Advanced Methods & Skills - intro

BRANDON P. ANTHONY

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Advanced Methods & Skills

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Advanced Methods & Skills are crucial in environmental science and policy because today's environmental challenges—such as climate change, biodiversity loss, and pollution—are complex, interconnected, and global in scale. Tackling these issues requires both a strong foundation in natural and social sciences and the ability to apply specialized, advanced techniques.

Together, these courses foster an integrated approach, combining scientific rigor with social insight. They prepare students to gather and analyze robust evidence, engage diverse perspectives, and design policies that are both effective and equitable. By progressing from introductory to advanced coursework, students develop the ability to navigate uncertainty, connect interdisciplinary knowledge, and create innovative solutions—bridging the gap between understanding environmental problems and implementing lasting change in the 21st century.

Fall Term…

Introductory courses offered in the department build the essential toolkit for research methods. *Environmental Impact Assessment* trains students to systematically evaluate the potential effects of projects or policies on ecosystems and communities. *Economics for Environmental Research* provides the framework to weigh environmental benefits against costs, supporting balanced decision-making. *Environmental Management* introduces the role of management and perspectives on strategy formation in addressing environmental problems. *Geospatial Data Visualization* introduces tools to map and present environmental patterns, while *Quantitative Research Methods* and *Qualitative Research Methods* ensure that data—whether numerical or narrative—is collected and interpreted rigorously. These foundational skills enable students to understand and communicate environmental issues clearly and accurately.

| Introductory Methods Modules		
EIA: Introduction to Environmental Impact Assessment (1/2)	A. Cherp	
IEER: Intro to Economics for Environmental Research (1/2)	C. Kerschner	
IEM: Introduction to Environmental Management (1/2)	A. Cherp	
IGDV-I: Introduction to Geospatial Data Visualization I (Basic) (1/2)[1]	V. Lagutov	2/4
QNRM: Introduction to Quantitative Research Methods (1/2)	T. Centofanti	
QUAL: Introduction to Qualitative Research Methods (1/2)	T. Steger	

[1] Students with previous experience in geospatial data visualization, may also take *IGDV-II: Introduction to Geospatial Data Visualization II (Advanced) (1/2) instead.

Environmental Impact Assessment (EIA): an introduction

EIA is one of the most widely used environmental policy tools

Learning outcomes:

- Understand the origins of EIA and its role in environmental protection and sustainable development

- Know key stages of a standard EIA process

- Understand the limitations of EIA and current approaches to address these
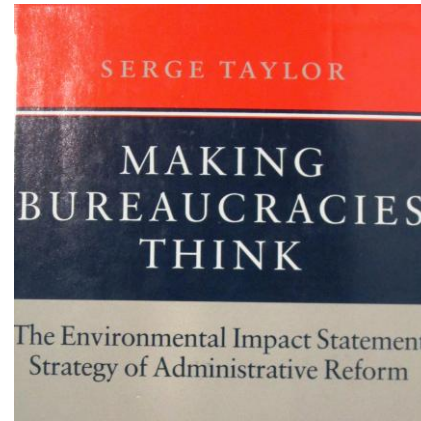
Teaching and learning:

- Classes
- Interactive reflection
- Group exercise

Introduction to Economics for Environmental Research (IEER)

Mag. Dr. Christian Kerschner, MSc

TOPICS COVERED:

- **Economics and the environment -** mainstream environmental vs. ecological economics (a critical perspective);
- **Deciding over Human-Environment Interactions**: Cost-Benefit Analysis vs. social multi-criteria analysis.
- **Decoupling & Green Growth vs Degrowth**

LECTURE FORMAT:
Input lectures followed by guided group discussions

ASSESSMENT
pass/fail only
3 written assignments (flipped classroom, peer work)
Participation
Moodle forum extra points

Introduction to Environmental Management (IEM)

'Management' is a cross-cutting concept in environmental practice

Learning outcomes:

- Understand the role of management (as distinct from science and policy) in achieving environmental objectives

- Understand the role and the nature of various 'mindsets' essential for effective management

