UNIVERSITY OF OREGON

Island Futures Media

HOW TO MAP AN ISLAND?

METHODS AND TECHNOLOGIES FOR ISLAND METRICS

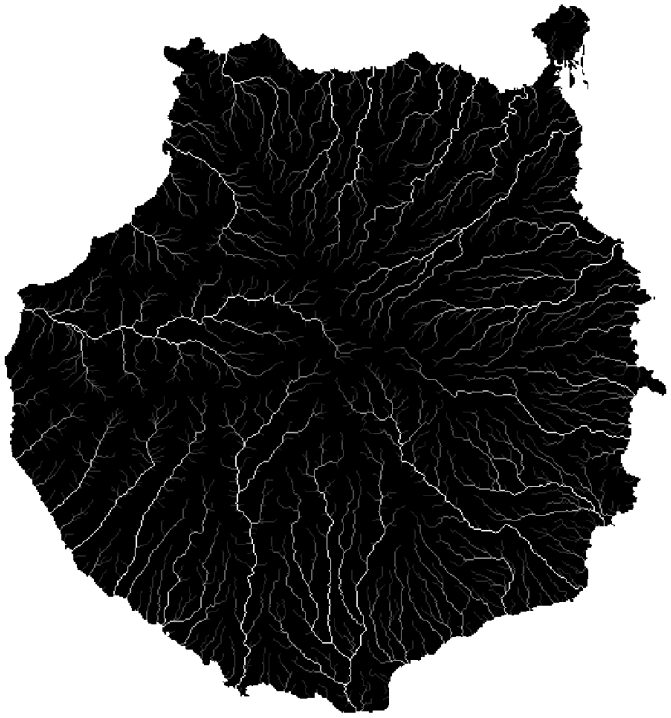
code
LA 450/550

instructor
Ignacio Lopez Buson

location
Las Palmas de GC, Spain

uo credits
2.0

contact hours
30 hours



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course description

The major technological breakthroughs resulting from the digital revolution at the end of the 20th century have allowed for dramatic advancements in the measurement, analysis, and prediction of complex environmental processes that have increased the general awareness of climate change and its consequences. In addition, growth in computational power and continuously evolving design tools allow architecture, landscape, and engineering professionals to model and evaluate projective scenarios at unprecedented speeds and scales.

GIS and remote sensing technologies like satellites, drones, and sensors have revolutionized spatial planning and our abilities to understand climate change scenarios by providing accurate data on environmental dynamics. They enable precise mapping of vulnerable areas, monitoring of changes over time, and informed decision-making for resilience strategies, essential for mitigating climate risks and preserving island ecosystems.

This media class offers an immersive exploration into the mapping of islands, with a specific focus on the comprehensive analysis and measurements of Gran Canaria. Students will explore advanced methods and technologies for island metrics, spanning environmental, urban, and social domains. Through a blend of theoretical instruction and hands-on practical exercises, students will master tools such as drones, remote sensing, Geographic Information Systems (GIS), 3D modeling, algorithmic analysis, computational fluid dynamics (CFD) simulations, and on-site surveying. By the end of the course, students will possess the skills to conduct thorough island assessments, providing valuable insights for sustainable development and resilience planning.

1- Territorial flow analysis of Gran Canaria, QGIS, Ignacio Lopez Buson, 2013

project context

The island of Gran Canaria, with its diverse landscapes and complex socio-environmental dynamics, serves as an ideal case study for this media class. Its varied terrain, from coastal areas to volcanic interiors, offers a rich tapestry for exploration. By applying advanced mapping techniques, students gain practical experience in addressing real-world challenges related to climate change, tourism management, and environmental conservation in island ecosystems. This hands-on approach provides invaluable insights into the complexities of sustainable development and resilience planning in island contexts, preparing students for impactful contributions to environmental stewardship and landscape management.

course objectives

This media class will support the studio assignments and teach the students:

- Master advanced mapping technologies for island analysis.
- Apply mapping methods to assess environmental, urban, and social aspects of Gran Canaria.
- Interpret and visualize spatial data to derive meaningful insights.
- Develop proficiency in drone operation, remote sensing, and GIS
- Master 3D modeling, algorithmic analysis, and CFD simulations for complex island environmental assessments.

instructional methodology

The course will employ a multifaceted instructional approach, combining theoretical lectures, hands-on workshops, and field exercises to offer a comprehensive learning experience. Practical sessions will immerse students in data collection using drones, analysis utilizing GIS software, and engaging in 3D modeling exercises, facilitating skill acquisition in real-world applications. Field trips to key sites on Gran Canaria will provide invaluable opportunities for on-site surveying and data validation, reinforcing classroom learning with practical field experience. Students will apply the acquired skills to support their studio production, with feedback based on the studio outcomes enhancing their understanding and refining their techniques for effective spatial planning and island analysis.

method of evaluation

Evaluation will be based on how each module successfully informs the studio project. Criteria will include the accuracy and thoroughness of data analysis, the effectiveness of visualization techniques, and the application of mapping technologies to address specific challenges on Gran Canaria. Additionally, participation in discussions and peer feedback will contribute to the overall assessment.

recommended software

The use of digital design tools will be a critical part of this course. In addition to drone training for site surveying, students will learn Agisoft Metashape to process the captured data and develop 3D models of the territory. These models will be exported to McNeel Rhinoceros for further editing, analysis and visualization with the help of Grasshopper. The Adobe Suite will be used for additional diagrams, collages and layouts for the presentations and final boards.

