

Spring 2-1-2019

ANTY 452.01: GIS in Archaeology

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ANTY 452 – GIS in Archaeology
Spring 2019
MW 3:00pm – 4:20pm
Classroom: Social Sciences Rm. 258
Office: Corbin Hall Rm. 346

Instructor: Ethan Ryan (email: ethan.ryan@umontana.edu)

Office hours: MWTh 10:00am-12:00 pm or by appointment

Preceptor: Jesse Harvkey (email: jesse.harvkey@umontana.edu)

Office hours: TW 11:00 am-12:30 pm or by appointment (Social Sciences 030 * basement)

Course Description

Archaeology focuses on the study of material culture as a means to explain, examine, and extrapolate about human behavior in the past. This class will examine how Geographic Information Systems (GIS) can be utilized in archaeology by providing the theoretical and methodological background necessary for such research. Focus will be given to (1) gaining a basic understanding of how to utilize ArcGIS, (2) how to use ArcGIS to display, analyze, and present data, (3) how to properly present archaeological data to create informative ethical maps, and (4) utilizing ArcGIS to answer archaeological questions. Students who satisfactorily complete the course will gain an understanding of how a GIS can be used to answer archaeological questions through hands-on experience acquiring data, summarizing results, spatial analysis, and producing visual representations/maps.

Course Goals and Learning Outcomes:

- Gain a basic understanding of ArcGIS, mapmaking, spatial analysis, and how best to present spatial data
- Design research strategies to answer theoretical questions within archaeology
- Techniques to acquire and assemble spatial datasets within a study areas
- Create, present, and write a conference poster or paper concerning archaeological data
- Understand the underlying principles in archaeological research and geospatial representations

This course requires extensive work using the ArcGIS program. Access to this program will be in-class and is available on campus computers in the library (the “multimedia use computers”) as well as in Stone Hall (Stone 106 Lab). It is highly recommended that you get a copy of the program for your own personal computer by seeing me for a student license for ArcGIS.

Required Readings:

James Conolly and Mark Lake

2006 *Geographical Information Systems in Archaeology* (5th Edition). Cambridge University Press, Cambridge.

Recommended Resource:

Michael Law and Amy Collins

2015 *Getting to Know ArcGIS for Desktop* (4th Edition*). ESRI Press, Redland, California

*3rd edition also fine

Grade Determination:

Mid-Term Exam	100
Final Project	150
Lab Exercises	120
Attendance	30
Total	400 points

A 360+ points (90% or greater)

B 320-359 points

C 280-319 points

D 240-279 points

F < 240 points

Other Policies

Disability Accommodations: Students with disabilities will receive accommodations in this course. To request course modifications, please contact me as soon as possible as well as talk with Disability Services. For more information, visit the [Disability Services website](http://www.umt.edu/dss/) (<http://www.umt.edu/dss/>) or call (406) 243-2243 (Voice/Text).

Drop Course: **January 31st (5:00pm)** is the last day to drop or switch grade mode on Cyberbear without additional fees or instructor permission. **April 26th (5:00pm)** is the last day to drop or switch grade mode with approval (from myself and your advisor) and a fee – late withdrawals are marked with a “W” on transcript.

Incomplete: An incomplete will only be considered if requested by the student. Typically this will be granted if a student has missed a substantial number of classes due to documented health or personal problems. Students have one year to complete the course with requirements being negotiated on a case-by-case basis.

Student Conduct: All students are expected to practice academic honesty and should read the [Student Conduct Code](#). Academic misconduct, such as plagiarism, will not be acceptable in this class, regardless of intention. Academic misconduct also includes copying material from another student during an exam, submitting another’s work as one’s own, or allowing someone to copy your work. Academic misconduct will be subject to an academic penalty (receiving a grade of “F”) and/or disciplinary action by the University.

