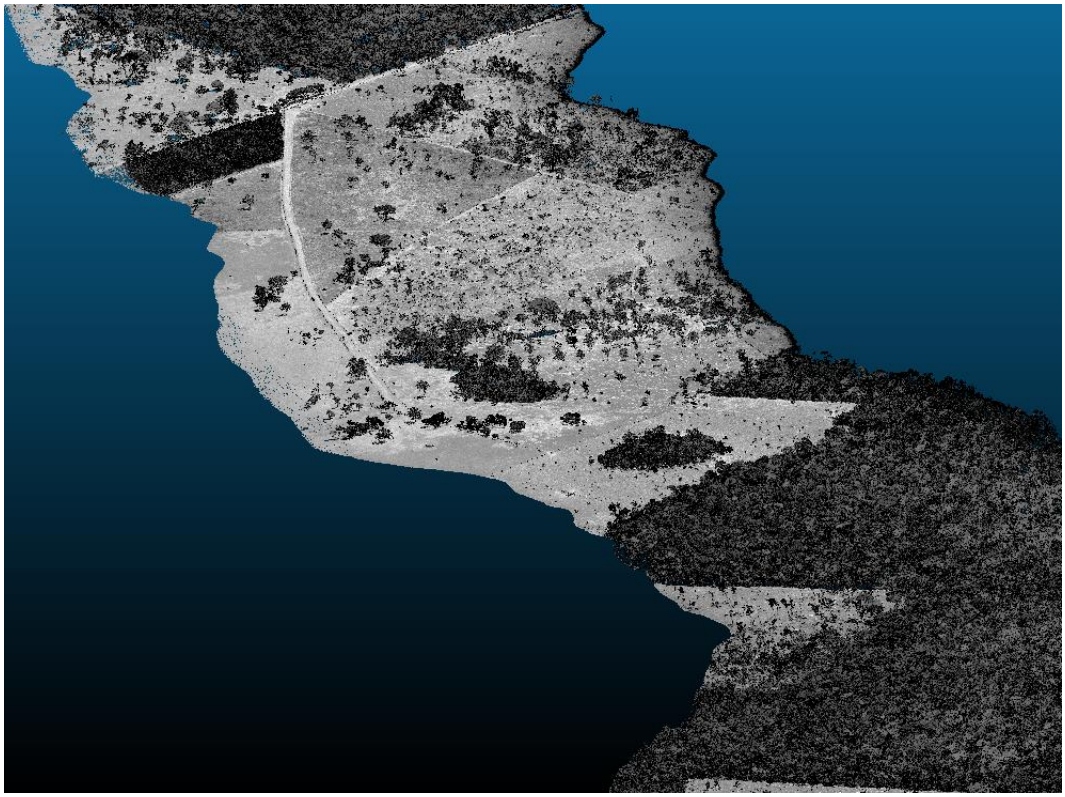
ANG 6930
Remote Sensing of Cultural Landscapes
Spring 2025



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Description

Remote sensing is the collection and analysis of spatial data through the observation and scanning of large areas from a distance. The applications of remote sensing in anthropology and archaeology are extensive, including site and feature prospection, mapping, topographic analysis, hydrological analysis, 3D modeling, subsurface imaging, vegetation, soil classification, among others. This course discusses the history and theory of the use of remote sensing of cultural landscapes. The class will explore the use and analysis of remote sensing datasets from aerial photography, satellite imagery, laser scanning, radar, and thermal sensors to interpret archaeological sites, landscapes, land cover change, land use, and other environmental applications. In addition to assessing case studies of remote sensing applications in anthropology, students will learn how to collect, preprocess, process, visualize, and analyze data. The course will also address ethical considerations in conducting remote sensing research.

Course Objectives
By the end of the course, students will:

1) be able to explain the principles, fundamentals, and applications of remote sensing for spatial analysis in archaeology, anthropology, and other disciplines.
2) know how to access and analyze satellite and other remote sensing data for archaeological and environmental applications.
3) become familiar with processing remote sensing data across several platforms, including ArcGIS Pro, QGIS, ENVI, Agisoft Metashape, LAStools, Google Earth Engine, R, and Python.
4) be able to evaluate and develop workflows for specific remote sensing analyses, from data collection to preprocessing, classification, and accuracy assessment.
5) consider the ethical ramifications of their work and the challenges facing the use and collection of remote sensing data in the twenty-first century.

Prerequisites
This class has no prerequisites, but some previous knowledge of GIS, coding, and photography will be beneficial.

