Geographic Information Systems Laboratory

A Grand Opening

Inaugural Report and Proposal
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Introduction to the GIS Lab

The Mission

This lab supports teaching and research. This is achieved by alleviating various curricular, pedagogic, and equipment deficiencies and by attracting academic and research opportunities. This state-of-the-art lab is a hands-on, exploration-based, multimedia learning environment where students gain personal experience with ideas, concepts, and problem-solving from a variety of disciplines. Computer techniques make some complex processes (like analytical modeling, non-linear and spatial correlation, layering, diffusion, and cartographic representation) easier to understand, and give students direct experience in applying concepts to problem-solving exercises. This approach to learning is consistent with broader pedagogical shifts in education.

The Great Central Valley, especially the San Joaquin Valley, is an important character in this story. Through various academic and research opportunities, students immerse themselves in this region. They gain insight into the region’s social, economic and environmental pressures, and they gain expertise needed by the region’s public agencies and private enterprises. In the context of workplace training, this lab provides students with an opportunity to develop the skills that are most often requested by employers—interpersonal and organizational skills and the ability to solve complex problems in different contexts.

There are many people to thank for making this lab a reality. The list is long. First of all I would like to thank Mary Cullinan, the Dean of Arts, Letters, and Sciences. During the Summer of 1997, she brought together a number of faculty mostly from the physical and social sciences to work on grants to the National Science Foundation (NSF). It was from this meeting that the idea of our grant took shape. Her help at every stage has been vital. Another instrumental person was Sheila Kruse, a grants writer, who kept my feet to the fire. I gave her a long proposal. She chopped it up, put it into NSF’s format, and gave me a list complete with a timetable of what I still needed to provide her. I doubt this grant would have been successful without her. Once the grant was successful, we had to come up with matching funds. These funds came from a variety of sources, but it was Walter Strong, Vice President of Development and University Relations, who came up with the bulk of the matching dollars. He foresaw and raised the importance of long term financial assistance, and he continues to pursue this goal. In addition, I would like to thank many others who have played an important role in the development of this lab. Off campus I thank Carol Whiteside, President of the Great Valley Center and Jim Hamilton, former Planning Director for the City of Turlock, for their support. Across campus, Provost Richard Curry, Don Bowers, Diana Mayer Demetrulias, Muriel DeSelms, Fran Jeffries, Debbie Lillie, Brian Duggan, Don Hanson, Julie Benevedes, Maihtreyi Manoharan, Regina Wagstaff, Doug Jones, Bob Rosas, Connie Bratten, Steve Cunningham, RayDelle Kistler, Andy Young and Elizabeth Greathouse deserve my thanks. In addition, I thank Austin Ahanotu, Steve Hughes, Cecil Rhodes, Ed Erickson, and Ken Entin for backing this lab. I also have to thank virtually every member of my department, but let me offer additional thanks to Sari Miller-Antonio, Leon Pitman and especially Ida Bowers and Tom Durbin for their constant support and actions. Finally, let me thank my students Rhianna “Rye” Lee, Alex Ligeti, Tyra Bumbalough, Anthony Areias, David Bollinger, James Kivley, Tom Holley, and numerous others who either worked on grants that led to this lab or helped set it up.

Michael Schmandt
Lab Resources

More than $100,000 has been received for the establishment of this GIS lab. Fifty percent of this money was secured from a National Science Foundation (NSF) grant. While providing additional and much-needed computer technology, this lab enables students to gain practical and technical experience. The lab is expected to aid academic programs and become a community resource for research projects that focus on this valley. The NSF reviewers were extraordinarily enthusiastic: they said this was “among the best proposals we reviewed,” “unusually creative,” with “substantial pedagogical and practical benefits.” They were greatly impressed by the multidisciplinary aspects of the proposal and said the project “represents a fundamental change in the type of science education on the campus.”