- Understand the main principles and stages of Environmental Management Systems

- Understand formation of environmental and sustainability strategies
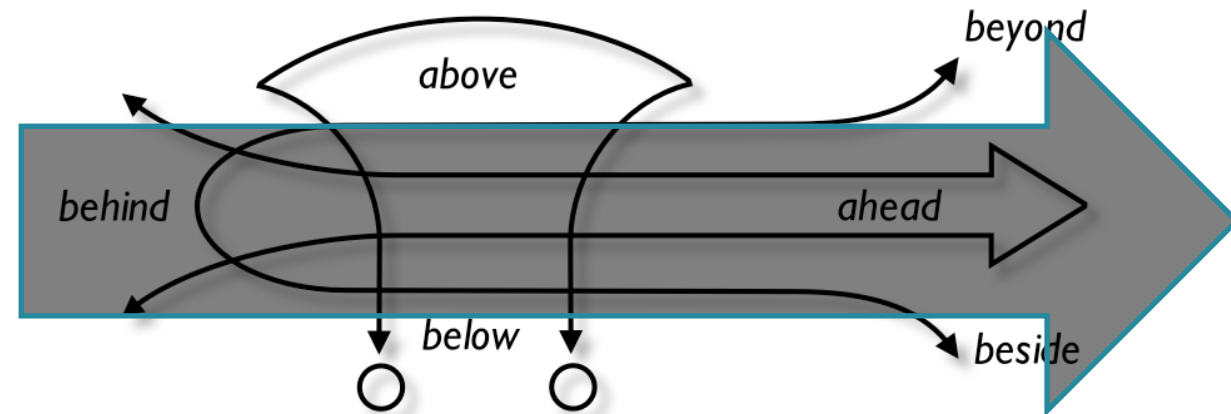
Teaching and learning:

- Classes

- Interactive reflection

- Take home exam

Introduction to Geospatial Data Visualization (IGDV - I / II) - V. Lagutov

- **Outcomes: acquire, analyze, and visualize geospatial/EO data; design clear maps; communicate insights**
- **Two standalone 1-credit modules (pass/fail) — take either or both (consecutive; only *one* counts towards minimum methods courses)**
  - IGDV-I: Foundations — core concepts & basic mapping skills
  - IGDV-II: Practice — advanced workflows & applied project
- **Guest talks & live demos from UN and industry practitioners (online & onsite)**
- **Double-session labs: Google Earth Pro • Online EO tools (e.g., EO Browser) • QGIS essentials**
- **Micro-tutorials + homework to build skills step-by-step**
- **Flexible pathway for students with prior GIS experience (individual plan)**
- **Prereqs: none for IGDV-I; IGDV-II expects IGDV-I or instructor approval**
- **Assessment: IGDV-I — 3 satisfactory map submissions, IGDV-II — capstone project**
- **Software: open-source / free academic licenses**

Introduction to Quantitative Research Methods

Course Information

- Course Code: ENVS5154
- ECTS: 2
- Instructor: Tizlana Centofanti
- Email: centofantit@ceu.edu

Topics Covered

Descriptive & inferential statistics

Experimental design

Data visualization

Statistical software

Why take This Course?

Learn core statistical concepts for environmental science and policy

Gain hands-on experience withRStudio for data analysis and visualization

Understand how to design experiments and Interpret results

Beginner-friendly

Interactive lectures

Practical exercises

Understand core statistical concepts for environmental science and policy

Learn experimental design and data analysis using RStudio

Apply descriptive and inferential statistics (t-tests, ANOVA, chi-square)

Visualize and interpret real-world environmental data

No prior statistics experience required

Pass/fail

Introduction to Qualitative Research Methods

In this course, you will gain:

1)   **Foundational Knowledge:** Understand in-depth interview techniques and their role in environmental studies.

2)   **Application Skills and Experience:** Practice interviewing by designing protocols, conducting ethical research interviews, and analyzing/presenting data.

3)   **Discernment:** Use interviewing to explore environmental issues from others' perspectives, while reflecting on your own perspective.

4)   **Passion for Learning:** Cultivate curiosity and the ability to share insights about environmental dynamics.

