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Spring 2-1-2018

### ANTY 452.01: GIS in Archaeology

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**ANTY 452 – GIS in Archaeology**  
**MW 3:00pm – 4:20pm SS258**  
**Office: Social Sciences 030**

Instructor: Ashley Hampton (e-mail: [ashley.hampton@umontana.edu](mailto:ashley.hampton@umontana.edu))

Preceptor: Ethan Ryan (e-mail: [ethan.ryan@umontana.edu](mailto:ethan.ryan@umontana.edu))

Office hours: MWF 9:30 – 1:30

### **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 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 CRM-style report concerning archaeological data
- Understanding 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 contacting Campus IT at [support@cfc.umt.edu](mailto:support@cfc.umt.edu) and requesting a license for ArcGIS.

### **Required Readings:**

James Conolly and Mark Lake

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

## Grade Determination:

<b>Mid-Term Exam</b>	<b>100</b>
<b>Final Project</b>	<b>125</b>
<b>Tutorials</b>	<b>25</b>
<b>Lab Exercises</b>	<b>50</b>
<b>Total</b>	<b>300</b>

**A 270 points (90% or greater)**

**B 240 - 269 points**

**C 210 – 239 points**

**D 180 – 210**

**F less than 179 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:* **February 9th (5:00pm)** is the last day to drop or switch grade mode on Cyberbear without additional fees or instructor permission. **April 2nd (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.

## Important Dates

<b>March 7</b>	<b>Mid-Term Exam</b>
<b>April 30-May 4</b>	<b>Presentations</b>
<b>May 10</b>	<b>Final Project</b>

## Reading List and Schedule

Week	Reading	Exercise
<b>January 22-26</b> Introduction to ArcGIS – Program Features	Chapter 1 – Theoretical Issues	Exercise 1: ArcGIS Knowledge Assessment
<b>January 29-February 2</b> Interacting With Maps Map Properties Interacting with Data and Layers	Chapter 2 - Principles	
<b>February 5-9</b> Using GIS in Archaeology – Displaying Data	Chapter 12 – Map and Digital Cartography Chapter 3 – Putting GIS to Work in Archaeology	Exercise 2: Acquiring Data
<b>February 12-16</b> Online Resources, Displaying/Presenting Data	Chapter 5 – Acquiring Spatial Data	Exercise 3: Converting Data and Georeferencing
<b>February 23</b> Symbolizing, Classifying, Labeling Features		
<b>February 26-March 2</b> Building Geodatabase Creating, Editing Features		Exercise 4: Importing Point Locations From XY Data
<b>March 5-9</b> Querying Feature Data Selecting Features	Chapter 7 – Exploratory Data Analysis	Exercise 5: Geophysics
<b>March 7 – Mid Term</b>		
<b>March 12-16</b> Joining and Relating Data Manipulating Data for Analysis	Chapter 6 – Building Surface Models	Exercise 6: Joining Tables, Relating Tables
<b>March 19-23</b> Geoprocessing: Vector Data		Exercise 7: Point Mapping and Converting Archaeological Point Data
<b>March 26-30 - Spring Break</b>		

<b>April 2-6</b> Intro to Spatial Analysis Tools	Chapter 8 – Spatial Analysis	
<b>April 9-13</b> Using Spatial Analysis	Chapter 9 – Map Algebra, Surface Derivatives, Spatial Process	
<b>April 16-20</b> Using Spatial Analysis: Point Data	Chapter 10 – Mapping Regions: Cost Path Mapping, Viewsheds	Exercise 8: Terrain Analysis: Viewsheds, Cost-Distance
<b>April 23-27</b> Using Spatial Analysis: Polygon Data		Work on Final Project
<b>April 30-May 4</b> Final Project Presentations		Work on Final Project
<b>May 10 – Final Project Due</b>		

## 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