19 Computers
- 15 Micron Pentium 450, 256 MB, 21” monitors
- 2 ARM Pentium300 laptops, 128 MB, 14.5” monitors
- 2 IBM Pentium 75, 32-40 MB, 15” monitors

Major Output and Input Devices
- Hewlett Packard DesignJet 755 CM, Color Plotter
- Hewlett Packard LaserJet 8000N, Color Laser Printer
- Hewlett Packard LaserJet 4000N, Black and White Laser Printer
- Summagraphics Summagrid IV Large-format Digitizer
- Calcomp ScanPlus III S3-800, Large-format Scanner

Presentation Device
- NEC MT 1030 + XGA Data Projection Unit

Specialty Software
- ArcInfo
- ArcView
- AtlasGIS
- Idrisi
- Network Analyst
- Spatial Analyst
- 3-D Analyst

General Software
- Access
- Excel
- Internet Explorer
- PowerPoint
- SPSS
- Word
Teaching Initiatives and Student Activities

GIS and Related Technology Courses

SECTION 1
(2000 SERIES COURSES)

GEOG 3751 (to be renumbered)
Introduction to Computer Applications in Geography
3 units, lecture and lab, once a year usually in fall
Michael Schmandt
Prerequisites: None. CS4000 or CIS2000 encouraged.
Course introduces computer systems and programs used in geographic research. Students will utilize systems and programs through the context of geographic research problems.

GEOG 3700
Cartography
3 units, lecture and lab, once a year usually in winter or fall
Michael Schmandt
Prerequisites: None. CS4000 or CIS2000 encouraged.
Introduction to thematic cartography; computer cartography; fundamentals of map reading and cartographic portrayal including map design, compilation, drafting, and reproduction.

SECTION 2
(3000 SERIES COURSES)

ANTH 3600
Method and Theory in Archaeology
3 units, lecture and lab, offered once a year usually in spring
Lew Napton
Prerequisites: ANTH2090
Study of current methods in archaeology, emphasis on applied and theoretical procedures in data sampling, collection, and evaluation; survey of method and theory in excavation of archaeological sites; integration, analysis, and interpretation of archaeological phenomena.

ECON 4300
Mathematical Economics
3 units, lecture and lab, offered once a year in spring
Eungsuk Kim
Prerequisites: ECON2500, ECON2510
Static analysis; comparative-static analysis; optimization problems, input-output analysis; linear programming and game theory.

GEOG 4350
Urban Geography
4 units, lecture and field, spring
Michael Schmandt
Prerequisites: None.
This course looks at the generality of urban spaces and the detail of urban places. In other words, all cities are different, but they possess similarities. Urban agents, processes, and forms are examined within a cultural context. Special consideration is given to problems of the urban environment including urban sprawl.

GEOG 4750
Geographic Information Systems
3 units, lecture and lab, spring
Michael Schmandt
Prerequisites: None. Encouraged to have taken either GEOG3751 or GEOG3700.
The use of computers for input, storage, representation, and retrieval of spatial data for cartographic purposes; GIS as a tool in information management and decision making.

SECTION 3
(4000 SERIES COURSES)

GEOG 4950
Applied GIS
3 units, seminar and lab, once every two years
Michael Schmandt
Prerequisites: GEOG4750
This multidisciplinary GIS research seminar has students articulating an independent research project; inputting and analyzing a subset of the data; and presenting their results.

PSCI 4600
Statistical Analysis for Politics
4 units, lecture and lab, once a year in spring
Staff
Prerequisites: None.
This course will address applications of statistical analysis for political and social research, involving the use of computerized statistical programs for social science data analysis.
Urban Visualization Initiative

Urban and Community Planning Concentration:

This concentration is an undergraduate course of study for students who wish to research the problems and prospects of urban areas. The curriculum covers urban topics and concepts from a variety of social science disciplines including anthropology, economics, geography, history, political science, social sciences, and sociology, and from other departments like art, psychology, and physical sciences. Technical courses, like GIS, that enable students to visualize and analyze the urban environment make up the curriculum’s second major component. Students who pursue this concentration obtain a background for positions in a variety of governmental agencies and private enterprises, as well as preparation for graduate training.

Each student must satisfy the graduation requirements of the University including the completion of a major in anthropology, economics, geography, history, political science, social science, or sociology. In addition, students must complete requirements for the Urban and Community Planning Concentration which are currently under revision.

