**ANTH/SCFS 361** **Introduction to Geographic Information Systems**

**University of Hawai’i, West Oʻahu
Credits: 3
Room: Computer Lab A227 or Zoom
Time: Tuesday, Thursday 3:30PM – 4:50PM
Course Syllabus: Spring 2021**

Dr. Kirsten Vacca
E-mail: kmvacca@hawaii.edu

Phone: 808-689-2359

Office hours: TuWe 1pm – 2pm

**Description:**

Geographic Information Systems (GIS) and remote sensing have become popular in many industries and multidisciplinary fields of study over the past 20 years. Having experience with GIS and remote sensing will broaden the opportunities of the student and challenge them to visualize their environments in new ways. This course is designed to introduce the basic concepts of GIS and remote sensing, and implement these tools with hands on tutorials and lessons. Students will learn the basics of geospatial analysis and their application in archaeological research projects. Students will practice geospatial analysis using a range of digital tools. Prerequisites: ANTH 210; or ANTH 481; or SCFS 300 (completed or concurrent)

**Course Requirements:**

Read all assigned readings and complete lessons/tutorials before the session they are assigned. There are exercises associated with each chapter, a final project working with Honouliuli data that will be submitted at the end of each week. The final project will consist of three benchmarks and a final submission complete with a research paper and presentation to the class.

Honoluiuli National Monument Project: this course supports the mapping initiatives of the Honoluiuli National Monument project. Throughout the semester, students will be producing deliverables that will culminate in one final project they will present on the last day. Final project benchmarks include: a project proposal, a project timeline, and a literature review. The final project will consist of a GIS story map that includes the equivalent of a 5-page research paper, and a presentation. The course focuses on the ethics of cultural geospatial data analysis and cultural sustainability through the mapping and preservation of cultural resources. Ethics-focused discussions are outlined in the class schedule and sustainability-focused class topics are highlighted. At least 75% of the labs and class discussions focus on issues related to sustainability.

**Student Support and Resources**

*Office for Disability Accommodations*: Any student who requires accommodations because of a physical or learning disability must contact the Office for Disability Accommodations as soon as possible. Contact Dr. Tom Hirsbrunner in Student Services (hirsbrun@hawaii.edu or at 689-2675). After you have documented your disability, please make an appointment or see me during office hours to discuss your specific needs.

Geographic Information Systems (GIS) have become popular in many industries and multidisciplinary fields of study over the past 20 years. Having experience with GIS will broaden the opportunities of the student and challenge them to visualize their environments in new ways. This course is designed to introduce the basic concepts of GIS and implement them with hands-on tutorials and lessons.

*The No'eau Center* offers services designed to help students improve their overall academic performance. Tutoring in writing and many other subject areas is offered by appointment, on a walk-in basis, and online via email. Students may schedule an appointment by emailing or calling the center or stopping by to make an appointment at the front desk. Workshops are also offered on topics including literature reviews, research papers, various formatting styles (e.g. MLA, APA, Chicago), how to study for exams, resumes, and interviews. Testing services and ADA accommodations are also available. For more information, stop by the No'eau Center (Library, B203), visit our website (www.tinyurl.com/noeaucenter), or call 808-689-2750.

*UH West O'ahu Computer Lab/Media Service:* The UHWO Computer Lab is located in the Lab Building E140. Students should visit the UHWO Computer Lab website (http://www2.hawaii.edu/~uhwolab/) for hours of operation. Email: uhwohelp@hawaii.edu

*UH-West O‘ahu Library & Resource Center:* Located in B115 is open 60 hours per week when school is in session. It is recommended that you visit the first week of classes and acquaint yourself to library hours and services. Contact: 808-689-2710; Applied & Social Sciences librarian, Carina Chernisky, carinac@hawaii.edu

**Grading Policy:**

Attendance 10%

Chapter Exercises (15) 30%

Ethical Assignments (15) 15%

Benchmarks (3) 20%

Final Project 20%

Final Project Presentation 5%

**Grading Scale:**

**A+ = 98-100%**

**A=93-97%**

**A- =90-92%**

**B+ =88-89%**

**B=83-87%**

**B- =80-82%**

**C+ =78-79%**

**C=73–77%**

**C- =70-72%**

**D+=68-69%**

**D=63-67%**

**D- =60-62%**

**F=<60**

**Chapter Exercises**: Completion of weekly tutorials associated with an assigned chapter. Student will take a screenshot of their results and/or convert results to a pdf format and submit on Laulima. Each exercise will include a discussion of how the skills are used in cultural sustainability approaches.

