

# FOUNDATIONS OF ECOLOGICAL ECONOMICS (FEE), 2013-2014

Tuesdays-Thursdays 10-13h, starting 15th Oct and finishing 12th Dec

Exam 8th Jan, 10 am

Room: C5b/011 & C5b/007 - Check Schedule

## Teaching Team

Prof. Jeroen van den Bergh (JvdB) [jeroen.bergh@uab.cat](mailto:jeroen.bergh@uab.cat)

Dr. Erik Gómez-Baggethun (EGB) [erik.gomez@uab.cat](mailto:erik.gomez@uab.cat)

Dr. Jesús Ramos Martín (JRM) [jesus.ramos@uab.cat](mailto:jesus.ramos@uab.cat)

Dr. Esteve Corbera (EC) (unit coordinator) [esteve.corbera@uab.cat](mailto:esteve.corbera@uab.cat)

## Course Contents

The FEE course involves a series of 3-hour lectures organised in four main sub-modules under the responsibility of specific teachers:

### **Sub-Module 1: Foundations, Policy & Innovation (JvdB)**

1. Introduction: History and principles of Ecological Economics
2. Welfare, markets, externalities and public goods
3. Theories and methods of environmental valuation
4. Assessment of environmental policy instruments
5. Economics of climate policy
6. The environment-growth debate

### **Sub-Module 2: Societal Metabolism (JRM)**

7. Complexity and Thermodynamics
8. Metabolism: key concepts and methods
9. MuSIASEM

### **Sub-Module 3: Institutional Aspects (EC & EGB)**

10. Institutional economics and environmental governance
11. Property and Access Theory
12. Institutional Fit, Interplay and Scale
13. Managing natural resources: Fishbanks I
14. Managing natural resources: Fishbanks II

### **Sub-Module 4: Assessment of Ecosystem Services (EC & EGB)**

15. Integrated assessment of ecosystem services
16. Commodification of ecosystem services
17. Payments for Ecosystem Services
18. Environmental Offsets: REDD+, No-Net Loss Policies

## Course assessment

Students will be assessed on the basis of (a) a written, closed-book exam; b) written papers, and c) their participation in class. In particular, they will be assessed based on:

- *Presence at lectures:* at least 75-80% of all lectures, unless well justified.
  - *A final exam, which will contribute to 50% of the final mark:* The exam will take place on *Wednesday the 8th of January*, from 10 to 13:00 h (please don't be late). It will last 3 hours and cover aspects of each module of the course. Students will have limited space to answer each of these questions and will have to show that they have understood and master key concepts and ideas introduced during the course. The four contributing teachers will evaluate the exam together.
  - *Four written essays:*
    - a) Two 500-words essays corresponding to sub-modules 1 (*Your perspective on the environment-versus-growth debate*) and 3 (*Your perspective on the commodification of nature's regulating services*), respectively;
    - b) Two 1000-words essays corresponding to sub-modules 2 (*Discuss the implications of Peak Oil (higher relative scarcity of fossil energy) for: i) material standard of living; ii) working time and its allocation among activities; and iii) population* - submission deadline November 26th) and 4 (*Discuss the implications of legal pluralism for the development of Payment for Ecosystem Services schemes* - submission deadline January 7th).
- The short essays will each contribute to 5% of the mark each (i.e. 10% in total), while the long essays will contribute to 15% of the final mark each (i.e. 30% in total).
- The corresponding teacher will mark the essay from 0 to 10 (see *Annex I & II on Essay Writing and Submission guidelines* below).
- *An exercise in class* (related to the Fishbanks lecture in sub-module 3): this will contribute to 10% of the final mark.

Each student will have to undertake all evaluation parts (exam, essays and exercise). A student who fails to pass as a result of a poor exam may re-take it before the final, overall mark is provided to UAB., but only if she/he has shown proof of progressive learning in the other evaluation exercises.

