

SCIENCE AND SOCIETY 18
EXPANDED COURSE DESCRIPTION

Course Title & Units:

Geographic Information Systems and Society (3)
CRN 89954 Sec A01

2 hours lecture (TR 9:00-9:50, Chem 166)

3 hours laboratory or discussion per week (R 12:10-3:00 1137 Plant and Environmental Sciences)

CRN 89955 Sec A02

2 hours lecture (TR 9:00-9:50, Chem 166)

3 hours laboratory or discussion per week (F 12:10-3:00 1137 Plant and Environmental Sciences)

Course Number & Quarter:

SAS 18

III

Course Goals: Learn Geographic Information Systems (GIS) as a spatial technology and as a tool for change in society. Evaluate physical, biological and social impact of GIS in the context of case studies such as land, water and community planning. Earn GIS certificate from Environmental Science Research Institute (ESRI) via their online virtual campus.

Texts:

LECTURE AND DISCUSSION REFERENCES ON TWO HOUR
RESERVE IN SHIELDS LIBRARY:

Ground Truth: The Social Implications of Geographic Information Systems. 1995. Editor Pickles, J., Guldorf Press, New York.

Socio-Economic Applications of Geographic Information System Science. 2002. Editors Kidner, D., Higgs, G., and White, S. Taylor and Francis Inc. New York (GIS and Crime).

Community Participation and Geographic Information Systems. 2002. Edited by Craig, W.J., Harris, T.M., and Werner, D. Taylor and Francis Inc. New York.

Spatial Analysis and Spatial Policy using Geographic Information Systems. 1991. Worrall, L. Editor. Belhaven Press. New York.

Geographic Information Systems and Science. 2001. Longley, P.A., Goodchild, M.F., Maquire, D.J., and Rhind, D.W. John Wiley and Sons, LTD. New York (Technical reference).

LAB TEXT: Online tutorial Learning ArcGIS Desktop by ESRI.

LAB SOFTWARE: ArcGIS 9.2 by ESRI.

Web Site:

Course materials <http://SmartSite.ucdavis.edu>

Online tutorial <http://campus.esri.com>

Entry Level: No restrictions or prerequisites

Grading (all work due on due date, otherwise zero credit.):

Midterm exam (multiple choice):	25%
In-lab ESRI tutorial quizzes as well as one discussion (eight online modules, pass full credit, not pass zero credit; one discussion and GPS lab attendance and active participation for full credit otherwise zero credit, see below):	20%
Essays (two at 700-900 words each, see below):	20%
Final exam(multiple choice):	35%

Course content:

1. Introduction to GIS
2. Case studies on the application of GIS to real world situations. All case studies will include the advantages and disadvantages of the use of GIS technology to solve problems. How decisions and policy are made using GIS technology. Public perception and acceptance of technology use will be explored. Outcomes from the use of GIS technology. Selected case studies may include: a) School district boundaries, b) Endangered and threatened species and development, c) Income distribution in the California's central valley, d) Water district water distribution, e) Crime distribution.
3. Environmental Science Research Institute (ESRI) tutorial includes: 1) Getting Started with ArcGIS Desktop, 2) Creating Map Symbology, 3) Referencing Data to Real Locations, 4) Organizing Geographic Data, 5) Creating and Editing Data 6) Getting Started with GIS Analysis, 7) Working with Geoprocessing and Modeling Tools, and 8) Designing Maps with ArcGIS. In addition to the ESRI tutorials and there is a mandatory-attendance (during scheduled time) laboratory on Global Positioning Systems (GPS).

Instructor: Wes Wallender, Professor, Departments of Land, Air and Water Resources (Hydrology Program) and Biological and Agricultural Engineering, 752-0688, wwwallender@ucdavis.edu, 221 Veihmeyer Hall. Office hours at the beginning of labs.
Guest lecturers will primarily focus on selected society impact topics.

Teaching Assistant:

Anne Senter aesenter@ucdavis.edu

Lecture and Discussion:

Lectures involve two activities. First, the concepts of GIS are presented and connected to the corresponding online laboratory module. Second, case studies are presented in the context of the technology and their impact on physical, biological and social systems. The guest lecturers will present for 35 minutes and this will be followed by 15 minutes of discussion (question and answer). Students are expected to participate actively.