Title IX Policy: The University of Montana is committed to providing an environment that emphasizes the dignity and worth of every member of its community and that is free from harassment and discrimination based upon race, color, religion, national origin, creed, service in the uniformed services (as defined in state and federal law), veteran status, sex, age, political ideas, marital or family status, pregnancy, physical or mental disability, genetic information, gender identity, gender expression, or sexual orientation. Such an environment is necessary to a healthy learning, working, and living atmosphere because discrimination and harassment undermine human dignity and the positive connection among all people at our University. The University will take appropriate action to eliminate, prevent and address the effects of discrimination, harassment, sexual misconduct, stalking and retaliation.

Important Dates

March 4	Mid-Term Exam (Due March 10th by midnight)
April 29/May 1	Presentations
May 3	Final Project Due

Reading List and Schedule

Week	Reading	Exercise
January 14/16	Chapter 1 – Theoretical Issues	Exercise 1: Getting to Know ArcGIS
January 21 (No class, MLK Day)/23	Chapter 2 - Principles	Exercise 2: Working with Coordinate Systems and Projections
January 28/30	Chapter 12 – Map and Digital Cartography Chapter 3 – Putting GIS to Work in Archaeology	Exercise 3: Georeferencing and Digitizing Data
February 4/6	Chapter 5 – Acquiring Spatial Data	Exercise 4: Building Geodatabases and Adding Data
February 11/13		Exercise 5: Mapping Historic Data
February 18 (President’s Day No Class)/20		Exercise 6: Data Prep: Buffers, Clips, Dissolves

February 25/27	Chapter 10 – Mapping Regions: Cost Path Mapping, Viewsheds	Exercise 7: Viewshed Analysis
March 4– Mid Term: Mapping from Narrative (due March 10th by midnight)		
March 6	Chapter 6 – Building Surface Models	Research Day for Final Projects, Finding Data
March 11/13	Chapter 7 – Exploratory Data Analysis	Exercise 8: Creating Raster Surfaces, Interpolation
March 18/20		Exercise 9: Using and Creating Topographic Data (DEM, Contours, etc.)
March 25-29 - Spring Break		
April 1/3	Chapter 10 – Mapping Regions: Cost Path Mapping, Viewsheds	Exercise 10: Least Cost Path Analysis
April 8/10	Chapter 8- Spatial Analysis Chapter 9 – Map Algebra, Surface Derivatives, Spatial Process	Exercise 11: Spatial Analysis
April 15/17		Exercise 12: Web Mapping
April 22/24		Work on Final Project
April 29/1 Final Project Presentations		Final Project Presentations
May 3– Final Project Due		

Terms

- GIS
- Vector
- Raster
- Graticule
- Layer
- Attributes
- Feature Class
- Symbology
- Display Scale
- Geodatabase
- Shapefiles
- Metadata
- Data View
- Layout View
- Data Frames
- Layers
- coordinate systems
- latitude
- longitude
- degrees-minutes-seconds
- decimal degrees
- geographic coordinate system
- spheroid/cylindrical/conic/azimuthal
- map projection
- projection coordinate system
- standard parallels/meridians
- map units
- georeferencing
- data transformation
- on-the-fly projection
- false easting/northing
- basemaps
- operational layers
- layer package
- map package
- style
- layer file
- hillshade
- pyramid
- graduated color map
- graduated symbol map
- proportional symbol map
- dot density map
- manual classification
- defined/equal/geometrical interval
- quantile/natural breaks
- standard deviation
- histogram
- normalization
- label
- annotation
- feature dataset
- attribute domain
- digitizing
- vertex
- end points
- edge
- edit sketch
- edit session
- snapping
- map topology
- geodatabase topology
- Location query
- attribute query
- attribute join
- join table
- relate
- spatial join
- geoprocessing
- dissolve
- clip
- model
- buffer
- overlay
- union
- intersect
- merge
- multipart polygon
- map algebra
- discrete data
- continuous data
- mask
- intermediate data
- reclassification