Class Meetings
Tuesday, Periods 3–5, 9:35 am–12:35 pm
Turlington B304

Office Hours
Tuesday 1:00–3:00 pm
Turlington B129

Recommended Books and Resources

Fundamentals of Remote Sensing. A Canada Centre for Remote Sensing Tutorial. https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/earthsciences/pdf/resource/tutor/fundam/pdf/fundamentals_e.pdf

ESRI. Introduction to Imagery and Remote Sensing. https://introduction-to-remote-sensing-learngis.hub.arcgis.com/

Kerle, Norman, Lucas L.F. Janssen, Gerrit C. Huurneman (editors). Principles of Remote Sensing: An Introductory Textbook. https://www.researchgate.net/publication/233793398_Principles_of_remote_sensing_an_introductory_textbook

These textbooks are available for free online.

Additional Required Readings
Additional readings and case studies will be provided each week.

Grading

A 93-100%	B+ 87-89.9	C+ 77-79.9	D+ 67-69.9	E <60
A- 90-92.9	B 83-86.9	C 73-76.9	D 63-66.9	
	B- 80-82.9	C- 70-72.9	D- 60-62.9	

https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies

Attendance and Participation	20%
Weekly Lab Discussion Posts	30%
Project Site Selection	10%
Presentation	10%
Final Project	30%

Attendance and Participation
Attendance is crucial to get the most out of this course. If you must miss a class meeting, please let me know by email or in person as soon as possible. I encourage you to discuss what you missed with another student or attend my office hours. Participation includes engagement during lectures and contributions to discussions. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies (https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies).

Readings
Readings will be posted on the course website and should be completed before the relevant class period. A goal of this course is to create a resource that students can use to learn about remote sensing, so feel free to contribute additional readings in the context of that week's topic.

Labs
Every class period will have a lab component to introduce topics and techniques. We will use example data in class, and students will be required to conduct the same analyses on their own data relevant to their final project. Lab work will continue outside of class and will be presented the following week. The results of these labs will be posted on the Canvas discussion board prior to the next class meeting.

Final Project
Students will develop a project throughout the semester. After the first class meeting students will select a research site/area, ideally related to their dissertation or thesis project, to be posted as a Google Earth .kml file to the class blog. The next phase of the project will be the crafting of a research question. The final project will be a proposal and preliminary analysis of your research area, using methods and tools learned in class. If the data needed to address your research question are not available, discuss how you would realistically plan to acquire such data. Students will present project updates prior to final submission during the last two weeks of class.

Academic Honesty and Integrity
Please be familiar with the University of Florida's Student Honor Code:
https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code

Special Accommodations
The process for requesting special accommodations is described at https://disability.ufl.edu/get-started, including registering with the Disability Resource Center in Reid Hall and requesting an accommodation letter to be presented to the instructor.

Online Course Evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results.

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Course Schedule (Subject to Change)

Week 1 January 14	Course Introduction Introduction to Remote Sensing History of Remote Sensing GPS and GNSS Review GIS Lab 1: Aerial Photography and Stereoscopic Imaging
Week 2 January 21	Project Site Selection Due (posted as a Google Earth .kml file on the Canvas discussion board) Leveraging historic satellite imagery Orthorectification and georeferencing Lab 2: Orthorectifying CORONA Satellite Imagery
Week 3 January 28	Lab 3: Digital Surface Models and Orthoimagery in Agisoft Metashape Drone Mission Planning Principles of photography Photogrammetry Structure from Motion (SfM) Ground control points Lab 4: Drone Mission Planning for Photogrammetry
Week 4 February 4	Data Sources Lab 5: Topographic Analysis with ASTER and SRTM Digital Elevation Models
Week 5 February 11	Introduction to multispectral satellite imagery Lab 6: Multispectral Imagery
Week 6 February 18	Land cover classification Lab 7: Supervised and Unsupervised Land Cover Classification
Week 7 February 25	Remotely-sensed big data Introduction to machine learning Decision trees and random forest algorithms Lab 8: Manipulating Remotely-Sensed Big Data in Google Earth Engine
Week 8	Lidar for Archaeology Data collection

March 4	Download datasets Visualization and ground classification Lab 9: Visualizing and Processing Lidar Point Clouds in R with the lidR Package
Week 9 March 11	Annotating Lidar data Lab 10: Annotating Lidar with Vectors
Week 10 March 18	**Spring Break**
Week 11 March 25	Machine learning approaches in aerial remote sensing TensorFlow, Python, and Google Colab Lab 11: Machine Learning Approaches in Remote Sensing
Week 12 April 1	Subsurface Remote Sensing and Geophysics GPR Demonstration Lab 12: Ground Penetrating Radar
Week 13 April 8	Ethics in Remote Sensing
Week 14 April 15	Student Presentations
Week 15 April 22	Student Presentations

Course Bibliography

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