Additional Priorities:

This initiative also supports existing, new, and modified courses. One new course is an advanced, undergraduate, multidisciplinary GIS research seminar which develops students’ analytical skills by having them frame research problems and envision simultaneously how GIS could be used to help address real-world research issues. Within this course, students articulate their research project and input, process, and analyze a subset of their project’s data. Finally, students present their projects cartographically, in written form, and with an oral presentation. Professional planners suggest that a major weakness of their new technicians is that they are unable to adequately communicate their findings to a larger audience. Professionals from various government agencies as well as faculty members from the social sciences are invited to the oral presentations.

Faculty will be technically trained and shown how these tools aid in problem-solving and conceptual development. Workshops will be offered by CSU faculty throughout the state and ESRI-based training in Redlands, California. Participating faculty members can then integrate computer-based exercises into their content-based courses. To aid these instructors, various GIS lecture methods, exercises, and datasets will be available online. Training is open to any faculty member who teaches technical courses or desires greater integration of computer technologies into their existing classes. Staff members supporting these computer techniques will also be eligible.

Finally, a goal of this initiative and the University’s strategic plan is to position the University as “an active partner in the educational, economic, and social life of the Northern San Joaquin Valley and the Central Sierra Foothills”. This region is covered by vast tracts of prime agricultural farmland, timber forests, and state and national parks. Many secondary and tertiary industries are directly tied to farming and forestry, including food processing, transportation services, paper products, and tourism. These industries are threatened by rapid and sprawling urbanization, occurring throughout the Central Valley and Sierra Nevada foothills. Though less than 1 million inhabitants in 1940, the Central Valley’s population has risen to 5.4 million in 1995. As the fastest growing region in the state, population projections for the year 2040 range from a low of 12 million inhabitants (Smith, 1997, citing California State Department of Finance) to 15.9 million (Platzek, 1994). Besides converting millions of acres of prime agricultural farmland and losing its products and associated industries, urbanization is producing many aesthetic, social and environmental consequences. In 1995 and again in 1997, floods destroyed thousands of housing units many of which were built over the past 10 years. Local and state government agencies and many private enterprises need professionals with strong conceptual and technical expertise.

Computer techniques like GIS help these agencies make better land use decisions that maintain and expand the region’s economic base and manage urban development more effectively. Most of the above industries, and the government agencies that oversee the region, utilize or plan to use GIS technology for facility management and decision making.
Manuel Cisneros - A native of Comayagua, Honduras, Manuel has recently completed (Summer, 1999) his BA in Geography. He is pursuing graduate studies and a career in the GIS industry.

David Glovier - David is pursuing an interdisciplinary graduate degree at CSUS. After working on an early GIS project at CSUS, he became an Intern for the City of Merced and then an Economic Development Specialist for the City of Riverbank. Recently he accepted a planning position with the City of Las Cruces.

Tom Holley - Tom is a Central Valley native, born in Dos Palos, who is a Social Science major with a concentration in Urban and Community Planning. He has worked on the Future Land Use in the Central Valley grant this past Summer and helped as a teaching assistant in Urban Geography this past Spring. Tom finishes his BA this year and then goes off to graduate school.

Rhianna “Rye” Lee - Rye finished her Geography degree here at CSUS in Dec., 1997 and is currently pursuing an interdisciplinary MA. Rye has worked on numerous GIS projects both here and with other agencies including the City of Stockton and Stanislaus National Forest (USFS). She was instrumental in starting up the GIS lab this past Spring. This Summer, she accepted a full-time job with the Endangered Species Recovery Program as a GIS Technician.

Alex Ligeti - A native of Santiago, Chile, Alex is pursuing an interdisciplinary MA degree at CSUS after finishing a BA in Geography in Summer, 1997. He worked as the principal Research Assistant on the Future Land Use in the Central Valley grant. Currently he works for the Great Valley Center as their GIS/Technology Coordinator.

John Martin Jr. - When John, a native of Honolulu, Hawaii, is not surfing he is majoring in Geography. When he completes his degree in May, 2000, he wants to work within the GIS industry long enough to buy a sailboat and set sail upon the seas.

Kerstin Stanford - A native of Nuremberg, Germany, Kerstin is a Geography major with the Applied Concentration. She plans to complete her degree in December, 2000, and then pursue graduate studies in Urban and Regional Planning.

Rose Stillo - Rose graduated from CSUS with a BA in Geography; she's now completing an interdisciplinary MA. After working on an early GIS project at CSUS, she became a GIS intern with the City of Turlock’s Planning Department. Currently she is working for Compass Maps in Modesto.