## **Lectures, obligatory and background literature and other resources**

The literature marked with (\*\*) is obligatory and must be read prior to each lecture as it will be the basis for the respective class. The other literature mentioned is voluntary background reading.

### **1. Introduction: History and principles of Ecological Economics (15th Oct)**

(\*\*) van den Bergh, J.C.J.M. 2000. Ecological Economics: Themes, Approaches, and Differences with Environmental Economics. *Regional Environmental Change*, 3(1): 13-23.

Martinez-Alier, J., Roca Jusmet, J. 2000. Economía Ecológica y Política Ambiental. PNUMA y Fondo de Cultura Económica.

Ropke, I. 2005. Trends in the development of ecological economics from the late 1980s to the early 2000s. *Ecological Economics*, 55: 262– 290.

### **2. Welfare, markets, externalities and public goods (17th Oct)**

(\*\*) Kahn, J.R. 2004. *The Economic Approach to Environmental and Natural Resources*. 3rd edition, Thomson/South-Western, Fort Worth, Mason, Ohio. ch. 2; & ch. 4, section “What is Value”.

(\*\*) Verhoef, E.T. 1999. Externalities. Chapter 13 in: J.C. J.M. van den Bergh (ed.). *Handbook of Environmental and Resource Economics*. Edward Elgar, Cheltenham, pp. 197-214.

### **3. Environmental policy instruments (22nd Oct)**

(\*\*) Russell, C.S., Powell, P.T. 1999. Practical considerations and comparison of instruments of environmental policy. Chapter 21 in: J.C.J.M. van den Bergh (ed.). *Handbook of Environmental and Resource Economics*. Edward Elgar, Cheltenham, pp. 307-328.

Sterner, T. 2003. *Policy Instruments for Environmental and Natural Resource Management*. Resources for the Future (RFF Press), Washington D.C., USA, 504 pages.

### **4. Theories and methods of environmental valuation (24th Oct)**

(\*\*) Perman et al., Valuing the Environment, Chapter 4 in *Natural Resource and Environmental Economics*

Hanley, N., Spash, C.L. 1993. *Cost-Benefit Analysis and the Environment*. Edward Elgar Publishers, Aldershot.

Martinez-Alier, J., Munda, J., O'Neill, J. 1998. Weak comparability of values as a foundation for ecological economics. *Ecological Economics*, 26: 277–286.

## 5. Economics of climate policy (29th Oct)

- (\*\*) Executive summary of The Stern review: *The Economics of Climate Change* (2006). [http://news.bbc.co.uk/2/shared/bsp/hi/pdfs/30\\_10\\_06\\_exec\\_sum.pdf](http://news.bbc.co.uk/2/shared/bsp/hi/pdfs/30_10_06_exec_sum.pdf)
- (\*\*) McKibbin, W.J., Wilcoxon, P.J. 2002. The role of economics in climate change policy. *Journal of Economic Perspectives* 16(2): 107-129.

J.C.J.M. van den Bergh (2010). Safe climate policy is affordable – 12 reasons. *Climatic Change* 101(3): 339–385.

Responses to / debate on the Stern review (<http://www.hm-treasury.gov.uk/6520.htm>).

Tol, R.S.J. (2009). The economic effects of climate change. *Journal of Economic Perspectives* 23(2): 29-51.

## 6. The environment-growth debate (31st Oct)

- (\*\*) Beckerman, W. 1992. Economic growth and the environment. *World Development*, 20(4): 481-496.
- (\*\*) Daly, H.E. 2005. Economics in a full world. *Scientific American* 293(3).
- (\*\*) van den Bergh, J., de Mooij, R. 2002. Growth and the environment in Europe: a guide to the debate. *Empirica*, 29: 79-91.

