

ECON0052: Economics of the Environment

Lecturer: Frank Witte

This course takes an interdisciplinary approach combining aspects of economics, environmental science, and computer modelling/programming to better understand current issues about Economics and the Environment. The learning aims of the module are flexible and allow a student to focus on specific areas of their own interest and/or take strongly computational, strongly qualitative approaches or anything in between. Group work is an essential part of the course.

This module

The module focusses on three core issues:

- *pollution,*
- *finite and renewable resources,* and
- *global climate change & biodiversity.*

The approach this module takes is one where modelling these economic and environmental phenomena is key and the following skills are assessed:

- understanding environmental economic modelling concepts and interpreting modelling outcomes,
- understanding why modelling and environmental science are essential ingredients to be combined with economics,
- searching, finding and assessing academic environmental economics and environmental science papers and reports and digesting them,
- formulating short, structured but highly information-rich answers to relatively open questions in environmental economics, and
- working creatively and independently with the material and having the skill to identify and focus on original, interesting, sources in environmental economics.

Aims:

Familiarise you, quantitatively and qualitatively, with important issues in environmental economics and environmental policy making such as (1) anthropogenic global warming, (2) the sustainable use of resources such as fish and forests and (3) environmental pollution.

Give you hands-on experience in how to model complex economic + environmental systems.

Help you understand the basic natural processes affecting the environment.

Introduce to you the main tools and challenges involved in environmental valuation.

Show you ways to determine the efficient level of pollution and discuss the instruments available to policy makers to reach such targets.

Engage you in the discussion about the role externalities and public goods play for environmental policy making.

Show you ways to determine the optimal use of renewable and non-renewable resources that includes intertemporal optimisation of utility.

Suitable For: Suitable for 2nd and final year students from Economics (L100 / L101 / L102), BSc Economics and Statistics (LG13), BSc Economics and Geography (LL17), BA Philosophy and Economics (VL51) and BSc Science Pathway (Y000/Y001). Students with backgrounds different from the above should contact the course tutor to discuss suitability.

Prerequisites: Students should have taken courses equivalent to our first-year modules ECON0002: Economics and ECON0010: Mathematics for Economics. Taking ECON0114: Computational Methods for Economists prior to taking ECON0052 is recommended *for those* students who would like to focus on the computational aspects of this module, but *not required as the module will be self-contained*.

Assumed knowledge: The prerequisites cover a good familiarity with the key results from linear algebra and the calculus of several variables, in particular optimization, and some elementary familiarity with ordinary, linear, differential equations and their solutions. A general familiarity with Economics at the level of the ECON0002 of an equivalent 30 credits in Economics, both the micro- as well as the macro-aspects, is also strictly required.

Assessment

Typically, the assessment consists of the following two components:

- Group project (40% weight) an environmental research project in groups of 3-5 students.
- Take-Home Assessment in term 3 (60% weight).

Weekly overview:

Week 1: *What should Economists know about Climate & Life*

Applicable book chapters & paper:

Book Chapter 1: Introduction: Economics for the Environment

The week 1 paper highlighted the importance of '**budget models**' in Economics.

Week 2: *Why do Markets struggle to be efficient*

Applicable book chapters & paper:

Book Chapter 3: Markets and the Environment

The week 2 paper highlights the use of the "transaction cost" concept in understanding market failures.

Week 3: *What are the fundamental choices we need to make when using CBA*

Applicable book chapters & paper:

Book Chapter 5: Cost-Benefit Analysis and Environmental Policy

Book Chapter 6: Valuing the Environment

The week 3 paper highlights the notion of '**bottom up CBA**' in as an alternative to the standard approaches.

Week 4: *What does efficiency mean when extracting finite and renewable resources?*

Applicable book chapters & paper:

Book Chapters 9 & 10: The Economics of non-renewable natural resources & The Economics of renewable resources

The week 4 paper highlights the state of world fisheries as an important context for these discussions.

Week 5: *Sustainable fisheries & forestry's*

Applicable book chapters:

Chapter 10: The Economics of Renewable Resources

Chapter 8: Conflicts & Cooperation: Strategic interactions

Week 5 papers: will be dealing with fisheries and optimal extraction policies as well as with the complexity of the sustainable fisheries problem by considering the case-study of the sustainable fisheries in Lake Victoria.

-----READING WEEK-----

Week 6: *Economic growth & pollution*

Applicable book chapters & paper:

Book Chapter 7: Economic growth, the Environment and sustainable development.

The week focusses on modelling Economic growth and exploring the effects of unmitigated pollution on long-term economic and health outcomes.

Week 7: *Can Economic growth ever be sustainable*

Applicable book chapters & paper:

Book Chapter 7: Economic growth, the Environment and sustainable development.

The week 7 paper highlighted the how a "Green Solow" model allows an understanding of the EKC.

Week 8: *The Economics of Climate Change I*

Applicable book chapters & paper:

Book Chapter 12: The Economics of Climate Change

We use the material of the previous weeks to study a Green-Solow model of climate change economics.

Week 9: *The Economics of Climate Change II*

Applicable book chapters & paper:

Book chapter 8: Conflicts & Cooperation: strategic interactions

The week 9 papers are a collection of papers revolving around Nordhaus' integrated assessment model of climate change economics.

Week 10: *How to value biodiversity*

Applicable book chapters & papers:

Chapters 4 (Valuing the Environment) and 16 (Biodiversity) of Hanley (2019).