Winter Term…

Advanced courses deepen and specialize capacity gained in the Fall Term. *Environmental Ethnography* offers a nuanced understanding of how cultural and social contexts shape environmental practices, while *Environmental Monitoring* applies sophisticated techniques to track ecological changes over time. *Geospatial Analysis* goes beyond visualization to model complex spatial relationships, and *Survey Research Methods* equip practitioners to design and analyze surveys that capture public opinion or stakeholder needs. *Stakeholder Identification & Analysis* builds the capacity to map power dynamics, anticipate conflicts, and design inclusive, participatory solutions.

Advanced Methods B.P. Anthony			
	EE: Environmental Ethnography (2/4)	G. Aistara, T. Steger	2/4
	EMON: Environmental Monitoring (2/4)	B. P. Anthony, T. Kovács	
	IGA: Introduction to Geospatial Analysis (2/4)	V. Lagutov	
	SRM: Survey Research Methods (2/4)	B. P. Anthony	
	STIA: Stakeholder Identification & Analysis (2/4)	B. P. Anthony	

ENPR: Environmental Practicum (2/4)	*MESP only!!*

Environmental Ethnography

This course invites you to step into the field to observe and listen closely to reveal nuance, contradiction, and meanings and capture what truly matters in a given setting from the perspective of participants.

Learn hands-on methods for exploring environmental issues and conflicts by:

- Crafting a strong research question.
- Conducting field observations and interviews.
- Transforming your observations and interview data into rich ethnographic writing.

ASSESSMENT (% of grade):

- Participation and attendance in class and field observation (10%);
- **Data Collection:** Field notes and field journal (20%); Interview protocol and transcript (20%);
- **Data Analysis:** Coding of one field journal entry and one interview transcript (20%)
- **Write-Up:** Ethnographic vignette (20%) Peer review of vignette (10%)

# Environmental Monitoring (2/4)

- B.P. Anthony

- 5 lectures + 3-day (+ nighttime!) field exercise at two sites in Hungary
- Assessment: 3 reflective blogs (30%) + individual report (40%) + group report (30%)

<u>Learning outcomes</u>
1) understand the basic principles of environmental monitoring
2) identify the pros and cons of various approaches to monitoring the environment
3) be aware of common bioindicators and how they are used
4) understand the concepts in effective study design & apply them to a monitoring question
5) conduct a simple amphibian monitoring study
6) present findings in a clear and concise fashion
7) work more effectively in a group setting
8) improve ethical conduct whilst undertaking field research
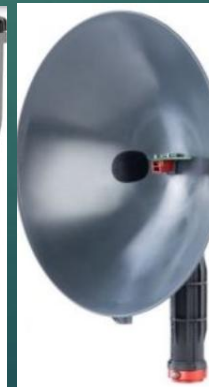
Survey Research Methods (2/4)
- B.P. Anthony

This course offers a review of some of the major theoretical and empirical issues associated with survey research methodology (including questionnaire design and scientific sampling) and prepares students in the fundamental skill areas necessary to design and conduct survey research projects.

- 11 lectures
- Assessment: one major assignment, distributed in three parts. Assn 1a (30%) + Assn 1b (30%) + Assn 1c (30%) + Class participation (10%)
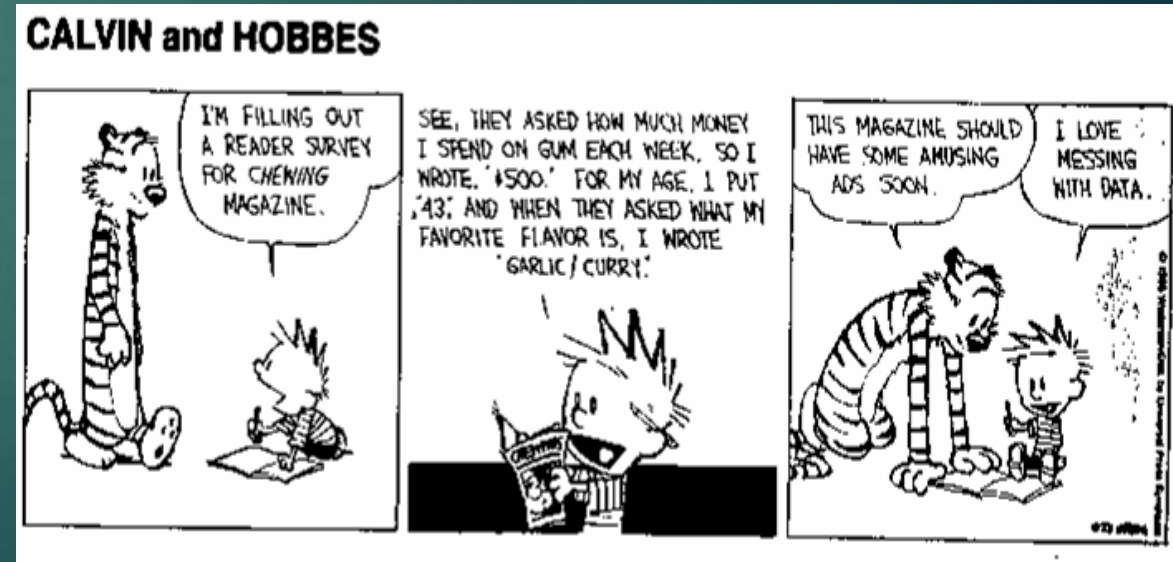
Stakeholder Identification & Analysis (2/4)
- B.P. Anthony