Jackson, T. 2009. *Prosperity without Growth. The transition to a sustainable economy*. Sustainable Development Commission, UK Government. <http://www.sd-commission.org.uk/publications.php?id=914>

Kallis, G. 2011. In defence of degrowth. *Ecological Economics*, 70(5): 873-880.

van den Bergh, J.C.J.M. 2009. The GDP Paradox. *Journal of Economic Psychology*, 30(2): 117-135.

van den Bergh, J.C.J.M. 2011. Environment versus growth — A criticism of “degrowth” and a plea for “a-growth? *Ecological Economics*, 70(5): 881-890.

## 7. Complexity and Thermodynamics (5th Nov)

- (\*\*) Schneider, E.D., Kay, J. J. 1994. Life as a manifestation of the second law of thermodynamics, *Mathematical and Computer Modelling*, 19(6-8): 25-48.

Geels, F.W. 2002. Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research Policy*, 31: 1257-1274.

Tainter, J.A. 2011. Energy, complexity, and sustainability: A historical perspective, *Environmental Innovations and Societal Transitions*, 1(1): 89-95.

Tainter, J.A., Allen, T.F.H., Hoekstra, T.W. (2006): “Energy transformations and post-normal science”, *Energy*, Vol. 31(1): 44-58.

## 8. Metabolism: Key concepts and methods (7th Nov)

- (\*\*) Giampietro M, Allen TFH, Mayumi K (2006) The epistemological predicament associated with purposive quantitative analysis. *Ecological Complexity*, 3 (4):307-327.

Allen TFH, Giampietro M (2006) Narratives and transdisciplines for a post-industrial world. *Systems Research and Behavioral Science*, 23 (5):595-615.

- Allen, T.F.H. (2008): "Hierarchy Theory in Ecology", *Encyclopedia of Ecology*, Pages 1852-1857
- Ayres, R.U., Ayres, L.W., Warr, B. (2003): "Exergy, power and work in the US economy, 1900–1998", *Energy*, Vol. 28 (3): 219-273.
- Brown, M.T., Ulgiati, S. (2004): "Emergy analysis and environmental accounting", in Cleveland, C.J. (Editor-in-chief) *Encyclopedia of Energy*, pp. 329-354.
- Giampietro M (2006) Comments on "The energetic metabolism of the European Union and the United States" by Haberl and colleagues – Theoretical and practical considerations on the meaning and usefulness of traditional energy analysis. *Journal of Industrial Ecology*, 10 (4):173-185.
- Giljum, S., and Hubacek, K. (2008): "Conceptual foundations and applications of physical input-output tables (PIOTs)", in Suh, S., *Handbook on Input-Output Economics for Industrial Ecology*, Springer.
- González-Martínez, A.C., Schandl, H. (2008): "The biophysical perspective of a middle income economy: Material flows in Mexico", *Ecological Economics*, Vol. 68 (1-2): 317-327
- Hoekstra, A.Y., and Hung, P.Q. (2005): "Globalisation of water resources: international virtual water flows in relation to crop trade", *Global Environmental Change* 15 (1): 45-56.
- Hoekstra, R., van den Bergh, C.J.M. (2006): "Constructing physical input-output tables for environmental modeling and accounting: Framework and illustrations", *Ecological Economics* Vol. 59 (3): 375-393.
- Scheidel A (2013). Flows, funds and the complexity of deprivation: Using concepts from ecological economics for the study of poverty. *Ecological Economics* 86:28-36.
- Velázquez, E. (2006): "An input–output model of water consumption: Analysing intersectoral water relationships in Andalusia", *Ecological Economics*, Vol. 56 (2): 226-240.
- Warr, B., Schandl, H., Ayres, R.U. (2008): "Long term trends in resource exergy consumption and useful work supplies in the UK, 1900 to 2000", *Ecological Economics*, Vol. 68 (1-2): 126-140.
- Zellmer, A.J., Allen, T.F.H., Kesseboehmer, K. (2006): "The nature of ecological complexity: A protocol for building the narrative", *Ecological Complexity*, Vol. 3 (1): 171-182

