Ph D course syllabus 2011

Course: C1a: Ecology (1.5 credits)
Coordinators: Dr. Ankila Hiremath**,** Dr. T. Ganesh

This course is designed for students with a background in the social sciences, or students from the natural sciences who have had no prior training in ecology. This introductory half-semester core course will introduce students to basic principles in ecology. Students will learn about ecological concepts that apply at levels of the population, community and ecosystem: the relationship between organisms and their environment, interactions amongst organisms; patterns in the distribution of species and communities; and processes that underlie the functioning of ecosystems. The course will also draw upon case studies to illustrate the application of ecological concepts to conservation and the environment.

Lecture modules
1. Ecology and evolution – An introduction (Dr. T. Ganesh)
2. Population ecology (Dr. Ankila Hiremath)
3. Community ecology (Dr. T. Ganesh)
4. Ecosystems ecology (Dr. Ankila Hiremath)

In addition to imparting an understanding of how ecologists think, the course will also foster students' skills in learning to read and think critically, and to understand and interpret how information is presented graphically.

C1**b: Fundamentals of Environmental Science (1.5 credits)**
Coordinators: Dr. Jagdish Krishnaswamy, Dr. Shrinivas Badiger

This course will introduce students to the conceptual fundamentals of environmental processes at global, regional and local scales using a biogeochemical frame-work, with a common theme of global change. It will introduce case studies based on primary research by the course instructor, and readings. It will also introduce students to laboratory analyses of soils and water. Finally, it will explore topics in sustainability in relation to the human transformation of global, regional and local processes.

Lecture modules
1. Introduction: Earth as a biogeochemical system, biogeochemical cycles and thermodynamic principles (Dr. Jagdish Krishnaswamy)
2. Introduction to composition, evolution and processes of atmosphere, lithosphere and biosphere. (Dr. Jagdish Krishnaswamy)
3. Soil properties and processes (Dr. Jagdish Krishnaswamy)
4. Hydrology and hydrologic processes: global and terrestrial cycles (Dr. Jagdish Krishnaswamy)
5. Basics of open-channel flow and ground-water (Dr. Shrinivas Badiger)
6. Water quality and pollution (Dr. Shrinivas Badiger)
7. Global and terrestrial carbon cycles (Dr. Jagdish Krishnaswamy and guest lecturers)
8. Global and terrestrial nitrogen cycles (Dr. Shrinivas Badiger)
9. Freshwater and wetland ecology and processes (Dr. Jagdish Krishnaswamy/ Dr. Shrinivas Badiger)
10. Sustainability and global change (Dr. Shrinivas Badiger)

Laboratory modules

1. Soil properties (soil moisture, bulk density, textural analysis and soil organic matter)
2. Hydraulics and hydrology (velocity, discharge measurements)
3. Pollutant and sediment concentration (sample collection from JNC stream)
4. Water quality analysis and pollutant load analysis (pH, DO, sediments etc) using concentration and discharge data
5. Carbon in terrestrial ecosystems (DBH, height, allometry, wood core etc)

Readings

a. Biogeochemistry: An Analysis of Global Change. William H. Schesinger. Academic Press. Second edition.
b. Environmental Studies. Ranjit Daniels and Jagdish Krishnaswamy

C2a: Basic Economics (1.5 credits)
Coordinator: Ashokankur Datta

The objective of C2a course is to introduce the principles of economics (mainly micro-economics) to students. The basic economic theory taught in the initial part of the course will be later used to develop an understanding of the more specialized field of environmental and ecological economics.

Lecture modules

1. History of economic thought (Dr. Bejoy K. Thomas, Ashokankur Datta)
2. Principles of micro-economics. (Ashokankur Datta)
3. National income accounting: Introducing green accounting. (Ashokankur Datta, Dr. Seema Purushothaman)
4. Introduction to sustainable development. (Dr. Seema Purushothaman)
1. Environmental and ecological economics (Dr. Seema Purushothaman)

Readings

a. Economics. Paul Samuelson
b. Intermediate Microeconomics. Hal Varian
c. Principles of Economics. Gregory Mankiw