Laura Walker - A native of Houston, Texas, Laura moved to this Valley in 1983. Currently, she works on the Future Land Use in the Central Valley grant. Upon completion of her Geography degree this Fall, Laura wants to work in the GIS industry.

Alumni Profiles

Anthony Arias - A Central Valley native of Lemoore, Anthony just graduated in May with a BA in Geography. He worked on several GIS projects at CSUS including the Future Land Use in the Central Valley grant and the Urban Growth in the Central Valley project. Upon graduation he went to work for California CAD Solutions in Modesto as a GIS Technician.

David Bollinger - David is currently a GIS Programmer/Analyst II with the City of Stockton’s MIS/GIS department. He has worked for the City for 2 years. David graduated from CSUS in May 1995 with a BA in geography. He is a native of Brawley, California.

Tyra Bumalough-Hays - This past Spring, Tyra graduated with a BA in Geography, and she plans to enter the planning profession and someday pursue a graduate degree. She was a longtime assistant on the Future Land Use in the Central Valley grant as well as helping out with the Urban Growth in the Central Valley project. At press time, Tyra was one of five final candidates for an Assistant Planner position with the City of Vacaville. She is a native Californian from Van Nuys.

James Kivley - A native of Merced, James graduated from CSUS in May 1995 with a BA in Geography. In November of the same year, he started work with the City of Stockton. Currently his position is a GIS Specialist II/Project Management with the MIS/PD division.

Stacey Larson - Stacey graduated with a Geography degree (Applied Concentration) in May, 1998. She has been working for the City of Turlock for the past 1 1/2 years as a GIS Technician. Her plans are to stay in the GIS industry. Stacey is a Central Valley native of Fresno.
Despite the fact that land use decisions made in one area can affect neighboring jurisdictions, the 96 cities and 18 counties of the Great Central Valley continue to plan independently for their particular localities. The end result has been an array of separate general plans and a framework that does not foster coordination of plans beyond the local level. This geographically and economically connected region lacks the informational tool that helps local policymakers prepare for the projected population explosion. The goal of this project is to produce a single integrated Central Valley map showing the aggregated results of local general plans. Providing such a map is the intent of this project, which has four specific tasks: 1) Gather current adopted general plans for each city and county; 2) Design a “common template” and standardize the various definitions and categories created in each county and city; 3) Transfer the accumulated data into a single GIS database; 4) Use the GIS data to produce maps that will be widely distributed throughout the Valley. An integrated GIS-based map that can be continually updated has many benefits. It serves as a flexible tool in a rapidly changing environment, provides clear and accessible development information for non-practitioners, highlights troubling patterns of development on a regional scale, and helps answer key research and policy questions. The first phase which focused on the 68 jurisdictions of the San Joaquin Valley is now complete. It was funded by the Public Policy Institute of California and the Great Valley Center. A second phase focusing on the Sacramento Valley is planned.
This project, funded by the Great Valley Center, plans to locate a GIS data library here at the University. This Internet library focuses on data layers pertaining to the Central Valley. GIS data are available from many sources and focus on a wide variety of topics including native vegetation, streets and parcels, and agriculture. GIS layers need to be available to allow beginning and advanced users the chance to analyze geographic patterns and experiment with ways of utilizing and developing this technology. More varied and detailed types of data must become more readily available, as users construct GIS applications. For GIS graduate students and professors conducting data searches, it is evident that an increasing number of GIS data sets exist which can be used by universities and the public. Data can often be acquired simply by downloading files from the Internet or by contacting specific agencies and requesting particular types of data sets. After an extensive data search, a variety of data sources pertaining to the Central Valley will either be stored or linked from one Internet location. This will allow students, faculty, and communities easy access to GIS data sets. The proposed data divisions are:

Land Use - GIS data for use as map reference (roads, public lands) and for the examination of past, current, and future land use patterns.

Natural Resources - GIS data for use as map reference and for change analyses (rivers, vegetation, soils, watersheds, etc.).

Demographic Data - Population data for conducting various types of spatial analyses.

Economic Data - Data for various types of economic activities for analyses of spatial distributions.