Laboratory Modules and Discussion:

Work through ESRI online modules and pass online exam. Verify that you passed the exam with the TA. The laboratories reinforce the concepts of GIS presented in lecture

and use ArcGIS software to demonstrate the concepts through problem solving. For the GPS as well as the Guest Lecture Discussion laboratories, attendance during the regularly schedule laboratory time is mandatory.

Discussions of guest lectures will be conducted in laboratory and will follow the outline of topics required for the essays (see below). For the discussion, in addition to attendance, active participation is required. The total number of students in the laboratory will be divided by the number of guest lectures and each of these groups will be assigned a guest lecture. Each small group will meet for 40 minutes to discuss the lecture and to prepare an oral presentation. The 10 minute oral presentation will follow the outline shown below for the essay. One or more members of the group make the oral presentation. After the 10 minute presentation the same group will also lead a 20 minute discussion.

Essays (600-800 words and double-spaced):

Write an essay on each of two GIS guest lectures. The first essay will be written on the topic presented by the first guest lecture whereas the topic for the second essay can be chosen from the remaining guest lectures. Source material is from lecture, discussion and outside reading (at least two references). Discuss each of the following (place a heading for each in the essay):

Problem (5 pts). State the problem to be solved or the issue studied.

Data (5 pts). Describe the data sources and data quality in the context of the problem.

Data model (5 pts). Was a vector or raster data model was used? Why? What was the spatial and temporal extent of the data? What was the spatial and temporal resolution of the data?

Analysis (20 pts). Describe the analytical model, its assumptions, sources of errors and how these assumptions and errors affect validity and interpretation of results.

Impact on Society (40 pts). Explain who is impacted directly as well as indirectly by the GIS technology. How are they impacted both in the short- and the long-term? Is GIS a good tool to address this problem, or not?

Communication of your ideas will also be graded, since content is of little value if it is not understood.

Clarity and Style of Writing (5 pts). Is the writing clear and appealing to read? (The best information in the world is valueless if it is incomprehensible or just so boring that nobody reads through the first half to get to it.)

Communication (5 pts). Is the content communicated clearly?

Writing structure (5 pts). Is the essay structured well, do the sentences build paragraphs logically, and do the paragraphs build the essay logically? Transitions? Connections?

Writing mechanics (5 pts). Proper grammar and punctuation, sentences that are complex, creative language, in short – the mechanics of writing – will certainly increase your score.

Professionalism (5 points). Lack of professionalism, here or in life, will result in applications being rejected or your ideas being lightly regarded. Professionalism can include: following rules; using appropriate style and tone for a professional document; no indications of lack of interest or lack of care such as missing words, misspellings 'fixed' to wrong words, breaks in writing due to lack of editing; not plagiarizing; citing references as appropriate. In essence, those things that would help get a document, whether a grant application, resume, annual report or teaching portfolio, to be read and taken seriously. When hiring colleagues, I rejected those who did not show care on their resumes. Why should I trust them with my data (my livelihood) if they could not maintain quality through a cover letter and resume that the applicant knew would be evaluated?

Each essay will be graded for content and writing style. There will be a clear expectation that a student's writing will improve as the quarter progresses. To facilitate this, each essay will be graded, with feedback on content and writing style, and returned one week before the second writing assignment is due.