## **9. Multi-Scale Integrated Assessment of Societal & Ecosystem Metabolism (MuSIASEM) (12th Nov)**

- (\*\*) Giampietro, M., Mayumi, K., Ramos-Martin, J. 2009. Multi-scale integrated analysis of societal and eco system metabolism (MuSIASEM): Theoretical concepts and basic rationale. *Energy*, 34(3): 313-322.
- (\*\*) Sciubba, E., Ulgiati, S. (2005): "Emergy and exergy analyses: Complementary methods or irreducible ideological options?" *Energy* Vol. 30(10): 1953-1988.
- (\*\*) Weisz, H., Krausmann, F., Amann, C., Eisenmenger, N., Erb, K.H., Hubacek, K., Fischer-Kowalski, M: (2006): "The physical economy of the European Union: Cross-country comparison and determinants of material consumption", *Ecological Economics*, Vol. 58 (4): 676-698

- Díaz-Maurin F, Giampietro M (2013). A “grammar” for assessing the performance of power-supply systems: comparing nuclear energy to fossil energy. *Energy* 49:162–177.
- Gasparatos, A., El-Haram, M., Horner, M. (2009): “Assessing the sustainability of the UK society using thermodynamic concepts: Part 1”. *Renewable and Sustainable Energy Reviews*, Vol. 13 (5): 1074-1081.
- Madrid C, Cabello V, Giampietro M (2013). Water-Use Sustainability in Socioecological Systems: A Multiscale Integrated Approach. *BioScience* 63 (1):14-24.
- Ramos-Martín, J., Cañellas-Boltà, S., Giampietro, M., Gamboa, G. 2009. Catalonia’s energy metabolism: using the MuSIASEM approach at different scales. *Energy Policy*, 37(11): 4658-4671.
- Ramos-Martin, J., Giampietro, M., Mayumi, K. (2007): “On China's exosomatic energy metabolism: An application of multi-scale integrated analysis of societal metabolism (MSIASM)”, *Ecological Economics*, Vol. 63 (1): 174-191.
- Sorman AH, Giampietro M (2013) The energetic metabolism of societies and the degrowth paradigm: analyzing biophysical constraints and realities. *Journal of Cleaner Production*, 38:80-93.

## 10. Institutional economics and environmental governance (14th Nov)

- (\*\*) Aguilera-Klink, F. 1994. Some notes on the misuse of classic writings in economics on the subject of common property. *Ecological Economics*, 9(3): 221-228.
- (\*\*) Hardin, G. 1968. The tragedy of the commons. *Science* 162: 1243-1248.
- (\*\*) Muradian, R., Gómez-Baggethun, E. 2013. The Institutional Dimension of “Market-based Instruments” for Governing Ecosystem Services: Introduction to the Special Issue. *Society & Natural Resources* 26: 1113-1121.
- Ostrom, E. 1990. *Governing the Commons: The Evolution of for Collective Action*. Cambridge University Press, Cambridge.
- Ostrom, E. 2003. How types of goods and property rights jointly affect collective action. *Journal of Theoretical Politics* 15(3): 239-270.
- Ostrom, E. et al. (eds) 2002. *The Drama of the Commons*. Washington, National Research Council.
- Vatn, A., 2005. *Institutions and the Environment*. Edward Elgar, Cheltenham, UK and Northampton, USA.

## 11. Property and Access Theory (19th Nov)

- (\*\*) Ribot, J., Peluso, N. 2003. A Theory of Access. *Rural Sociology*, 68(2): 153-181.
- (\*\*) Schlager, E. and E. Ostrom, E. 1992. Property-Rights Regimes and Natural Resources: A Conceptual Analysis. *Land Economics*, 68(3): 249-262.
- and Change 40: 1-22.
- Feeny, D., Berkes, F., McCay, B.J. y J.M. Atcheson, 1990. The tragedy of the commons - 22 years later. *Human Ecology*. 18: 1-19.
- Ostrom E, Schlager E, 1996. "The formation of property rights", in Rights to Nature. Ecological, Economic, Cultural and Political Principles of Institutions for the

Environment Eds S Hanna, C Folkem, K G Maler (Island Press, Washington, DC) pp 127-156.

