

ECOLOGICAL ECONOMICS

(Year 3)

Aims of the Course

This course aims to give students an insight into the new and rapidly developing subject of Ecological Economics. It is particularly suited to those who have already taken a course in Environmental Economics.

Learning Objectives

1. To recognise the role of ethical systems in determining attitudes towards nature.
2. To realise the nature and extent of the effects of economic activity on the natural environment, through an understanding of the Entropy concept
3. To examine the role of human inventiveness, using the concept of evolution, in long-run economy-environment interactions.
4. To explore the scope for, and limitations on, policy making for ecologically sustainable development.

Course Structure

The course is in four parts. The first five lectures set the scene, with discussions of the background to ecological economics, and the roles of ethics and 'knowledge' in formulating environmental policy. The next five lectures look at the conceptual foundations of ecological economics, including the use of notions of entropy and evolution.. The next two lectures examine in more detail problems of knowledge and ignorance in formulating environmental policy. The final two lectures apply the above concepts to concrete environmental problems.

Teaching Structure

The course lasts 10 weeks, and will consist of 15 lectures (two per week in even weeks of the semester, one per week in odd weeks). In addition there will be 5 seminars, at fortnightly intervals, in odd weeks.

Text

The required text for the course is:

M. Faber, R. Manstetten and J. Proops (1996) *Ecological Economics: Concepts and Methods*. Edward Elgar, Cheltenham (below this is referred to FMP *EcEc*).

There are several copies of this in the library, but you are strongly recommended to buy this book.

ECOLOGICAL ECONOMICS - COURSE OUTLINE

Lectures

1. An introduction to ecological economics

2. Ecological economics: rationale and problem areas
3. Towards an open future: ignorance, novelty and evolution
4. The dilemma of modern humans and nature: an exploration of the Faustian imperative
5. Sustainable development: the roles of science and ethics
6. Entropy: a unifying concept for ecological economics
7. The use of the entropy concept in ecological economics
8. Evolution in biology, physics and economics: a conceptual analysis
9. On the conceptual foundations of ecological economics: a teleological approach
10. Interdisciplinary research between economists and physical scientists: retrospect and prospect
11. Humankind and the environment: an anatomy of surprise and ignorance
12. Experience, knowledge and the environment
13. Linking ecology and economy: joint production in the chemical industry
14. Reducing CO₂ emissions: analysis and policy
15. The Environmental Footprint and International Trade

Seminars

1. Issues in ecological economics (Readings for Lectures 1-3)
2. Ethics, entropy and sustainable development (Readings for Lectures 4-6)
3. Entropy, evolution and self-organisation in human-nature systems (Readings for Lectures 7-9)
4. Interdisciplinarity and knowledge in ecological economics (Readings for lectures 10-12)
5. Policy implications of ecological economics (Readings for Lectures 13-15)

ECOLOGICAL ECONOMICS - READINGS

Basic Reading

1. FMP *EcEc*, Chapter 1.
C. Spash (1999) The development of environmental thinking in economics. *Environmental Values* 8:413-435
2. FMP *EcEc*, Chapter 2.
G. Hardin (1991) Paramount positions in ecological economics (Chapter 4). In: R. Costanza (ed.) *Ecological Economics*. Columbia University Press, New York.
3. FMP *EcEc*, Chapter 3.
J. Gleick (1987) The butterfly effect; Life's ups and downs. In: *Chaos: Making a New Science*.

Penguin, Harmondsworth.

4. FMP *EcEc*, Chapter 4.

A. Leopold (1949) The land ethic. In: *A Sand County Almanac*. Oxford University Press, Oxford.

5. FMP *EcEc*, Chapter 5.

J. Proops, M. Faber, R. Manstetten and F. Jöst (1996), Achieving a sustainable world, *Ecological Economics*, 17:133-5.

6. FMP *EcEc*, Chapter 6.

N. Georgescu-Roegen (1971) Entropy, value and development (Chapter 10). In: *The Entropy Law and the Economic Process*. Harvard University Press, Cambridge, Mass.

7. FMP *EcEc*, Chapter 7.

S. Baumgärtner, M. Faber and J. Proops (1999) All production is joint production. In: S. Faucheux, J. Gowdy and I. Nicolai (eds.) *Sustainability and Firms*. Edward Elgar, Cheltenham.

8. FMP *EcEc*, Chapter 8.

G. Buenstorf (2000) Self-organization and sustainability: energetics of evolution and implications for ecological economics. *Ecological Economics* 33:119-34.