- Rhino 7.0 or 8.0 (Free 90-day trial) https://www.rhino3d.com/
- Agisoft Metashape Standard Edition (Free 30-day trial) https://www.agisoft.com/downloads/installer/
- Adobe Suite Photoshop, Illustrator, InDesign (Subscription) https://www.adobe.com/creativecloud/buy/students.html

course outline

This media course is divided into five technical modules: 1. Drones, 2. GIS and Urban Analysis, 3. Algorithmic analysis (GH), 4. Data visualization and animation, and 5. Story-telling and documentation. These modules are designed to support the studio sequence and will be evaluated based on studio outcomes. Trips to other islands and fieldwork in Gran Canaria will be great opportunities to learn drone surveying on-site. The media sequence will be normally taught in the morning before studio.

MODULE 1	WEEK 1	M	06/30/25	WELCOME + COURSE OVERVIEW
DRONE		T	07/01/25	INTRO TO DRONE TECHNOLOGIES
TECHNOLOGIES		W	07/02/25	INTRO TO PHOTOGRAMMETRY
AND		R	07/03/25	DRONE SURVEYING
REMOTE SENSING		F	07/04/25	TRIP TO LA GOMERA
		S	07/05/25	TRIP TO LA GOMERA
		S	07/06/25	TRIP TO LA GOMERA
MODULE 2	WEEK 2	M	07/07/25	INTRO TO QGIS
GIS		T	07/08/25	INTRO TO URBAN METRICS
AND		W	07/09/25	GIS MAPPING
URBAN ANALYSIS		R	07/10/25	STUDIO INTERNAL PRESENTATION - NO CLASS
		F	07/11/25	LOCAL TRIP IN GC
		S	07/12/25	
		S	07/13/25	
MODULE 3	WEEK 3	M	07/14/25	FROM POINTCLOUDS TO 3D MODELS
3D MODELING		T	07/15/25	GRASSHOPPER (I)
AND		W	07/16/25	GRASSHOPPER (II)
ALGORITHMIC ANALYSIS		R	07/17/25	STUDIO INTERNAL PRESENTATION - NO CLASS
		F	07/18/25	TRIP TO TENERIFE
		S	07/19/25	TRIP TO TENERIFE
		S	07/20/25	TRIP TO TENERIFE
MODULE 4	WEEK 4	M	07/21/25	GRASSHOPPER (III)
DATA VISUALIZATION		T	07/22/25	GRASSHOPPER (IV)
AND		W	07/23/25	INTRO TO ADOBE PREMIERE
ANIMATIONS		R	07/24/25	STUDIO INTERNAL PRESENTATION - NO CLASS
		F	07/25/25	LOCAL TRIP IN GC
		S	07/26/25	
		S	07/27/25	
MODULE 5	WEEK 5	M	07/28/25	INTRO TO FILM EDITING
STORYTELLING		T	07/29/25	INTRO TO AFTER EFFECTS
AND		W	07/30/25	VIDEO POSTPRODUCTION
DOCUMENTATION		R	07/31/25	PRESENTATION REHEARSAL - NO CLASS
		F	08/01/25	FINAL PRESENTATION
		S	08/02/25	
		S	08/03/25	

course readings

These readings provide a comprehensive guidance on computational techniques and workflows essential for analyzing complex geographical data. By exploring parametric design principles and computational tools, students can enhance their ability to visualize, measure, and model island landscapes accurately. These skills empowers them to employ innovative approaches in mapping and measuring, facilitating a deeper understanding of island ecosystems and their dynamics:

- Cantrell, B. (2017). Responsive Landscapes: Strategies for Responsive Technologies in Landscape Architecture. Routledge.
- Cantrell, B., & Mekies, A. (2018). Codify: Parametric and Computational Design in Landscape Architecture. Routledge.
- Zawarus, P. (2023). Landscape Performance Modeling Using Rhino and Grasshopper
- Lima, M. (2013). Visual Complexity: Mapping Patterns of Information. Princeton Architectural Press.
- Wegmann, M. (Year). Remote Sensing and GIS for Ecologists: Using Open Source Software.
- Gras, R., & Burke, J. (2023). City Science: Performance Follows Form.
- Madl, A. (2022). Parametric Design for Landscape Architects: Computational Techniques and Workflows
- Harmon, B. (2024). Computational Design for Landscape Architects
- Gerhardt, C. (2023). Sea Change: An Atlas of Islands in a Rising Ocean

accessible education statement

The University of Oregon is working to create inclusive learning environments. Please notify me if there are aspects of the instruction or design of this course that result in disability-related barriers to your participation. You are also encouraged to contact the Accessible Education Center in 360 Oregon Hall at 541-346-1155 or **uoaec@uoregon.edu**. (See **https://aec.uoregon.edu/best-practices-faculty** for more information.)

academic misconduct statement

The University Student Conduct Code (available at conduct.uoregon.edu) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students' obligation to clarify the question with the instructor before committing or attempting to commit the act. Additional information about a common form of academic misconduct, plagiarism, is available at researchguides.uoregon.edu/citing-plagiarism. (See **https://dos.uoregon.edu/academic-misconduct** for more information)

reporting obligations

I am a student-directed employee. For information about my reporting obligations as an employee, please see Employee Reporting Obligations on the Office of Investigations and Civil Rights Compliance (OICRC) website. Students experiencing any form of prohibited discrimination or harassment, including sex or gender-based violence, may seek information and resources at safe.uoregon.edu, respect.uoregon.edu, or investigations.uoregon.edu or contact the non-confidential Title IX office/Office of Civil Rights Compliance (541-346-3123), or Dean of Students offices (541-346-3216), or call the 24-7 hotline 541-346-SAFE for help. I am also a mandatory reporter of child abuse. Please find more information at Mandatory Reporting of Child Abuse and Neglect."