Sikor T., Lund C., 2009. Access and property: a question of power and authority'. Development

Sikor, T. (ed) 2008. Public and Private in Natural Resource Governance. A False Dichotomy? London, Earthscan.

von Benda-Beckmann F, von Benda-Beckmann K, Wiber M, 2006. "The properties of property", in *Changing Properties of Property* Eds F von Benda-Beckmann, K von Benda-Beckmann, M Wiber (Berghahn, New York).

## **12. Institutional fit, interplay and scale (21st Nov)**

(\*\*) Eakin, H., Winkels, A., and Sendzimir, J., 2009. Nested vulnerability: exploring cross-scale linkages and vulnerability teleconnections in Mexican and Vietnamese coffee systems. *Environmental Science & Policy*, 12(4): 398-412.

(\*\*) Reischl, G., 2012. Designing institutions for governing planetary boundaries — Lessons from global forest governance. *Ecological Economics*, 81, 33-40.  
Corbera, E., Brown, K., 2008. Building Institutions to Trade Ecosystem Services: Marketing Forest Carbon in Mexico. *World Development*, 36(10): 1956-1979.

Basurto, X. and Coleman, E., 2010 Institutional and ecological interplay for successful self-governance of community-based fisheries *Ecological Economics*, 69, 5: 1094-1103

Galaz, V., et al. 2012. 'Planetary boundaries' — exploring the challenges for global environmental governance. *Current Opinion in Environmental Sustainability*, 4 (1): 80-87.

Mitchell, R.B., 2008. Evaluating the Performance of Environmental Institutions: What to Evaluate and How to Evaluate It? In: Young, O.R., King, L.A., Schroeder, H. (Eds.), *Institutions and Environmental Change: Principal Findings, Applications, and Research Frontiers*. The MIT Press, Cambridge.

Ostrom, E., 2005. *Understanding Institutional Diversity*. Princeton University Press, Princeton & Woodstock.

Wyborn, C. and Bixler, R.P., 2013. Collaboration and nested environmental governance: Scale dependency, scale framing, and cross-scale interactions in collaborative conservation., *Journal of Environmental Management*, 123: 58-67.

Young, O.R., 2002. *The Institutional Dimensions of Environmental Change. Fit, Interplay and Scale*. MIT Press, London.

Young, O.R., Agrawal, A., King, L.A., Sand, P.H., Underdal, A., Wasson, M., 1999. *Institutional Dimensions of Global Environmental Change*. Report No. 9. International Human Dimensions Programme on Global Environmental Change, Bonn.

## **13.14. Fishbanks (28th Nov (6h, breaking for lunch))**

(\*\*) Ruiz-Pérez, M., Franco-Múgica, F., González-Novoa, J., Gómez-Baggethun, E., Alberruche-Rico, M.A. 2011. An institutional analysis of the sustainability of fisheries: Insights from FishBanks simulation game. *Ocean and Coastal Management* 54: 585-592.

- Ahn, T.K., Ostrom, E., Walker, J., 2010. A common-pool resource experiment with postgraduate students from 41 countries. *Ecol. Econ.* 69: 2624-2633.
- Bailey, M., Rashid Sumailaa, U., Lindroos, M., 2010. Application of game theory to fisheries over three decades. *Fish. Res.* 102, 1e8.
- Basurto, X., Coleman, E., 2010. Institutional and ecological interplay for successful self-governance of community-based fisheries. *Ecol. Econ.* 69: 1094-1103.

