

Geospatial Analysis in Cultural Anthropology

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Description and Objectives:

This intensive course introduces different components of geospatial analysis and their applications in Anthropology: Remote Sensing (RS), Geographic Information Systems (GIS), Global Positioning System (GPS), and their integration. The course covers basic concepts necessary to work with geospatial data. We pay particular attention to research set-up and design, and the use of specialized software, such as ArcGIS, Erdas Imagine, and Multispec via hands-on activities. By the end of the course, participants should understand how to:

- add a geospatial component to traditional anthropological questions (ex. resource use, disparities, adaptation)
- understand how anthropologists can improve geospatial analysis research
- generate data (for example, change detection) using remotely sensed images
- integrate data sources from paper & electronic maps & tables
- analyze geospatial data
- create maps for presentation or field work

Course Outline:

1. *Introduction & history of geospatial analysis in anthropology*
2. *Geospatially explicit anthropological research*
3. *Introduction to remote sensing and GIS*
4. *Research design*
5. *Introductory GIS*
6. *GIS Analysis*
7. *Datums, projections, coordinate systems & metadata*
8. *Georeferencing*
9. *Thematic classification*
10. *Change detection*
11. *Visualization*
12. *Data generation*
13. *Creating Maps*
14. *Maps for the field*
15. *Presentations*

Course Requirements and Grading

A (90-100), A- (87-89), B+ (84-86), B (80- 83), B- (77-79), C+ (74-77), C (70-73), C- (67-69), D+ (64-66), D (60-63), D- (57-59), E (<57).

1. *Class participation (10%).* Your participation grade is based on your postings of the discussion topics for each week. Your postings should focus on solutions you developed to confront the problems you faced with exercises and assignments. Your posting should

be BRIEF and, if relevant, contain a screen shot showing relevant error messages and the path you selected to solve it. Each week's posting is 2 points.

2. *Assignments* (60%). Students are required to complete one assignment per week based on weekly themes. Each assignment is composed of several sub-sections (HW assignments) related to each of the main concepts covered during the week. Each weekly assignment is worth 12 points.
3. *Final presentation* (30%). Your final presentation is a synthesis of your earlier assignments plus and additional analysis showing the integration of several types of datasets processed during the course. Your assignment should demonstrate your proficiency in responding to different questions and ability to use the two main software proficiently.

Detailed Course Schedule:

This course is 5 weeks long and meets once a week for one hour.

Week 1: Geospatial analysis in anthropology, the basics

Discussion topics for week: Post your research interests & how you think geospatial analysis will aid your research. Post ideas on how you can make your research more geospatial. Online Meeting: Discuss lecture & tutorial 1, 2 & 3, postings & reading.

Lecture 1:

View Lecture 1: *History of geospatial analysis in anthropology*: evolution of tools and questions

Tutorial 1: Installing ArcGIS, Erdas Imagine & 7-zip on your personal computer.

Lecture 2:

View: Lecture 2. *How to evaluate geospatially explicit anthropological research*—map making, data generation, and data analysis check sheet.

Tutorial 2: Complete getting started with ArcGIS.

Lecture 3:

View Lecture 3. *Definitions of remote sensing and GIS; raster & vector datasets*

Tutorial 3: Complete Arc Catalog tutorial and intro on ArcGIS and Imagine

Tutorial

Assignment week 1:

- screenshot of ArcGIS & Erdas Imagine installed (lect 1)
- completion certificate (or screenshot) from Getting Started with ArcGIS (lect 2)
- metadata worksheet (lect 3)

Week 2: Research design and GIS

- *Discussion topics for week 2:* Post a data search or GIS data analysis questions. Discuss goals for your course project. Online meeting: Discuss lectures & tutorials 4, 5, & 6, postings, and readings.

Lecture 4:

View Lecture 4: *Research design: sampling in time and space, data requirements, matching questions and data limitations*

Tutorial 4: Metadata & data search principles.

Lecture 5:

View: Lecture 5: *Introductory GIS*

Tutorial 5 GIS-ArcGIS Intro; vector processing

Lecture 6:

View Lecture 6: *GIS Analysis Advanced Concepts & summarizing data*

Tutorial 6: GIS- ArcGIS Advanced

Assignment week 2:

- hand in completed data search exercise (lect 4)
- hand in beginning GIS analysis (lect 5)
- hand in advanced GIS analysis (lect 6)

Week 3: Remote Sensing & data generation

Discussion board topics for week 3: Discuss sources for ground control points when georeferencing. Discuss linking local and regional data using geospatial analysis. Online meeting : Discuss lecture & tutorials 7,8, & 9, postings, and readings.

Lecture 7:

View Lecture 7: *Datums, projections, coordinate systems & metadata*

Tutorial 7: Projection exercise.

Lecture 8:

View Lecture 8: *Image georeferencing principles, map georeferencing, and layer staking*

Tutorial 8: georeferencing exercise & layer stacking

Lecture 9:

View Lecture 9: *Digital image classification*-different kinds of classification, spectral signature overview

Tutorial: land cover classification exercise; interpreting land use patterns; basic runs of unsupervised and supervised image classification

Assignment week 3:

- Post projection exercise (lect 7)
- Submit stacked layers (lect 8)
- post supervised classification (lect 9)

Week 4: Generating Data

Discussion board topics for week 4: Discuss how many classes you selected and what were the trade-offs. Also, which bands were most useful in your color composites? What type of information you might extract from a satellite image from a study site in your area of research? Online meeting discuss lecture & tutorial 10, 11 & 12 & postings.