C2b: Sociology (1.5 credits)
Coordinator: Dr. Siddhartha Krishnan

Lecture modules

1. Why study sociology?

2. Modern sociological thought
3. Brief sociological clarifications of some concepts frequently encountered in social scientific engagements with nature

Readings

a. Abraham, Francis. 2006. Contemporary Sociology: An Introduction to Concepts and Theories. New Delhi. Oxford.
b. Agrawal, Arun. 1999. 'Community-in-Conservation: Tracing the Outlines of an Enchanting Concept'. Pp. 92-108. In A New Moral Economy for India's Forests, Edited by Jeffery, Roger and Sundar, Nandini. New Delhi. Sage.
c. Agrawal, Arun.2006. Environmentality. New Delhi. Oxford.
d. Bauman, Zygmunt and May, Tim. 2001. Thinking Sociologically. Australia. Blackwell.
e. Baviskar, Amita. 1997. 'Ecology and Development in India: A Field and its Future'. Pp. 193-207. *Sociological Bulletin*, 46.
f. Bell, Michael M. 2010. An Invitation to Environmental Sociology. Pine Forge Press. California.
g. Beteille Andre. 2008. Sociology: Concepts and Institutions. Pp. 41-60, in Oxford Handbook of Indian Sociology. Edited by Das, Veena. New Delhi. Oxford.
h. Buttel Frederick and Gijswijt August. 2004. Emerging Trends in Environmental Sociology. Pp. 43-57, in the Blackwell Companion to Sociology. Edited by Judith R. Blau. Victoria. Blackwell.
i. Cook, Daniel Thomas. 2005. Consumer Culture. Pp.160-175, in The Blackwell Companion to The Sociology of Culture. Edited by Jacobs, Mark. D and Hanrahan, Nancy Weiss. Victoria. Blackwell.
j. Deshpande, Satish. 2008. Modernization. Pp. 172 – 202, in Oxford Handbook of Indian Sociology. Edited by Das, Veena. New Delhi. Oxford.
k. Foster, John Bellamy. 1999. Marx's Theory of Metabolic Rift: Classical Foundations for Environmental Sociology. Pp. 368-405. American Journal of Sociology, 105.
l. Fulcher, James and Scott, John. 2007. Sociology. Oxford. Oxford University Press.
m. Gadgil, Madhav, and Malhotra K.C.1998. 'The Ecological Significance of Caste'. Pp. 27-41 in Social Ecology, Edited by Ramachandra Guha. New Delhi. Oxford
n. Giddens, Anthony. 2004. Runaway World. London. Profile Books.
o. Guha Ramachandra. 1998. Social Ecology. New Delhi. Oxford
p. Gupta, Dipankar. 2008. 'Social Stratification'. Pp. 120-141, in Oxford Handbook of Indian Sociology. Edited by Das, Veena. New Delhi. Oxford.
q. Hannigan, John. 2006. Environmental Sociology. New York. Routledge.
r. Sen, Amartya. 2006. Identity and Violence: The Illusion of Destiny. London. Allen Lane.
s. Turner, Jonathan H. 1995. The Structure of Sociological Theory. Jaipur. Rawat Publications.

C3: Issues in Conservation and Sustainable Development (2 credits)

Coordinator: Dr. Sharachchandra Lele with contributions from Dr. Nitin Rai, Dr. Bejoy K. Thomas, Dr. Ashokankur Datta (AAD), Dr. M. Soubadra Devy (SD), Dr. Shrinivas Badiger (SB), Dr. Ravikanth G (GR), Dr. Seema Purushothaman (SP) (and 1-2 guest lecturers from outside ATREE)

While the other core courses cover theories on the biotic or the abiotic environment (C1) and about human decision-making and social processes (C2), there is no explicit discussion of the environment and society relationship. This course addresses that gap. It has been tailored to broaden and deepen our understanding of human- environment interactions, and to challenge our conventional way of thinking about issues that we assume we are familiar with. The course will expose students to the magnitude, diversity, complexity, and inherent subjectivity in a range of environmental issues that are especially relevant in the south Asian or the developing country context.

Lecture modules

Part 1: Perspectives: Five perspectives that are most popular or common in environmental analysis and how each of these perspectives brings a particular combination of values, assumptions, and causality in 'framing' the problem.