### **15. Integrated Assessment of Ecosystem Services (3rd Dec)**

- (\*\*) De Groot, R.S., Wilson, M., Boumans, R., 2002. A typology for the description, classification and valuation of ecosystem functions, goods and services. *Ecological Economics*, 41(3): 393–408.
- (\*\*) Gómez-Baggethun, E., de Groot, R., Lomas, P., Montes, C., 2010. The history of ecosystem services in economic theory and practice: from early notions to markets and payment schemes. *Ecological Economics*, 69: 1209-1218.
- Daily, G.C. 1997. *Nature's Services: Societal Dependence on Natural Ecosystems*. Island
- Daily, G.C. 1997. *Nature's Services: Societal Dependence on Natural Ecosystems*. Island Press.
- Martín-López, B., Gómez-Baggethun, E., García-Llorente, M., Montes, C. 2013. Trade-offs across value-domains in ecosystem service assessment. *Ecological Indicators*, DOI: <http://dx.doi.org/10.1016/j.ecolind.2013.03.003>

### **16. Commodification of ecosystem services (5th Dec)**

- (\*\*) Gómez-Baggethun, E., Ruiz-Pérez, M. 2011. Economic valuation and the commodification of ecosystem services. *Progress in Physical Geography*, 35: 617 - 632.
- (\*\*) Kallis, G., Gómez-Baggethun, E., Zografos, K. 2013. To value or not to value. That is not the question. *Ecological Economics* 94: 97–105.
- Kosoy, N., Corbera, E. 2010. Payments for ecosystem services as commodity fetishism. *Ecological Economics*, 69: 1228-1236.
- Luck, G.W., Chan, K.M.A., Eser, U., Gómez-Baggethun, E., Matzdorf, Norton, B., Potschin, M.B. 2012. Ethical Considerations in On-ground Applications of the Ecosystem Services Concept. *BioScience*, 62: 1020–1029.
- Marx, K. The commodity. In: *Capital*, Chapter 1. Read specially sections 1 (The Two Factors of the Commodity) and 4 (The Fetishism of the Commodity and Its Secret).
- Polanyi, K. 2001. *The Self-regulating Market and the Fictitious Commodities: Labor, Land, and Money*. Chapter 6 in: *The great transformation: The political and economic origins of our time*. Boston: Beacon Press.

### **17. Payments for Ecosystem Services (10th Dec)**

- (\*\*) Kosoy, N., Corbera, E. 2010. Payments for ecosystem services as commodity fetishism. *Ecological Economics*, 69: 1228-1236.
- (\*\*) Muradian, R., Corbera, E., Pascual, U., Kosoy, N., May, P. 2010. Reconciling theory and practice: An alternative conceptual framework for understanding payments for environmental services. *Ecological Economics*, 69: 1202-1208.



65, 834-852.

- Brouwer R, Tesfaye A, Pauw P., 2012. Meta-analysis of institutional economic factors explaining the environmental performance of payments for watershed services. *Environmental Conservation*, 38, 380-392.
- Corbera, E., Brown, K. 2010. Offsetting benefits? Analysing access to forest carbon. *Environment and Planning A*, 42(7): 1739-1761.
- Corbera, E., Brown, K., Adger, W.N. 2007. The equity and legitimacy of markets for ecosystem services. *Development and Change* 38(4): 587-613.
- Corbera, E., Soberanis, C., & Brown, K. (2009) Institutional dimensions of payments for ecosystem services. An analysis of Mexico's carbon forestry programme. *Ecological Economics* 68, 743–761.
- Muñoz-Piña, C., Guevara, A., Torres, J. & Braña, J., 2008. Paying for the hydrological services of Mexico's forests: analysis, negotiations and results. *Ecological Economics* 65, 725–736.
- Muradian et al., 2013. Payments for ecosystem services and the fatal attraction of win-win solutions. *Conservation Letters* doi: 10.1111/j.1755-263X.2012.00309.x
- Pattanayak, S., Wunder, S. & Ferraro, P., 2010 Show me the money: do payments supply environmental services in developing countries? *Rev. Env. Econ. Pol.* 4, 254–274.
- Vatn, A., 2010 An institutional analysis of payments for environmental services. *Ecological Economics* 69,1245–1256.