Information included with each data set provides a brief description, origin of data, name and date of source, limitations of data set, and map information (scale, projection, datum, coordinate system, etc.). Other important information covers data formats and conversion techniques (ArcInfo to ArcView, Intergraph to ArcInfo, Access to DBIV, etc.).
A Preliminary Look at Urban Growth in California's Central Valley

The spatial history of urban land use change in California's Great Central Valley is being studied in an analysis that focuses on understanding the impacts of human-induced land transformations. This work provides an historical perspective of changes in land use and an assessment of the spatial patterns, rates, and trends of that change. The data shown here illustrates the dramatic changes to the Central Valley landscape over the past 100 years. A GIS, historical maps, remotely sensed data, and related farmland mapping surveys were used to reconstruct the extent of urban land over time.

1870s
Towns like Fresno and Modesto began due to the development of a railroad line through the Valley.

1875
The raisin industry in Fresno County began when some grapes were accidentally left to dry on the vine. A.Y. Easterby and Clovis Cole developed extensive grain and cattle ranches. These and other citizens laid the groundwork for the cultivation of Fresno County.

1890
The route of the new railroad built in the 1890’s determined the likely sites of new Valley towns. Turlock was one of many town sites that were selected as loading sites for the trains that carried the wheat crop to market. The railroad displaced the steam boats that previously carried the wheat that was not delivered by horse and wagon.

1924
The Army Corps of Engineers began planning projects of navigation and flood control in the Central Valley. By 1925 the Valley had experienced slow but steady growth. Sacramento and Stockton continued to lead development, but urban centers were also growing in Fresno, Bakersfield and Modesto.

1933
After the repeal of Prohibition, Ernest and Julio Gallo started their winery in Modesto.

1937
Construction of the massive Central Valley Project began. Surplus waters from the Sacramento River and its northern tributaries were now transferred to the water-deficient areas of the San Joaquin Valley. Shasta Dam is the central feature of this project. Slow but steady growth was the general trend leading into the 1940s. The Sacramento area was just beginning to expand to the northeast, while Fresno and Stockton remained similar in size and grew only slightly.

1945
GI Bill and Veteran Home loans stimulated suburban growth throughout the Central Valley. By 1950, increased urbanization in the Los Angeles Basin and the San Francisco Bay area pushed the production of citrus, other fruits, vegetables, and dairy products into the Valley. Significant increases in agricultural productivity are realized due to the expansion of irrigation, increased fertilizer use, and the development of new crop varieties. During the post-World War II era, suburbs around Sacramento were expanding quickly. Cities like Modesto and Lodi were also growing, however, the towns in the southern portion of the Valley remained comparatively small and distinct.

1973
Initial facilities of the State Water Project were completed and water delivery to southern California began. During the 1970’s, major metropolitan regions enlarged as suburbs expanded past city boundaries. By the 1980s the need for affordable housing created commuter corridors between Stockton, Modesto, Tracy, and the Bay Area. Many other cities began to merge into localized population centers like Modesto, Oakdale, and Turlock.

1990s
The Central Valley is one of the leading agribusiness regions of the world and the predominant agricultural producer in the nation. In the 1990s, Bay Area pollution affecting the Valley becomes an issue. EPA estimates increased air pollution has been the culprit of lowered annual crop harvests. The growing prominence of the Highway 99 corridor becomes apparent. A linear city, or conurbation, anchored by Redding in the north and Bakersfield in the south takes shape.
The study is a broad analysis of the Merced County labor market including an investigation of the underpinnings of the County’s economy and an assessment of the County’s economic and human capital challenges and opportunities. The final report will provide the following: a profile of the region’s economy including longitudinal information on jobs, labor force, earnings, income and commuting patterns; an economic impact analysis; a location quotient analysis; surveys of employers, the unemployed, welfare recipients and the employed; and computer mapping to provide information about the location of business firms, child-care providers, and public transportation routes. Based on the above information, the final report also offers a series of policy recommendations for consideration by the County Board of Supervisors. The following map was created for a previous and somewhat similar study of Stanislaus County.