1. Neo Malthusianism (Dr. Sharachchandra Lele)
2. Market Economics (Dr. Ashokankur Datta)
3. Institutional analysis (Dr. Sharachchandra LeleL)
4. Political Economy (Dr. Bejoy K. Thomas)
5. Environmental ethics (Dr. Sharachchandra Lele)

Part 2: Debates around specific environmental issues: Nature of the crises in south Asia, and the different ways in which each crisis is being defined or 'framed', and implications for policy and action.

1. Forests (Dr. Sharachchandra Lele)
2. Wildlife (Dr. Nitin Rai)
3. Nuclear Energy (Dr. M. V. Ramana)
4. Dams (Dr. Sharachchandra Lele)
5. Air Pollution (Dr. Ashokankur Datta)
6. GMOs (Dr. G.. Ravikanth)
7. Water (Dr. Shrinivas Badiger)
8. Urban Environment (Dr. M. Soubadra Devy)
9. Climate Change (Walter Mendoza)
10. Agriculture/Biofuels (Dr. Seema Purushothaman)
11. Synthesis (Dr. Sharachchandra Lele)

Readings

a. Part 1 will be based on five chapters in Robbins et al (to be shared beforehand)
b. Each session in part 2 will use 2-3 readings as background material. These readings (to be assigned by different lecturers) will be announced a week beforehand and uploaded to the ATREE repository.

C5a: Research Methods in Social Sciences (1.5 credits)
Coordinator: Dr. Bejoy K. Thomas

The objective of C5a course is to introduce the essential qualitative, quantitative and participatory research methods used in social sciences and natural resources management research. Emphasis will be placed on organizing and executing research projects and combining disciplinary approaches and methods in field settings. The course will comprise of several sessions of class based lectures and a short hands-on application in the field.

Lecture modules

1. Overview of social research process (Dr. Siddhartha Krishnan , Dr. Bejoy Thomas
2. Qualitative methods: Sampling (Dr. Siddhartha Krishnan)
3. Qualitative methods: Field tools (participant observation, interviews, triangulation) (Dr. Siddhartha Krishnan)
4. Qualitative methods: Analysis (Dr. Siddhartha Krishnan)
5. Quantitative methods: Sampling (Dr. Bejoy Thomas, Dr. Ashokankur Datta)
6. Quantitative methods: Questionnaire survey (Dr. Bejoy Thomas, Dr. Ashokankur Datta)
7. Quantitative methods: Analysis (Dr. Ashokankur Datta, Dr. Bejoy Thomas
8. Participatory methods: Overview and tools (Dr. Bejoy Thomas, Dr. Siddappa Setty

9. Participatory methods: Case study Dr. Siddappa Setty, Dr. Bejoy Thomas
10. Field assignment and presentation (Dr. Ashokankur Datta, Dr. Bejoy Thomas, Dr. Siddappa Setty, Dr. Siddhartha Krishnan, Dr. Seema Purushothaman

Readings

a. Research Methods in Anthropology: Qualitative and Quantitative Approaches, H. Russell Bernard (2006): http://library.atree.org/cgi-bin/koha/opac-detail.pl?biblionumber=3989
b. Researching Society and Culture, Clive Seale (2004): http://library.atree.org/cgi-bin/koha/opac-detail.pl?biblionumber=2534

C5b: Research Methods in Natural Sciences (1.5 credits*)*
Co-ordinator: Dr. T. Ganesh

Lecture modules

1. Doing ecology in field: Issues and constraints (Dr. T. Ganesh)
   Taxa based sampling **(**Dr. Aravind N.A.**)**
   Insect sampling (Dr. Priyadarsanan Dharma Rajan)
2. Plant sampling (Dr. R. Ganesan)
3. Basic biodiversity statistics (Dr. Aravind N.A.)

Data mining for conservation (Dr. Aravind N.A.)

Field modules (Dr. T. Ganesh and Dr. Aravind N.A.)

Reading

a. Ecological Methodology: Charles Krebs
b. Ecological Census Technique: William Sutherland
c. Anne Magguran