## 18. Environmental offsets (12th Dec)

- (\*\*) Lovell H, Bulkeley H, Liverman D., 2009. Carbon offsetting: sustaining consumption?' *Environment and Planning A*, 41, 2357-2379.
- (\*\*) McAfee, K., 2012. The contradictory logic of global ecosystem services markets. *Development and Change*, 43, 105–131.
- and problems in environmental governance. *Geoforum*, 35, 361-373.
- Beymer-Farris BA, Bassett TJ., 2012. The REDD menace: resurgent protectionism in Tanzania's mangrove forests. *Global Environmental Change*, 22, 332-341.
- Bumpus A, Liverman D., 2008. Accumulation by decarbonization and the governance of carbon offsets. *Economic Geography*, 84, 127-155.
- Corbera, E., 2012. Problematizing REDD+ as an experiment in payments for ecosystem services. *Current Opinion in Environmental Sustainability*, 4, 612-619.
- Liverman D., 2004. Who governs, at what scale and at what price? *Geography, environmental governance, and the commodification of nature'. Annals of the Association of American Geographers* 94, 734-738.
- Lockie, S., 2013. Market instruments, ecosystem services, and property rights: assumptions and conditions for sustained social and ecological benefits. *Land Use Policy*, 31, 90-98.
- Lohmann L., 2005. Marketing and making carbon dumps: commodification, calculation and counterfactuals in climate change mitigation" *Science as Culture*, 14, 203-235.
- Putz, F.E., Redford, K.H., 2009. Dangers of carbon-based conservation. *Global Environmental Change* 19, 400–401.
- Robertson M M., 2000. No net loss: wetland restoration and the incomplete capitalization of nature. *Antipode*, 32, 463-493.
- Robertson M M., 2004. The neoliberalization of ecosystem services: wetland mitigation banking.

## **Annex I – Suggestions for writing an article/essay**

### *Objectives of writing an article/essay*

#### Learning to:

- Collect, select and interpret information;
- Formulate a problem statement, a hypothesis, a goal statement and research questions;
- Be systematic in planning the research and writing the report;
- Write in a logical and readable way, paying attention to structure (sections, paragraphs), grammar, logic, style and spelling;
- Develop a convincing argument;
- Draw clear conclusions that are consistent with the formulated problem, goal, hypothesis or questions;
- Handle data and apply (statistical and modelling) techniques of data analysis and description (optional);
- Be creative/original.

### *Structure of the article/essay*

1. Start with a short summary/abstract (max. 150 words) of the paper.
2. Introductory section: provide an introduction to the paper, with an explicit motivation of the relevance of the topic/problem selected, and with clear formulations of the problem, goal, questions or hypotheses; embed the study in the relevant literature and make clear what is innovative about it; finish the introduction with an outline of the paper, i.e. a very short and systematic overview of the contents of each subsequent section; make sure that this outline logically follows from the previous part of the introduction, i.e. do not introduce new issues or concepts.
3. One section (optional): with a short survey of the relevant literature; this includes conclusions of other similar studies;
4. One or more sections: a description of the specific research orientation and approach in detail; make a relevant distinction between concepts, definitions, framework, theories, case study, data, methods/techniques, application/testing and results; make sure you have clear conclusions at the end of each section;
5. One section: use a final chapter for a short summary and conclusions of the whole paper;
6. List of references: an alphabetical list of references to the literature made in the paper should be put at the end of the paper.
7. (optional) Annexes with technical details. But if you can avoid these.