Lecture 10:

View Lecture 10: Overview of *change detection* procedures: conceptual and technical considerations

Tutorial 10: Hands on change detection exercises using images and maps

Lecture 11:

View Lecture 11: *Transition matrix*

Tutorial 11: Transition matrix

Lecture 12:

View Lecture 12: *Data generation, integration, & requested analyses*

Tutorial 12: Hands on GIS analysis

Assignment week 4:

- hand in change detection (lect 10)
- hand in visualization (lect 11)
- hand in data extraction summary table (lect 12)

Week 5: Visualization and field work

- *Discussion Board Topics for week 5:* Discuss what makes visually appealing maps. How you might alter maps to best demonstrate your goals/objectives? Offer your colleagues insights on how to prepare for the field. Online meeting: Discuss lecture & tutorial 13 & 14 & final presentations. Comment on your colleague's final presentations

Lecture 13:

View Lecture 13: *Creating Maps*

Tutorial Lecture 13: How to make a map.

Lecture 14:

View Lecture 14: Maps for the field, ethical issues and data sharing

Tutorial Lecture 14: How to create a map for the field

Lecture 15:

Post your final presentation and comment on your colleague's maps

Assignment week 5:

- Final presentation: create a map either with GIS, remote sensing data or your own
- Include data that you generated on your own
- Explain what data you still need to collect, how this map may be used, what types of analyses you would propose to do in geospatial research

Policy on Late Assignments

Assignments must be complete by due date. Late assignments will lose one half grade for each day late.

Academic Honor Code

Unless it is specifically connected to assigned collaborative work, all work should be individual. Evidence of collusion (working with someone not connected to the class or assignment), plagiarism (use of someone else's published or unpublished words or design without acknowledgment) or multiple submissions (submitting the same paper in different courses) will lead to the Department's and the University's procedures for dealing with academic dishonesty. All students are expected to honor their commitment to the university's [Honor Code](#).

Accommodation for Students with Disabilities

Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation. Please make any requests by the second week of class.

Student Support Services

As a student in a distance learning course or program you have access to the same student support services that on campus students have. For course content questions contact your instructor.

For any technical issues you encounter with your course please contact the UF computing Help Desk at 342-392-4357. For Help Desk hours visit: <http://helpdesk.ufl.edu/>.

For a list of additional student support services links and information please visit:

<http://www.distance.ufl.edu/student-services>

Special Accommodations

Students requesting disability-related academic accommodations must first register with the Disability Resource Center. <http://www.dso.ufl.edu/drc/>

The Disability Resource Center will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

Complaints

Should you have any complaints with your experience in this course please visit <http://www.distance.ufl.edu/student-complaints> to submit a complaint.

UF Counseling Services

Resources are available on-campus for students having personal problems or lacking clear career and academic goals that interfere with their academic performance. These resources include:

- University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling
- Student Mental Health, Student Health Care Center, 392-1171, personal counseling
- Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual counseling
- Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

Syllabus Change Policy

This syllabus is a guide for the course and is subject to change with advanced notice.

Required Readings

Bolstad, P. 2005. Basic Spatial Analyses. *In* *Gis Fundamentals, a First Text on Geographic Information Systems*. Pp. 225-66. St. Paul, MN: Eider Press.

Brondizio, E. S. and T. Von Holt. [submitted] Geospatial Analysis. In R. Bernard and C. Gravelee (eds.) *Handbook of Methods in Cultural Anthropology*. Lanham, Maryland: Altamira Press.

Brondizio, E., and R. R. Chowdhury. Forthcoming. Spatial-Temporal Methodologies in Environmental Anthropology: Geographic Information Systems, Remote Sensing, Landscape Changes and Local Knowledge. *In* *Environmental Anthropology: Methodologies and Research Design*. I. Vaccaro, E. A. Smith, and S. Aswani, eds. Pp. 1-31. Cambridge, UK: Cambridge University Press.

Dana, Peter H. The Geographer's Craft Project, Department of Geography, The University of Colorado at Boulder. [Geodetic Datum Overview](#). [Coordinate Systems](#). [Map Projections](#). [ESRI Map Projections and Coordinate Systems Help File Tab](#)

Green, G. M., C. M. Schweik, and J. Randolph. 2005. Linking Disciplines Across Space and Time: Useful Concepts and Approaches for Land-Cover Change Studies. *In* *Seeing the Forest and the Trees: Human-Environment Interactions in Forest Ecosystems*. E. F. Moran, and E. Ostrom, eds. Pp. 61-80. Cambridge, Mass: MIT Press.

Tutorials: [ESRI Getting Started with GIS Tutorial](#).

Recommended Textbooks

This list of remote sensing and geographic information systems (GIS) textbooks are classics used in many introductory GIS and remote sensing courses (these books are in their 2nd or 3rd edition). Included are descriptions of the book

Remote Sensing Books

Jensen, J.R. 2006. Remote Sensing of the Environment: An earth resource perspective, 2nd edition. Prentice Hall**

Jensen, J. (2004). Introductory digital image processing: A remote sensing perspective, 3rd edition. Upper Saddle River: Prentice Hall.

GIS Books General

Bolstad, P. 2005. GIS Fundamentals. A first text in Geographic Information Systems, 3rd edition. White Bear Lake, Minnesota: Eider Press.**

Ornsby, T., Napoleon, E.J., Burke, R., Groessl, C., and L. Bowde. 2010. Getting to Know ArcGIS. The Basics of ArcView, ArcEditor, and ArcInfo Updated for ArcGIS 10, 3rd edition. Redlands: ESRI press.

Gorr, W.L., and K.S. Kurland. 2010. GIS Tutorial I: Workbook for ArcView 10, (with teacher resource DVD), 3rd edition, Redlands: ESRI Press.

Allen, D. 2010. GIS Tutorial II: Spatial Analysis Workbook (with teacher resource DVD), 2nd edition. Redlands: ESRI Press.