The Central California Information Center operates under the auspices of the State Office of Historic Preservation on the CSU Stanislaus campus as one of the eleven state-wide regional repositories of the California Historical Resources Information System (CHRIS). The Information Center serves the historic preservation community (local, state and federal agencies and private consultants) by accumulating and disseminating archaeological and historical resource data. This resource information is currently referenced on topographic maps supplemented by hard-copy archival materials. The mandate and mission of CHRIS over the next few years is to become a fully operational electronic data repository incorporating GIS technology, specifically ESRI ArcView and ArcInfo software. The goal is to digitize all resource locations and aerial survey coverage areas onto USGS 7.5 minute quadrangle templates and to scan all hard-copy data files.
Future Directions (2000-2005)

Technology Needs
The future is bright, but the lab must keep up with emerging technologies. Mixing visualization technologies with GIS is one important direction. Here 3-D computer graphics are used to see or visualize patterns and processes that are not apparent through other means. It helps us come closer to modelling reality. Instead of using a typical 2-D map, we could move through a 3-D world looking at various scenarios and impacts. In addition, field technologies, those which enable people to enter data directly in the field, must be pursued. Today we go out into the field mark a map and write down the condition of various entities. Then we return to the computer and enter our data to create a database. With small, light-weight, pen-based computers, we will be able to create the database directly in the field. Merging GIS, GPS, and voice-recognition software will allow us to create the database in the field by just speaking.

Equipment and Space Needs
While the existing GIS lab serves most of our teaching and research needs, additional space will soon be required. Even today, two computers and two large input devices, a digitizer and scanner, are located outside of the main lab (L-160) in C-203A because space is tight. This setup is somewhat preferable since the input devices are heavily used for on-going research projects. These projects can generally proceed despite the increasing usage of the main GIS lab. However, as the number of research projects increases, it will be necessary to create a second lab that focuses primarily on research while today’s main lab will be dedicated to teaching.

In this laboratory environment, computers older than three years are antiquated. These computers will meet the needs of many staff and faculty across campus, and will become available once new computers are obtained. New lab equipment is continuously needed, and should be pursued in at least three ways: 1) All new GIS research projects need to contain hardware and software budgets. The equipment will first be used for the grant and upon its conclusion will enhance the lab. 2) Equipment grants, like the NSF grant which made this lab possible, must be pursued. 3) community contributors should be sought.

Faculty and Staff Needs
Now that a technology infrastructure exists, focus must be placed on a human infrastructure. This means that existing faculty and staff need to be trained in GIS and related technologies. This has already begun. Our needs, however, go beyond existing personnel. A GIS team needs to take shape that includes a new faculty member and a few staff.

One new tenure-track faculty position - The faculty member will contribute to teaching, research, and lab duties. The ideal candidate should have the following qualifications:
1) versed in GIS but should bring to this campus a remote sensing expertise.
2) climatology or meteorology background
3) agriculture background

Two to four staff positions are needed that focus on the following duties:
Financial Officer (10 hrs/week): manage and interpret budgets, forecast grant budgets, research and purchase equipment.
Grants Writer (20 hrs/week): search for and write grants, meet with potential grantees.
Public Affairs Officer (10 hrs/week): write press releases, develop Internet pages, give community talks, answer public’s questions.
Lab Manager (40 hrs/week): manage equipment and software; maintain lab schedule, policies and procedures; provide support for research grants and GIS education.
Student Lab Assistant (20 hrs/week): help lab manager with tasks, provide technical support to students.
General Information

GIS Lab Policies and Procedures:

The GIS Laboratory primarily seeks to provide state-of-the-art computer facilities for teaching and research involving GIS. Other techniques including remote sensing, computer cartography, and statistics will also benefit greatly from this lab. The lab supports and encourages the use of computer technology in all aspects of geographic research, from data collection, storage, management, analysis, and display.

Laboratory Scheduling:
The following priorities have been established for reserving the laboratory. Top priority goes to those disciplines which are part of the Urban and Community Planning Concentration. Secondarily, the lab supports any GIS course in any discipline. Final priority goes to any computer course that can adequately utilize the lab’s equipment.

Printing:
The lab maintains 3 printers. If it is for a course or research project that is directly related to the lab, printouts can be made from the black-and-white HP4000 printer at no cost. Do not use this printer for printing out assignments for other courses or web page readings. The lab enforces a charge for color printing, and this is done by prior arrangement only.