### *Additional advice*

- (1) Write always goal-oriented. Keep the reader informed about any intermediate objectives, to avoid that the reader is left wondering where the discussion is going to.
- (2) Provide informative and motivational introductions to all sections. Conclude every section clearly but briefly. Provide adequate bridges (connecting text) between sections where necessary. Use informative but short titles – avoid cryptic titles.

(3) Arrange a balanced structure of the text, on every level. This means that paragraphs within sections should be balanced in length (one third of page at maximum). The length of sections should also be in balance. If one section turns out to be much longer than the rest and you see no way to shorten it, you may consider moving some of its material to footnotes (which usually shortens the text) or to an annex. But in general, a preferable strategy is to shorten the text as this tends to turn it into more attractive reading.

(4) It is essential to make a clear distinction, for yourself as well as for the reader, between statements of facts (e.g., by adding a reference), opinions of other authors (e.g., by adding a citation or a clear formulation like “X thinks that”, “according to X”, etc.), an interpretation of what others have said (by being explicit about it), and your own opinion/conclusion (by stating so explicitly). If you copy figures or tables from others mention clearly the source. If you include a citation to someone else, mention not only the reference (name and year) but also the page number (to allow the reader to check the original source).

(5) Do not hide uncertainties, lack of information to draw clear conclusions, differences of opinion, etc. Indicate what is sure and what is uncertain. Do not draw overly strong conclusions – be modest and formulate very carefully.

(6) Be consistent in your choice of style. For instance: use one style of references (see point 9 for detailed suggestions), separate paragraphs either by tabs (indents) or by empty lines (don't mix the two styles); in publications like journals and books tabs are most commonly used; mention titles and numbers of figures always below and of tables always at the top, in Italics; include clear, succinct titles for tables and figures; indicate source and notes below the figure/table; use only horizontal lines in the tables (preferably 3, two to separate the title row, and one at the bottom of the table); introduce figures and tables well in the main text (“see Figure 3”, “as shown in Figure 3”). Tables and figures are a complement and not a substitute for discussion in the text, i.e. explain/discuss them. Use better footnotes instead of endnotes (nicer for the reader); don't put references in footnotes (see point 9); be very restrictive with footnotes (they are not required); use a smaller letter type for footnotes than for the main text.

(7) There is much to say about style of writing; to some extent this is a matter of taste; nevertheless, some standards have evolved over time; the most famous, concise book on style in (American) English language is W. Strunk and E.B. White, *The Elements of Style*, last revised edition, MacMillan, New York. It can be read in an afternoon, and is very cheap.

(8) Be concise and to the point in your conclusions section; first summarize the problem studied and the approach followed. Then answer systematically the questions formulated in the introduction section. Try to avoid references as much as possible: your conclusions have to derive from your analysis in previous sections (so no new information is needed, and may in fact be confusing). Only when you want to compare your findings with those of others, references are in order. If possible, mention further research (but this is not required).

(9) Take care of correctly mentioning literature/references to books, journal articles, reports and websites; in the main text mention the last name of the author and the year of publication: “name (1999)” or “(name, 1999)”. Add the page number if you refer to a citation, or if the information is very specific (relating to a particular chapter or section in the publication referred to). Mention the full reference in an alphabetical list at the end of the paper following a standard format (copy the format of a particular journal; but write journal names in full); references to websites can be done in the main text (“see <http://www.websitename>)” or following similar rules as given for publications.

## **Annex II – Submission guidelines for FEE essays**

Essays must be submitted via email to the relevant lecturer in a Word Document, using Times New Roman 12 pt for the main text (10 pt for footnotes) and 1,5 line spacing. If they are submitted after the date of the deadline students face a 5% mark penalty for every day of submission delay. References are excluded from the word count. Please mention the word count at the beginning of the document. If a paper that much exceeds the word limit is submitted, it runs a serious risk to get an insufficient grade. They should be formatted using the style of the journal Ecological Economics (<http://www.elsevier.com/journals/ecological-economics/0921-8009/guide-for-authors#68000>).