10% |
| Lab 4 | Due (<i>fill in</i>) : _____ | 10% |
| Midterm Exam | March 16 @ 3:00 PM | 20% |
| Final Project (Lab 7) | Due (<i>fill in</i>) : _____ | 20% |
| Final Exam | May 23 @ 12:15 PM (Duration: 2 h. 15 m.) | 20% |
| Extra Credit? | Yes! There will be a few unannounced "quizzlets" which will yield as many as 5 extra points, based on your scores. The results of these quizzlets will not lower your grade; they are intended to allow you to "strut your stuff," and not to penalize you in any way! | 5% |
| Maximum point count | | 105 |

Cumulative points will translate to alphabetical course grades as follows:

| | | | | | |
|----------------------|----------|-----------|-----------|-----------|----------|
| Numeric total | 90 - 105 | 80 – 89.9 | 70 - 79.9 | 60 – 69.9 | Below 60 |
| Course grade | A | B | C | D | F |

Scores within the top 3 points of a given range will be recorded as + grades; scores within the lowest 3 points of a given range will be recorded as – grades.

Other than success on “quizzlets,” there are no extra credit options in this class.

Assignment Policies

Each assignment has a specific date and time that it is due. Late assignments will not be graded. There will be no exceptions to this rule, unless a medical emergency prevents an assignment’s prompt completion. In such cases, *verifiable* medical notes must be obtained and presented to the professor.

Attendance:

This class meets only once a week. For that reason, attendance is critical; you are expected to attend every class, and to arrive on time. If you cannot attend your scheduled lab for any reason, please let your professor know in advance via D2L e-mail or phone. All course notes and assignments are available online, but these are not substitutes to being in class. It is essential that you stay with the class during lab time, since your classmates will be your greatest resources as you work on assignments together!

Discussion Board:

In addition to our scheduled labs, it is assumed that you will require additional time to complete your assignments. If you are working on an assignment in the computer lab by yourself and you have questions, please make use of the discussion board on D2L. Your professor will monitor the discussion board, as should all of the class participants. You are *strongly encouraged* to post helpful hints as well as questions! Doing so will truly pay off!

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](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](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.

Geol 137 / Introduction to GIS/GPS, Spring 2011 Tentative Course Schedule

Please note: There may be some modifications to this schedule. Such substitutions will be announced online, and in class with fair notice, when possible.

| Week | Date | Topics, <i>Required Readings</i> | Lab Assignments |
|------|---------|---|--|
| 1 | 1/26/11 | Review of the Green Sheet; What is a GIS: Its Uses in the Natural Sciences | <i>Clarke:</i> <i>Chapters 1</i> <i>& 9</i> Computer Lab Logistics Lab #0 (ungraded) |
| 2 | 2/2/11 | GIS's Roots in Cartography: Map Projections, Coordinate Systems; Introduction to ArcGIS | <i>Clarke:</i> <i>Chapter 2</i> Lab #0 due @: (<i>fill</i> <i>in</i>) _____ Lab #1 (Ungraded ArcGIS Tutorial) will be assigned |
| 3 | 2/09/11 | Map Projections (con'd); Making a Map with a GIS | <i>Clarke:</i> <i>Chapters 2</i> <i>& 7</i> Lab #1 due @: _____ Lab #2 (Using Vector Data to Analyze Geobiological Phenomena) will be available |
| 4 | 2/16/11 | Representing Maps as Numbers: Introduction to Raster and Vector Data Structures | <i>Clarke:</i> <i>Chapter 3</i> Lab #2 (continued) |
| 5 | 2/23/11 | Representing Maps as Numbers: Raster and Vector Data Structures (continued); Decimal, Binary, and Hexadecimal; Introduction to Spatial Analyst | <i>Clarke:</i> <i>Chapter 3</i> Lab #2 due @: _____ Lab #3 (Ungraded Spatial Analyst Tutorial) will be available |
| 6 | 3/2/11 | Delving More Deeply--Raster Data and Representation of Continuous Surfaces; Vector Data and Representation of Earth Surface Objects | <i>TBA</i> Lab #3 (continued) Lab #4 (Using Raster Data to Analyze Geobiological Phenomena) will be available |
| 7 | 3/09/11 | Terrain and Spatial Analysis – <i>bring a scientific calculator to</i> <i>lecture today</i> | <i>TBA</i> Lab #3 is due @: _____ |

| Week | Date | Topics, <i>Required Readings</i> | Lab Assignments |
|--|---------|---|---|
| 8 | 3/16/11 | Up Close and Personal with Spatial Data Sources, and the Final Project | <i>Clarke: Chapter 4</i> Lab #4 (continued) Lab #7 (Final Project) Directions, etc. will be available before spring break. Put your thinking caps on! |
| 9 | 3/23/11 | Midterm Exam: The test will be heavily based on lecture materials, and may contain only a few items that pertain to the nuts-and-bolts of using ArcGIS. Questions will be composed by the students! (More on this in class.) The midterm exam may not be taken at a time other than during our scheduled lecture. Please plan accordingly. | Lab #4 is @: _____ Lab #5: (Ungraded GeoExplorer GPS Tutorial) will be conducted <i>in lab</i> during your regular lab section |
| Spring Break (March 28 – April 1)/Cesar Chavez Day (March 31) | | | |
| 10 | 4/6/11 | Review of the Midterm Exam; Introduction to Mapping Technologies; the Global Positioning System | Lab #5 is due @: _____ _____ |
| 11 | 4/13/11 | Paula will be attending a meeting. No class. | Lab #7 (Phase I) is due online @: _____ |
| 12 | 4/20/11 | GPS Accuracy and Sources of Error GPS vs. Differential GPS | Lab #6: Ungraded GPS Practicum Lab #7 (continued): Final Projects |
| Field Trip (tentative, pending NPS approval): 4/22 (F), 4/23 (Sa), <u>or</u> 4/24 (Su); <i>Or</i> 4/29 (F), 4/30 (Sa), <u>or</u> 5/1 (Su) | | | |
| 14 | 4/27/11 | Final Projects –or–Field Trip Wrap-up | Lab #7 (continued): Final Projects |
| 15 | 5/04/11 | Final Projects –or–Field Trip Wrap-up | Lab #7 (continued): Final Projects |
| 16 | 5/11/11 | Semester Wrap-up; Review for the Final Exam | Lab #7: Final Project Presentations |

| Week | Date | Topics, <i>Required Readings</i> | Lab Assignments |
|-------------|-------------|---|---|
| Final Exam | | | The Final Exam will be administered on Monday, May 23 from 12:15 -2:30 PM. Tentative classroom: DH 221. The venue may change, pending classroom availability; any changes will be announced with fair notice. |