Schedule: Spring 2008

Week	Date Day	Lecture/Discussion (Chem 166)	Laboratory/Discussion (1137 PESC)	Homework
1	03.31 T	(Module 1). Introduction to Geographic Information Systems. Distance, buffers, boundaries.		
1	04.02 R	Guest lecture 1. Melody Poilvez	ESRI Learning ArcGIS 9, Module 1.	ESRI Learning ArcGIS 9, Module 1 quiz.
1	04.03 F		ESRI Learning ArcGIS 9, Module 1.	ESRI Learning ArcGIS 9, Module 1 quiz.
2	04.07 T	(Module 2). Creating map symbology. Florida roads and population		
2	04.09 R	(Module 3). Coordinate systems. North America and the world.	ESRI Learning ArcGIS 9, Module 2.	ESRI Learning ArcGIS 9, Module 2 quiz.
2	04.10 F		ESRI Learning ArcGIS 9, Module 2.	ESRI Learning ArcGIS 9, Module 2 quiz.
3	04.14 T	(Module 3). Projections. The world		
3	04.16 R	Guest lecture 2. Jesse Hernandez for William McCarthy.	ESRI Learning ArcGIS 9, Module 3	ESRI Learning ArcGIS 9, Module 3 quiz. Quizzes 1 and 2 due.
3	04.17 F		ESRI Learning ArcGIS 9, Module 3.	ESRI Learning ArcGIS 9, Module 3 quiz. Quizzes 1 and 2 due.
4	04.21 T	(Module 4). Geographic data. Soils, elevation and flooding.		
4	04.23 R	6 (Module 5). Editing data. Roads and buildings.	ESRI Learning ArcGIS 9, Module 4.	ESRI Learning ArcGIS 9, Module 4 quiz.
4	04.24 F		ESRI Learning ArcGIS 9, Module 4.	ESRI Learning ArcGIS 9, Module 4 quiz.
5	04.28 T	(Module 5). Editing data with topology. Roads and buildings.		
5	04.30 R	Guest lecture 3. Reed Bekins	ESRI Learning ArcGIS 9, Module 5.	ESRI Learning ArcGIS 9, Module 5 quiz. First essay due. Quizzes 3 and 4 due.
5	05.01 F		ESRI Learning ArcGIS 9, Module 5.	ESRI Learning ArcGIS 9, Module 5 quiz. First essay due. Quizzes 3 and 4 due.
6	05.05 T	Homestead Ranch		
6	05.07 R	Guest lecture 4. Karen Beardsley	GPS module.	Mandatory attendance and class participation at scheduled time.

6	05.08 F		GPS module.	Mandatory attendance and class participation at scheduled time.
7	05.12 T	Midterm through 05.08 information.		
7	05.14 R	(Module 6). Analysis. Find house for sale in neighborhood.	Discuss guest lectures.	Mandatory attendance and class participation at scheduled time.
7	05.15 F		Discuss guest lectures.	Mandatory attendance and class participation at scheduled time.
8	05.19 T	(Module 6). Analysis. Find house for sale in neighborhood.		
8	05.21 R	(Module 7). Geoprocessing. Riparian habitat assessment.	ESRI Learning ArcGIS 9, Module 6.	ESRI Learning ArcGIS 9, Module 6 quiz.
8	05.22 F		ESRI Learning ArcGIS 9, Module 6.	ESRI Learning ArcGIS 9, Module 6 quiz.
9	05.26 T	(Module 7). Modeling. Timber lease.		
9	05.28 R	(Module 8). Design maps. Timber lease.	ESRI Learning ArcGIS 9, Module 7.	ESRI Learning ArcGIS 9, Module 7 quiz. Quizzes 5 and 6 due.
9	05.29 F		ESRI Learning ArcGIS 9, Module 7.	ESRI Learning ArcGIS 9, Module 7 quiz. Quizzes 5 and 6 due.
10	06.02 T	Guest lecture 5. Bruce Boyd		
10	06.04 R	Guest lecture 6. Anne Senter	ESRI Learning ArcGIS 9, Module 8.	ESRI Learning ArcGIS 9, Module 8 quiz. Second essay due. Quizzes 7 and 8 due.
10	06.06 F	Dead Day. Students enrolled in Section A02 can complete their lab at this time on Dead Day or the TA will schedule an earlier time.	ESRI Learning ArcGIS 9, Module 8. Students enrolled in Section A02 can complete their lab at this time on Dead Day or the TA will schedule an earlier time.	ESRI Learning ArcGIS 9, Module 8 quiz. Second essay due. Quizzes 7 and 8 due. Students enrolled in Section A02 can complete their lab at this time on Dead Day or the TA will schedule an earlier time.
11	06.08 M	FINAL EXAM (Comprehensive) 10:30-12:30, Chem 166		