Course title: Economics of natural resources

Course code: MPE 146	**No. of credits:** 4	**L-T-P:** 56-0-0	**Learning hours:** 56

Pre-requisite course code and title (if any): None

Department: Department of Policy Studies

Course coordinator: Dr. Sukanya Das	**Course instructor** Dr.Sukanya Das

Contact details: sukanya.das@teriuniversity.ac.in

Course type: Core	**Course offered in:** Semester 2

Course description:

This course will highlight the efficiency concepts for evaluating natural resource use and policies and identify potential sources of inefficiency in the context of forestry, fisheries and exhaustible energy resources. This is followed by discussions on sustainable development concepts, and natural resource accounting. It is expected that the course will help bridge the gap between theoretical models and empirical study of resource allocation and management issues in a real-world context.

Course objectives:

- To provide an in-depth exposure to the students on various Methods and Applications within the mainstream Neoclassical Environmental Economics and Heterodox Ecological Economics with a specific focus on South Asian context
- To prepare the students on constructing a research proposal followed by the Master's Thesis to be carried out in the second year of the programme.

Course contents

S.No	Topic	L	T	P
1	Basic concepts in resource economics: What is Resource economics, setting up a problem, discount rates, discrete time extension of Lagrange multipliers	1		
2	Review of mathematical tools and concepts Equation of motions, Euler equation, Calculus of variations, optimal control	10		
3	Renewable Resources Fisheries, Forestry and Water: growth functions, production functions, dynamic models, and optimal time paths, optimal management of resources	24		
4	Non renewable resources – Hotellings‟ rule, Extraction and price paths, reserve dependent costs	8		
5	Resource Scarcity and Economic growth: population growth, technological changes and implications for long-term growth.	4		
6	Accounting for natural resources – green accounting, SEEA, calculation of income from natural resources.	9		
	Total	**56**		

Evaluation criteria:

1. Presentation of a classic paper on either a method or application of a method in the area of environmental and resource economics-20%
2. Literature survey of a method or applications of a method-20%
3. A term paper-20%
4. End semester-40%

Learning outcomes:

- Ability to 'see' the link between the concepts, theories and principles with the methods and applications in the area of ecological, environmental and resource economics (EERE)
- Exposure to a variety of methods in both mainstream and alternative frameworks that connect economy with its environment or the eco-system within which it functions.
- Skill to apply various methods in EERE in the South Asian context
- Prepare for the Thesis proposal and the Master's Thesis itself to be carried out during the second year of the programme

Materials:

Suggested readings

1. Conrad J M. and C. W. Clark (1987). Natural Resource Economics: Notes and Problems. Cambridge University Press.
2. Conrad J M. (1999). Resource Economics. Cambridge University Press
3. Dasgupta, P.S. and G.M. Heal. (1979). Economic Theory and Exhaustible Resources. Cambridge, Cambridge University Press.
4. Fisher, A. C. (1981). Resource and Environmental Economics, CUP.
5. Neher, P. A. (1990). Natural Resource Economics: Conservation and Exploitation, OUP.

I. **Basic Concepts in Resource Economics**

Dasgupta and Heal Ch. 1 pp 1- 10

Conrad J. M. (1999). Resource Economics. CUP Chs 1 and 2

Winkler, R. (2006). "Does „Better" Discounting Lead to Worse Outcomes in Longrun Decisions? The Dilemma of hyperbolic Discounting" Ecological Economics, 57; 573-582

II. Review of mathematical tools and concepts

Conrad and Clark Ch. 1

Alpha C. Chiang. (1992) Dynamic Optimization McGraw Hill, 1992, Chs 1, 2, 7

*M. Kamien and N. Schwartz. (1991) Dynamic Optimization: The Calculus of Variations and Optimal Control in Economics and Management, Part II. Section 1-4, 7-9.

III. Renewable Resources

A. Fisheries

Conrad Ch 3

Conrad and Clark Ch 2; 2.1-2.8

*Fisher Ch 3

*Dasgupta and Heal Ch 5

Ray Hilborn et al., (2003) "State of the World's Fisheries", Annual Review of the Environment and Resources 28, 359-399

*Clark. C and Munro G. (1975) "The Economics of Fishing and Modern capital theory: A simplified approach", Journal of Environmental Economics and Management, December

Wilen, J. E. (2000). "Renewable Resource Economics: What Difference Have We Made." Journal of Environmental Economics and Management, 32:1-21

B. Forestry

Conrad Ch 4

P. Dasgupta (1982). The Control of Resources HUP Ch 9

Hanley, N., J.F. Shogren, and B. White, (1997). Environmental Economics: In Theory and Practice. New York: Oxford University Press, Ch. 11

Vincent, J. R. and C. S. Binkley. (1993) "Efficient Multiple-Use Forestry May Require Land-use Specialization", Land Economics 69, 370-376.

*Montgomery, C.A. and D.M. Adams. (1995) "Optimal Timber Management Policies", in

D. Bromley (ed.), Handbook of Environmental Economics. Oxford: Blackwell, 379-404.

C. Water
Conrad and Clark Ch 5; 5.4

Rosegrant, M. W., Ximing Cai, and S. A. Cline, (2002) "World Water Outlook to 2025: Averting an Impending Crisis", International Food Policy Research Institute,Washington, DC, September 2002.

C. J. Vörösmarty, P. Green, J. Salisbury, and R. B. Lammers, (2000) "Global Water Resources: Vulnerability from Climate Change and Population Growth", Science 289, 284-288

*Howitt, R. "Water Markets, Individual Incentives and Environmental Goals." Choice
(First Quarter 1994):5-9
*Gisser, M. (1983) "Groundwater: Focusing on the real issue", Journal of Political Economy, 91(6) 1001-1027

IV. Non Renewable Resources
Conrad and Clark, Ch 3

Fisher Ch 2 *Neher Chs 15, 16, 17, 18, 19

*Dasgupta and Heal Chs 6 and 12

*Solow, R. M. (1974) "The Economics of Resources or Resources of Economics", AER No. 64, pp 1-14

V. Resource Scarcity and Economic Growth

Conrad and Clark Ch 3.3

Fisher Ch. 4

Krautkraemer, J. A. (2005) "Economics of Natural Resource Scarcity: The State of the Debate", RFF discussion paper 05-14

a. Natural Resource Accounting
El Serafy, S. (1989) "The Proper Calculation of Income from Depletable Natural Resources" in Ahmad Y. J. et al (Ed) Environmental Accounting for Sustainable Development, World Bank.

Karl - Goran Mäler (1991) "National Accounts and Environmental Resources", Environmental and Resource Economics, Vol. 1 No. 1 March pp 1-15

Smith, R. (2007) "Development of the SEEA 2003 and its Implementation",Ecological Economics 61(4)

Weitzman, M (1976) "On the Welfare significance of National Product in a Dynamic economy", Quarterly Journal of Economics, Vol 90, pp156-62

*Alfsen, K. H. and M. Graeker (2007) "From Natural Resource and Environmental Accounting to Construction of Indicators for Sustainable Development", Ecological Economics 61(4)

*Crowards, T. (1996). "Natural Resource Accounting: A Case Study of Zimbabwe", Environmental and Resource Economics, 7; 213-241

Additional information (if any):

Student responsibilities: Attendance, feedback, discipline: as per university rules.

Course reviewers: