

## Environmental Systems, Justice, & Technology Seminar

ENVI-3010 (3 credits)

### Portugal: Sustainability and Environmental Justice

*This syllabus is representative of a typical semester. Because courses develop and change over time to take advantage of unique learning opportunities, actual course content varies from semester to semester.*

#### Description

This seminar is structured into five modules, each focusing on a specific aspect of sustainability, environmental systems and justice. Module 1 introduces sustainability models, including the Water-Energy-Food-Ecosystems (WEFE) Nexus, and examines Portugal's progress towards UN sustainable development goals. Module 2 investigates the WEFE Nexus in the Portuguese context, exploring integrated management of water, energy, food, and ecosystems for sustainable development. Module 3 addresses environmental justice and injustice, examining power dynamics between policymaking, neoliberalism, and environmental movements. Module 4 provides a historical and analytical overview of environmental conflicts in Portugal, including the role of advocacy groups and NGOs in advancing environmental justice. Finally, Module 5 explores the dual roles of Artificial Intelligence in enhancing societal resilience and raising ethical concerns, discussing its applications in environmental monitoring and management. Through site visits and classroom sessions, students will be exposed to high-tech solutions for resource management and will learn about the surrounding areas and how policies have protected (or failed to protect) the people living nearby. These site visits will also allow students to engage with local activists and municipal leaders, providing critical perspectives on the over-reliance on technology in mainstream sustainable development narratives and the technocratic approaches to sustainability that often lead to environmental conflicts and injustice. The course aims to cultivate a community of stakeholders among students dedicated to sustainable development and social equity.

#### Learning Outcomes

Upon completion of the course, students will be able to:

- Analyze the WEFE Nexus framework and generate data-driven insights and provide recommendations for sustainable resource management within the Portuguese context;
- Analyze the complex interdependencies among waste, water, energy, soil, and biodiversity, fostering a holistic understanding of sustainability challenges and evidence-based solutions;
- Gain country-specific knowledge about environmental conflicts in Portugal, examining local efforts to uphold environmental justice;
- Advocate for fair and inclusive solutions that prioritize environmental equity and justice, drawing upon an understanding of power dynamics, policy-making processes, and the role of social movements in advancing society rights;

- Explore AI applications in addressing environmental challenges and critically assess ethical considerations associated with AI technologies and consequently, create informed decision-making.

### **Language of Instruction**

This course is taught in English, but students will be exposed to vocabulary related to course content as well as the nuances of renewable energy, technology, resource economics, and environmental science through in-country expert lecturers and field visits to a wide range of venues and regional locales.

### **Course Material and Texts**

A course pack including selections from the texts listed below will be provided on the class website. You are not required to purchase these textbooks; selected chapters will be available on the course website; large sections are also available for perusal on Google books. The course website also contains numerous relevant articles and will be updated with required and optional readings throughout the program.

### **Suggested Pre-Departure Readings**

All pre-departure readings and assignments can be found on the program's Virtual Library.

### **Course Schedule**

Students will be provided with a detailed course schedule during orientation on the program. Please be aware that topics and excursions may vary to take advantage of any emerging events, to accommodate changes in our lecturers' availability, and to respect any changes that would affect student safety. Students will be notified if this occurs.

### **Module 1: Sustainability Models**

This module surveys the main sustainability models and examines the state of Portugal considering the UN sustainable development goals. The module also addresses conceptualizations of green, circular and bioeconomy, and discusses the potential gains and costs of implementation alternatives. The WEF Nexus is introduced as a steppingstone towards systems thinking for sustainability. Through an examination of specific examples, students develop a perspective of sustainability frameworks, building knowledge of the relevant indicators.

*Sessions and class discussions in this module may explore:*

- Emerging sustainability models: planetary boundaries and doughnut economics;
- Concepts in bioeconomy: green, circular and bioeconomy;
- The WEF Nexus as a framework for sustainability and regeneration
- Sustainability indicators in Portugal.
- Excursions may include visiting the Municipio de Lisboa (Lisbon Municipality) Environmental Team to learn about their strategy

*Recommended Readings:*

Europe Sustainable Development Report 2023/24, <https://eu-dashboards.sdgindex.org/chapters>

D'Amato, D., Korhonen, J. (2021) Integrating the green economy, circular economy and bioeconomy in a strategic sustainability framework, Ecological Economics, <https://doi.org/10.1016/j.ecolecon.2021.107143>

Malagó, A., Comero, S., Bouraoui, F., Kazezyilmaz-Alhan, C. M., Gawlik, B. M., Easton, P., & Laspidou, C. (2021). An analytical framework to assess SDG targets within the context of WEFE nexus in the Mediterranean region. *Resources, Conservation and Recycling*, 164, 105205.