**Final Project:** Various deliverables will be assigned throughout the semester leading up to a comprehensive GIS project that will teach the student project management skills using GIS technology and methods. Students will be required to include a discussion of ethics and cultural sustainability in the final essay as well.

**Attendance Policy**: Students are required to attend every class session. Attendance will be taken at the beginning of each class. More than 2 unexcused absences will negatively impact the participation component of the student’s grade. Please email kmvacca@hawaii.edu if there is an expected absence.

**Ethical Assignments**: Students will be required to respond to an ethical question related to archaeology and/or geospatial data each week. Responses should incorporate information from the readings and class. The students will post their responses in the weekly Flipgrid board and respond to another student’s post.

**Required Texts:**

Introduction to Geospatial Technologies (5th Edition) by Bradley A. Shellito ($153)

Geographic Information Systems in Archaeology by J. Conolly and M. Lake

(4th addition is fine)

Additional articles available on Laulima

**Computing Environment**

ESRI’s ArcGIS Pro 2.2.1, Windows Operating Systems, download available online.

For compatibility with iOS (Apple) products you will need to have Boot Camp to run Windows on your machine, which requires a split hard drive.

**Credit Hour Statement:** This is a 3 credit-hour course. Each course credit is equivalent to three hours of work/week. You should anticipate this class requiring 9 hours of work each week (on average). This includes completing readings, attending lectures and discussions, producing responses to readings, conducting research and writing papers, preparing for exams, field trips (safety permitting), and reviewing instructor feedback on assignments.

***Learning Objectives***

This course will emphasize and fulfill the following University of Hawai’i-West O’ahu student learning outcomes:

* Learn Valuable job market GIS methodology skills (SLO-1; DLO-BA-SSCI-4; CLO-BA-SSCI-ANTH-3)

**Course Schedule**

**Week 1 – It’s a Geospatial World Out There**

*Topic*: What is geospatial data and how does it relate to our world? Ethics of Privacy, cultural resource management

*Readings*: Chapters 1 (Shellito 2020)

*Ethics Assignment:* Thinking Critically Response 1:1 (Shelitto 2020)

*Hands-on Application*: Google Maps

**Week 2 – Introduction to Geospatial Data in Archaeology**

*Topic*: Archaeology and Geospatial Data, preserving and protecting archaeological data

*Readings*: Ch.1 (Conolly and Lake) &

Archaeology, Space and GIS (Wheatley and Gillings 2002, pdf on Laulima)

*Ethics Assignment:* Ethics of archaeological mapping

*Hands-on Application*: Exploration of geospatial data in Hawai‘i

**Week 3 – Ethics in Archaeology and Spatial Data Analysis**

*Topic*: Ethics of working with geographic and archaeological data

*Readings*:  Hacιgüzeller, P. (2012). GIS, critique, representation and beyond. *Journal of Social Archaeology*, *12*(2), 245-263 &

Archaeology Laws and Ethics (https://www.saa.org/about-archaeology/archaeology-law-ethics)

*Ethics Assignment*: Comparing ethical GIS applications with archaeological ethics

*Hands-on Application*: Exploring Hawai‘i spatial data

**Week 4 – Where in the Geospatial World Are You?: THURSDAY'S CLASS CANCELLED**

*Topic*: Reprojecting, Georeferencing, and Geographic Information Systems, recording cultural sites

*Readings*: Ch. 2 (Shelitto 2020) and ch. 2 (Conolly and Lake) (also watch videos posted on Laulima in place of Thursday's class)