9. FMP *EcEc*, Chapter 9.

M. Zeleny (1996) On the social nature of autopoietic systems. In: E. Khalil and K. Boulding (eds.), *Evolution, Order and Complexity*, Routledge, London.

10. FMP *EcEc*, Chapter 10.

P. Vedeld (1994) The environment and interdisciplinarity: ecological and neoclassical economical approaches to the use of natural resources. *Ecological Economics* 10:1-13.

11. FMP *EcEc*, Chapter 11.

P. Ehrlich, G. Wolff, G. Daily, J. Hughes, S. Daily, M. Dalton, L. Goulder (1999) Knowledge and the environment. *Ecological Economics* 30:267-84.

12. FMP *EcEc*, Chapter 12.

F. Luks (1998) The rhetorics of ecological economics, *Ecological Economics* 26:139-149.

13. FMP *EcEc*, Chapter 13.

K. Rennings (2000) Redefining innovation: eco-innovation research and the contribution from ecological economics. *Ecological Economics* 32:319-332.

14. FMP *EcEc*, Chapter 14.

R. Kaufmann et al. (1998) The determinants of atmospheric SO₂ concentrations: reconsidering the environmental Kuznets curve. *Ecological Economics* 25:209-220.

15. D. van Veen-Groot and P. Nijkamp (1999) Globalisation, transport and the environment: new perspectives for ecological economics. *Ecological Economics* 31:331-346.
J. Proops et al. (1999) International trade and the sustainability footprint: a practical criterion for its assessment. *Ecological Economics* 28:75-97.

Further Reading

Current developments in the subject are discussed in the journal *Ecological Economics*, held in the library.

Full references are given in the next section.

1. For an overview of ecological economics, see: Chapters 1-11: R. Costanza (ed.) (1991) *Ecological Economics*.
2. For a full discussion of the Gaia concept, see: J. Lovelock (1979) *Gaia: A New Look at Life on Earth*. For a review of the historical roots of ecological economics, see: J. Martinez-Alier (1987) *Ecological Economics*.
3. The issue of chaos is explored in detail in: J. Gleick (1987) *Chaos: Making a New Science*.
4. A fuller philosophical introduction to environmental ethics is: J. Des Jardins (1993) *Environmental Ethics*. An influential book has been: A. Leopold (1949) *A Sand County Almanac*. See the special issue on this topic: *Ecological Economics* (1998) 24.
5. The classic statement of the problem on sustainable development is: World Commission on Environment and Development (1987) *Our Common Future*. For a range of views, see: Chapters 20-23: R. Costanza (ed.) (1991) *Ecological Economics*.
6. For a gentle introduction to the whole area of thermodynamics and entropy, see: P.W. Atkins (1984) *The Second Law*. A more demanding discussion is Chapter 6, N. Georgescu-Roegen (1971) *The Entropy Law and the Economic Process*.
7. For a fuller appreciation of the entropy debate, see: N. Georgescu-Roegen (1971) *The Entropy Law and the Economic Process*. See also the special issue on this topic: *Ecological Economics* (1997) 22. For a discussion of Georgescu-Roegen's contribution, see: T. Beard and G. Lozada (1999) *Economics, Entropy and the Environment: The extraordinary Economics of Nicholas Georgescu-Roegen*.
8. An influential text has been: R.R. Nelson and S.G. Winter (1982) *An Evolutionary Theory of Economic Change*. For an extended discussion of evolutionary principles, and how these relate to time, see: M. Faber and J. Proops (1998) *Evolution, Time, Production and the Environment*, Chaps 1-6.
9. Open systems and dissipative systems are discussed in: E. Jantsch (1980) *The Self-Organizing Universe*. Also see: E. Khalil and K. Boulding (eds.), *Evolution, Order and Complexity*
10. For a study of interdisciplinary approaches to valuation, see: E. Wilson (1988) *Biodiversity*.

11. There is an analysis of the implications of knowledge for prediction in: M. Faber and J. Proops (1998) *Evolution, Time, Production and the Environment* (3rd edn.) chap. 8.
12. An interesting analysis of knowledge issue is: S.O. Funtowicz and J.R. Ravetz (1991) A new scientific methodology for global environmental issues (Chapter 10). In: R. Costanza (ed.) *Ecological Economics*. Columbia University Press, New York.
13. A good discussion of the nature of technical change is in: N. Rosenberg (1994) *Exploring the Black Box*.
14. For a fuller discussion of the CO₂ study, see Proops, Faber and Wagenhals (1993) *Reducing CO₂ Emissions*. For the environmental Kuznets curve, see the special issue: *Ecological Economics* (1998) 25.
15. See the special issue on this topic: *Ecological Economics* (2000) 32.