## Module 2: The WEFE Nexus in Portugal

Considering the challenges brought on by climate change, which predicts higher temperatures and lower precipitation for most of the Iberian Peninsula, this module highlights aspects of the WEFE nexus in the Portuguese context. It examines how the integrated management of water, energy, food, and ecosystems can promote sustainable development. The module explores Portugal's innovative practices and policies in these areas, providing insights into the challenges and successes of implementing the WEFE Nexus approach.

*Sessions and class discussions in this module may explore:*

- Understanding waste, water/sewage and energy services and technologies.
    - Excursions may include visiting waste, water, and wastewater management plants; or energy management companies or facilities.
  - Sustainable agriculture practices in the context of the EU “Farm to Fork” strategy and the Nature Restoration Law;
  - Understanding efforts to preserve and restore ecosystems and biodiversity in Portugal.
    - Excursions may include visiting the Conservation of Biodiversity Project at Arrábida Natural Park.
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- Culture visits - fado music concert and cooking activity to experience city culture

*Recommended Readings:*

European Commission (n.a.) The European Green Deal  
[https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal\\_en](https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en)

Ronzon, T. and M'Barek, R. (2018). Socioeconomic Indicators to Monitor the EU's Bioeconomy in Transition. *Sustainability*, 10: 1745. doi:10.3390/su10061745

Neves, M.C.; Malmgren, K.; Neves, R.M. Climate-Driven Variability in the Context of the Water-Energy Nexus: A Case Study in Southern Portugal. *J. Clean. Prod.* 2021, 320, 128828. <https://doi.org/10.1016/j.jclepro.2021.128828>

da Conceição Neves, M.; Neves, R.M. Exploring the Interplay between Water Availability and Solar and Wind Energy Potential in the Algarve (Portugal). In *Water-Energy-Nexus in the Ecological Transition*; Springer: Berlin/Heidelberg, Germany, 2022; pp. 63–65

## Module 3: Environmental Justice and injustice

This module explores critical issues in the environmental justice debate within a dominant neoliberal framework. Students will examine the power dynamics between policymaking, neoliberalism, capitalism, and movements advocating for the "right to nature" and the "right to the city."

*Sessions and class discussions in this module may explore:*

- Neoliberal environmental in/justice and policymaking;

- Biodiversity, food security, and socio-economic development;
- Neoliberalism and responsible tourism;
- Environmental justice and inclusion and equity.

*Recommended Readings:*

- Apostolopoulou, E. and Cortes-Vazquez, J. (2018). Neoliberalism and environmental movements around the World after the 2008 financial crash: Defending the right to nature. In Apostolopoulou, Elia and Cortes-Vazquez, Jose A. (Eds.). *The Right to Nature: Social Movements, Environmental Justice and Neoliberal Natures*. New York: Routledge.
- Menton, M., Larrea, C., Latorre, S., Martinez-Alier, J., Peck, M., Temper, L., & Walter, M. (2020). Environmental justice and the SDGs: from synergies to gaps and contradictions. *Sustainability Science*, 15(6), 1621-1636.
- Schlosberg, D., & Collins, L. B. (2014). From environmental to climate justice: climate change and the discourse of environmental justice. *Wiley Interdisciplinary Reviews: Climate Change*, 5(3), 359-374.

#### **Module 4: Environmental conflicts and advocacy**

This module provides a historical and analytical overview of environmental conflicts in Portugal. These conflicts encompass a range of areas such as fisheries, mining, energy, pollution, and rural-urban disputes related to natural resource management. The aim is to develop understanding of the political, social, and economic struggles that shape environmental conflicts and mechanisms of environmental conflict resolutions. Additionally, the module explores the impact of advocacy groups, non-governmental organizations (NGOs), and grassroots movements in advancing environmental justice and shaping policy decisions.

*Sessions and class discussions in this module may explore:*

- Environmental advocacy and conflict resolution;
- Mega development projects and environmental conflicts;
- Resource management and environmental conflicts in rural Portugal;
- Environmental awareness and advocacy in Portuguese media.
- Excursions may include visiting activists in groups such as ZERO or Acção Climática.

*Recommended Readings:*

- Batel, S. A brief excursion into the many scales and voices of renewable energy colonialism. In *Routledge Handbook of Energy Democracy* (pp. 119-132). Routledge.
- Mouro, C., Santos, T., & Castro, P. (2018). Past-present discontinuity in ecological change and marine governance: An integrated narrative approach to artisanal fishing. *Marine Policy*, 97, 163-169.
- Batel, S., & Pataco, L. (2020). Portuguese media representations of nuclear facilities in Almaraz, Spain: beyond borders and risk perception (Representaciones en los medios portugueses de las plantas nucleares en Almaraz, España: más allá de las fronteras y la percepción del riesgo). *PsyEcology*, 11(1), 104-115.
- Figueiredo, E. (2004). Struggling for Rural Environment: Conflicts between desires and needs in Portuguese rural areas. WORKSHOP 3–Natural Resources Management and Farm Functions in Landscape Construction Available: [http://ifsa.boku.ac.at/cms/fileadmin/Proceeding2004/2004\\_WS3\\_04\\_Figueiredo.pdf](http://ifsa.boku.ac.at/cms/fileadmin/Proceeding2004/2004_WS3_04_Figueiredo.pdf)

## Module 5: Artificial Intelligence and Societal Resilience

This module explores the dual roles of Artificial Intelligence (AI) in enhancing societal resilience and raising ethical concerns. Students will explore how AI technologies can address environmental challenges, improve resource management, and support sustainable development. The module also critically examines the ethical implications of AI, ensuring that advancements in technology are aligned with principles of equity and justice.