- 3 lectures <u>only</u>, including guest speaker from City of Vienna, Forestry Office and Urban Agriculture (*largely independent work!!*)
- Assessment: Assn 1a: Stakeholder Identification (40%) + Assn 1b: Stakeholder Analysis (20%) + Assn 1c: Stakeholder Position (40%)

<u>Learning outcomes</u>
1. Identify a diversity of stakeholders relevant to a specific environmental project and compare their varying viewpoints, degrees of influence, and interest;
2. Research an environmental project and select relevant evidence supporting an assigned stakeholder position; and
3. Explain the key factors of effective stakeholder engagement, why they are important, and analyze how these factors play out in the case of a specific project
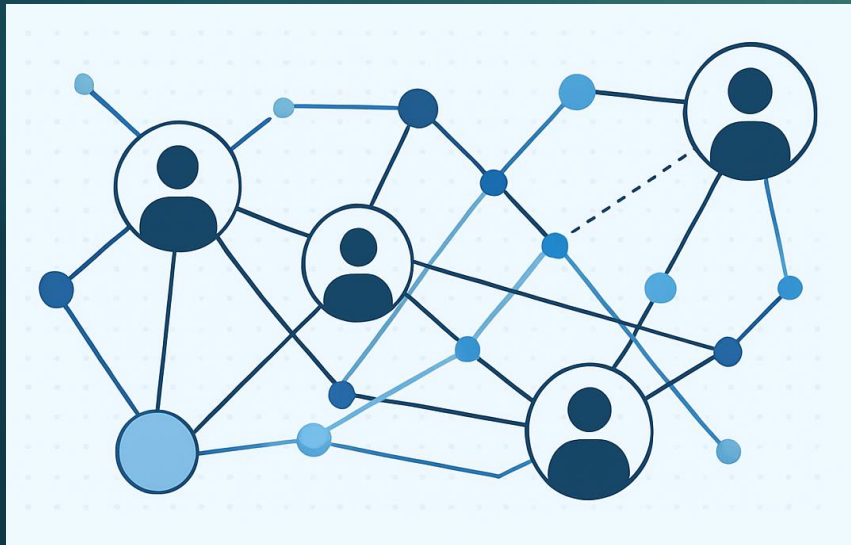
Environmental Practicum (2/4)
MESP only!

Aims, objectives, and learning outcomes

The course allows students to gain first-hand experience in dealing with environmental challenges in international, industry, NGO, and other relevant institutions. Students will tackle contemporary environmental issues assisting professionals and experiencing real-life context and practical application of their coursework. Through such experiential learning, students enhance their research, critical thinking, problem-solving, and presentation skills. The course can be used to get acquainted with a potential host institution to conduct thesis research.

Students are supervised jointly by a representative of the host organization and a departmental faculty member. Passing the course requires a student to intern a minimum number of hours, to successfully complete assignments given by the host, and to report the experience. Students can propose potential internship placement based on their own professional networks, but these offers should be preapproved by the department. Any recognized environmental organization can be a host. The selection of interns is made by the host organization.

Thank you!

Questions?