*Ethical Assignment*: Private data in public spaces

*Hands-on Application*: Geospatial Lab Application 2.1: Coordinates and Position Measurements

**Week 5 – Matching the Map, Working with Historical Images**

*Topic*: Georeferencing digital spatial data and using GIS for spatial analysis, preserving historical data through maps

*Readings*: Ch. 3 (Shelitto 2020) and ch. 3 (Conolly and Lake)

*Ethical Assignment*: When to *not* georeference spatial data

*Hands-on Application*: Geospatial Lab Application 3.1: Georeferencing an Image

*Topics assigned for Final Project.*

**Week 6 – Geodatabases in Archaeology**

*Topic*: Spatial Data Storage, long-term sustainability of data

*Readings*: Ch. 5 (Shelitto) & ch. 4 (Conolly and Lake)

*Ethical Assignment*: Who owns the past?

*Hands-on Application*: Geospatial Lab Application 5.2 (Shellito 2020)

**Week 7 – Spatial Analysis**

*Topic:* Modelling material culture with GIS

*Readings*: Ch.6 (Shellito 2020) & ch. 5 (Conolly and Lake)

*Ethical Assignment:* Thinking Critically—ethics of representation (6.1 Shellito 2020)

*Hands-On Application*: Geospatial Lab Application 6.2 (Shellito 2020)

*Benchmark 1: Final Project Proposal Due*

**Week 8 – Map Making**

*Topic*: Scale, Map Elements, and Map Layouts

*Readings:* ch. 7 (Shellito 2020) and ch. 12 (Conolly and Lake)

*Ethical Assignment*: Representation or misrepresentation?

*Hands-on Application*: Geospatial Lab Application 7.2 (Shellito 2020)

**Week 9 – Mapping Regions**

*Topic*: Territories, catchments, and viewsheds, preserving and interpreting past perspectives on the landscape

*Readings*: ch. 10 (Conolly and Lake)

*Ethical Assignment*: Distribution and privatization of maps

*Hands-on Application*: How to Work with DEM in ArcGIS Pro

**Spring Break: March 15-19**

**Week 10 – Routes**

*Topic*: Networks, cost paths, and hydrology, predictive sustainability methods

*Readings*: ch. 8 (Shellito 2020) & ch. 11 (Conolly and Lake)

*Ethical Assignment*: Functional vs symbolic human behavior

*Hands-on Application*: How to Perform Network Analysis in ArcGIS Pro

**Week 11 – GPS and Remote Sensing**

*Topic:* Finding your location with GPS, Aerial Photography. Recording the landscape, geocaching, digital landscapes, and preservation through photography

*Readings*: ch. 4 and 9 (Shellito 2020)

*Ethical Assignment*: Knowing your location data

*Hands-on Application*: How to obtain online GIS data and use them in ArcGIS Pro. How to Use Remotely Sensed Imagery in ArcGIS Pro

*Benchmark 2: Literature Review research due*

**Week 12 – Rasters and Seeing the world in 3D**

*Topic*: 3D Modeling and usefulness in preservation work

*Reading:* ch. 13 and 14 (Shellito 2020)

*Ethical Assignment*: Types of representation

*Hands-on Application*:  How to use Raster Data, How to Represent Geospatial Data in 3D Imagery in ArcGIS Pro

**Week 13 –The Future of GIS in Archaeology**

*Topic:* The Future of GIS and unique applications in archaeology and cultural sustainability

*Readings*: ch. 15 (Shellito 2020) & Fitzjohn, M. (2007). Viewing places: GIS applications for examining the perception of space in the mountains of Sicily. *World Archaeology*, *39*(1), 36-50.

*Ethical Assignment*: Objectivity vs. subjectivity and differing epistemologies

*Hands-on Application*: Story Maps, Work on Final Projects

**Week 14 –Work on Final Projects**

**Week 15 – Final Projects**

Work on Final Projects

*Benchmark 3: Finalized GIS work*

**Week 16 – Final Projects**

Final Project Presentations