*Sessions and class discussions in this module may explore:*

- AI Applications in Environmental Monitoring and Management
- Balancing Advantages and Ethical Challenges when AI is used in different activities and subjects
- Learning about the EU AI Act: the first regulation on Artificial Intelligence

*Recommended readings:*

Khakurel J, Penzenstadler B, Porras J, Knutas A, Zhang W. The Rise of Artificial Intelligence under the Lens of Sustainability. *Technologies*. 2018; 6(4):100. <https://doi.org/10.3390/technologies6040100>

Galaz, V., Centeno, M. A., Callahan, P. W., Causevic, A., Patterson, T., Brass, I., Baum, S., Farber, D., Fischer, J., Garcia, D., McPhearson, T., Jimenez, D., King, B., Larcey, P. & Levy, K. (2021). Artificial intelligence, systemic risks, and sustainability. *Technology in Society*, 67, 101741. <https://doi.org/https://doi.org/10.1016/j.techsoc.2021.101741>

Dumbrava, C. Artificial intelligence at EU borders: Overview of applications and key issues. 2021, European Parliamentary Research Service, European Union. <https://doi.org/10.2861/91831>

Adams, R. Can artificial intelligence be decolonized? *Interdisciplinary Science Reviews*, 46(1-2): 176-197. <https://doi.org/10.1080/03080188.2020.1840225>

### Evaluation and Grading Criteria

Evaluation is based not only on assessment of comprehension of the course concepts listed above, but also on student engagement and initiative in course exercises and activities. Grade is determined by:

#### Site visit questions (30%)

The AD will provide questions for students to reflect on and analyze their observations and experiences from the site visits.

#### Group Podcast series (70%)

In this assignment, you will work in groups to create a podcast series. The podcast will be divided into three episodes, corresponding to Modules 1-2, 3-4 and 5. Each episode should integrate course concepts, discuss relevant case studies, and include diverse perspectives. Each episode should integrate course concepts, discuss relevant case studies, and include diverse

perspectives.

The assignment will be evaluated based on the following four components:

1. Round table group presentations (10%)
2. Episode covering Modules 1-2 (20%)
3. Episode covering Modules 3-4 (20%)
4. Episode covering Module 5 (20%)

Each episode should integrate course concepts, discuss relevant case studies, and include diverse perspectives. Students will have access to faculty for technical support as needed.

Assessment:

Site visit questions	30%
Group Podcast series	70%

Grading Scale

94-100%	A
90-93%	A-
87-89%	B+
84-86%	B
80-83%	B-
77-79%	C+
74-76%	C
70-73%	C-
67-69%	D+
64-66%	D
below 64	F

Expectations and Policies

- Show up prepared. Be on time; have your readings completed and points in mind for discussion or clarification. This raises the level of class discussion for everyone. Frequent tardiness will count as absences.
- Have assignments completed on schedule, printed, and done accordingly to the specified requirements. This will help ensure that your assignments are returned in a timely manner.
- Ask questions in class. Engage the lecturer. These are often very busy professionals who are doing us an honor by coming to speak. Comply with academic integrity policies as specified in the [SIT Study Abroad Student Handbook](#)
- Respect differences of opinion (classmates, lecturers, local constituents engaged with on the visits). You are not expected to agree with everything you hear, but you are expected to listen across difference and consider other perspectives with respect.

**Please note:** the syllabus, course content, lecturers, and readings may be modified by the Academic Director in order to better suit the needs of the course and its participants. Should any change of class topics or lecturers be necessary, students will be promptly notified.

**Academic Policies:** SIT prides itself on providing students with an experientially based program; we hold ourselves, and our students, to the highest of academic standards. Students are asked to refer to the **SIT Study Abroad Handbook** for policies on academic integrity, ethics, academic warning and probation, diversity and disability, sexual harassment and the academic appeals process.

**Disability Services:** Students with disabilities are encouraged to contact Disability Services at [disabilityservices@sit.edu](mailto:disabilityservices@sit.edu) for information and support in facilitating an accessible educational experience. Additional information regarding SIT Disability Services, including a link to the online request form, can be found on the Disability Services website at <http://studyabroad.sit.edu/disabilityservices>.