User Obligations:
• Do not bring food or drink into the lab.
• Do not load software on any computer.
• Do not reconfigure any computer software or delete any files.
• Do not move around the equipment.
• Save your data to a Zip disk (E drive) or diskette (A drive).
• If a particular piece of hardware or software does not function, please leave a note on the white board. This will notify the lab manager as well as alert others to the problem.
• Users must supply their own consumable supplies (diskettes, Zip-disks)
• Manuals are available for reference in the lab, but are not to be removed.
• Journals and magazines are available in the lab, but if copies are desired they must be signed-out and returned within 2 days.
• Do not make copies of any software. The lab adheres strictly to copyright and licensing laws that govern use of software and computers. Attempting to copy software for personal use or use on other computers is illegal. No infringement can be accepted. Public-domain software may be copied without cost or penalty, but if you are unsure, ask first.
• Please turn your computer and monitor off when you leave the lab unless someone is waiting for the computer. HOLD the off button for about 5 seconds until the hard drive shuts down and the red light turns off. The green light on the monitor should not be blinking.
• Make sure the door is closed and lights are turned off if you are the last person to leave the lab.

Penalties:
Failure to meet the obligations listed above can result in loss of lab privileges, either temporarily or permanently. Intentional breakage, misuse or theft of equipment or software results in permanent suspension from the lab and will be reported to the appropriate CSUS authorities for disciplinary action.
## Lab Schedule - Fall 1999

### General Schedule

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<tr>
<th>Mondays</th>
<th>Special Reserved Dates and Times</th>
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<tbody>
<tr>
<td>7:30-13:20 Open Lab</td>
<td><strong>Monday</strong></td>
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<tr>
<td>13:25-14:23 ECON3202</td>
<td>Nov. 1 Faculty Center, 8:00-9:30</td>
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<tr>
<td>14:25-15:30 Open Lab</td>
<td>Nov. 22 Faculty Center, 8:00-9:30</td>
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<td>15:35-17:00 GEOG3700</td>
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<tr>
<td>17:00-19:00 GEOG3702</td>
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<tr>
<td>19:00-2100 Open Lab</td>
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<th>Tuesdays</th>
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<td>7:30-12:50 Open Lab</td>
<td><strong>Tuesday</strong></td>
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<tr>
<td>12:55-15:57 ART3700</td>
<td>Nov. 2 Faculty Center, 8:00-9:30</td>
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<tr>
<td>16:00-19:00 PSYC3002</td>
<td>Nov. 23 Faculty Center, 8:00-9:30</td>
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<td>19:00-21:00 Open Lab</td>
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<th>Wednesdays</th>
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<tr>
<td>7:30-12:15 Open Lab</td>
<td><strong>Wednesday</strong></td>
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<tr>
<td>12:20-13:18 Faculty Center</td>
<td>Sept. 8 Geography, 14:30-16:00</td>
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<tr>
<td>13:25-14:23 ECON3202</td>
<td>Oct. 13 Geography, 14:30-16:00</td>
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<tr>
<td>14:25-17:55 Open Lab</td>
<td>Nov. 10 Geography, 14:30-16:00</td>
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<td>18:00-21:00 GEOG4950</td>
<td>Dec. 8 Faculty Center, 8:00-9:30</td>
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<th>Thursdays</th>
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<td>7:30-12:50 Open Lab</td>
<td><strong>Thursday</strong></td>
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<tr>
<td>12:55-15:57 ART3700</td>
<td>Dec. 9 Faculty Center, 8:00-9:30</td>
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<td>16:00-17:00 Faculty Center</td>
<td></td>
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<tr>
<td>17:05-21:00 Open Lab</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Fridays</th>
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</thead>
<tbody>
<tr>
<td>7:30-18:00 Open Lab</td>
<td><strong>Friday</strong></td>
</tr>
<tr>
<td></td>
<td>Nov. 12 Faculty Center, 13:00-16:00</td>
</tr>
</tbody>
</table>

This schedule changes without notice. Please consult the calenders and notes posted on the door to L-160. Even if a class does not use all the available computers, the instructor has the right to reserve the room for just his/her students. Check with the instructor before class begins to see if you may use an available computer. If one is given this privilege, do not make any noise or disturb the class while class is in session (this includes printing and walking in and out of the lab). Do not attempt to ask the instructor for permission once class has begun.