Kolea Institute: exploring remote sensing applications in cultural landscape studies
(ENVS 193 Special Topics 3-cr)
Syllabus

Instructors:	Sanjay Pyare
E-mail:	spyare@alaska.edu
Phone:	796-6007
Office:	Whitehead 223
Office hours:	TWR 1-3p/MW 1:45-3:15.
Class location:	By distance (Angoon) & in person (Hawaii Island)

Course Objectives & Overview:

This course integrates geotechnologies, cultural mapping, and environmental science as a participant in the Kōlea Institute, an earth-science educational & research institute to better understand environmental hazards and increase coastal resilience for underserved coastal communities across the Pacific (Alaska and Hawai'i). High school students will collaborate with undergraduate mentors and professors from the Universities of Alaska & Hawaii and interact with community participants in this Institute learning environment. Students will engage in field-based learning, applying analytical skills to cultural-environmental challenges, while developing their ability to document and communicate findings through writing and storytelling. A key focus will be on remote sensing technologies and analysis – from 3D modeling to GIS map making and drone remote sensing-- to enhance storytelling and research documentation, culminating in cultural project opportunities and a teach-back session for a geocultural mapping drone course in Angoon. Students will also integrate photographic documentation, case study research, and writing skills to create digital and physical representations of their work. By utilizing these modern navigation, imaging and geospatial mapping tools with interdisciplinary research methods, students will gain critical skills in STEM concepts of data analysis, environmental fields, and geospatial science, and extend learning to interdisciplinary concepts about culture, such as ethnomathematics, geocultural science, archaeology, environmental history and cultural landscape studies. The course will culminate in an opportunity to present at upcoming AISES (American Indian Science & Engineering Society) conferences in Juneau and Minnesota.

This tech-based curriculum not only strengthens students' understanding of STEM principles but also prepares them for future opportunities in STEM fields such as environmental science, geography, engineering, and data science. This course fosters mentorship, research, and career support, ensuring that district students have greater access to STEM careers, higher education, and industry connections. This program is a stepping stone to future innovation and success in STEM disciplines.

General competencies and Student Learning Outcomes

Upon successful completion of the course, students will achieve the following:

- Develop proficiency in geospatial technologies (drone mapping, image analysis).
- Gain experience in community-engaged research with Indigenous knowledge systems.
- Apply critical thinking to analyze changing environments and cultural landscapes.
- Enhance communication skills through mentorship, team based work, storytelling, and presentations.
- Build a portfolio of research and mapping work applicable to future studies and careers.

Course Outline, Organization & Schedule

The course is organized into pre-trip meetings, the field institute and post trip research and presentations sessions translating to ~40hrs.

Session	*Description*	*Timing & Location*
Pre-Meeting & Preparation	Orientation, project overview, field study prep, familiarization with remote sensing software	Feb 28, March 3 (3:00-4:30) Angoon + Juneau via distance
Skills Development	Hands-on fieldwork in Hawai'i: immersive training in drone mapping, ag-forestry experiences and analysis of cultural-landscape features	March 10 – 15 (9:30-3:30) Field Study in Hawai'i
Community Engagement	Participating in knowledge exchange with local Hawaiian communities and post-secondary institutions and undergraduate mentors	Hawaii Community College, Palamanui (Kona) and Manono (Hilo) Campus, Hawai'i
Leadership & Mentorship	Pairing with undergraduates for development of case study plans and mentoring peers upon return to Angoon	
Research & Storymapping	Contributing to the work on documenting local cultural features, documenting findings through writing, map renderings, and photo documentation	
Post-Trip Integration, Reflection & Teachback	Post-Trip Meeting: Reflection, synthesis, and classroom-presentation planning & Translating field experiences to classroom applications, teaching back to the drone course at school	April 2, April 10 (3:00-5:00) Angoon + Juneau via distance ~3 hrs
Independent Research	Writing, data analysis, and finalizing project deliverables & Developing an individual or group academic poster for AISES or a group presentation proposal	April 11-29
Final Project & AISES Presentation Prep	Submission of case study plan, evidence of teach back, remote sensing products, and AISES prep	April 30 Final Project Due

Assignments:

- Contributions to research case study in geocultural mapping
- Remote sensing products, field data, and written reflection for future Storymap integration
- Photo/AV documentation of field experiences and project work
- Written or audio reflection capturing personal insights, connections between field experiences and Indigenous knowledge systems, and applications to future studies and careers
- Academic poster or presentation for AISES Regional/National Conference (group or individual proposal)

Grading

• Component 1: Skills Development	20%
• Component 2: Community Engagement	20%
• Component 3: Leadership & Mentorship	20%
• Component 4: Research & Storymapping	20%
• Participation, Professionalism, & Performance (PPP)	20%

A grade letter will be assigned as follows.

90 – 100%	A
80 - 89	B
70 - 79	C
60 - 69	D
0 - 59	F

Plusses and minuses may be given at the discretion of the instructor.

Required Materials

- Laptop or tablet for GIS work
- Field notebook for documentation
- Access to GIS/remote sensing software (provided)
- Camera or phone for photo documentation