Course title : Application of Environmental Science			
Course code : MPD 135	**No. of credits :** 3	**L-T-P distribution :** 18-08-32	**Learning hours :** 42
Pre-requisite course code and title (if any) :			
Faculty : Prof. V. Subramanaian		**Department Policy Studies**	
Course coordinator (s) : Dr.Smriti Das		**Course instructor (s) : Prof. V. Subramanian**	
Contact details :			
Course type	**Core**		
Course offered in	**Semester 1**		

Course Description :

The course aims at transferring basic knowledge in environmental science with a special emphasis in ecology. Based on this knowledge the students will learn and experience the practical implication of environmental science in the context of natural resource management. External faculty from a practical and scientific background in the field of development work will be recruited to deliver modules or parts of modules for forestry and agriculture. Lectures and tutorials will be supplemented with a field trip to an organic farming estate.

Course objectives :

The objective of the course to get the students an insight of the role of environmental science in selected fields of natural recourse management in a development context.

Module	Topic	L	T	P
1	**Understanding the environment: scientific principles and concepts:** Introduction in the course: what is science, models of implementation of scientific knowledge in natural resource management, structure of scientific work (from the aim to the output), what are statistics and why are they important, principles of collecting information (quantitative, qualitative) Role of environmental science in development work.	4	2	0
2	**Application of ecological principles Case 1: ecosystem dynamics** Students will learn about the principles of disturbance and succession (definitions, ecological trades of plant species) in lectures and at hand of an article (e.g. With more 1998.). Students have then to work on the case of the Manger-Bani Faridabad at the hand of empirical data.	2	2	4
3	**Application of ecological principles Case 2: biodiversity** Students will learn about the principles of biodiversity (definition, drivers, and significance) in lectures and at hand of articles (e.g. Rockström et al. 2009), based on this students have to analyse different cases of biodiversity conservation and present the same	2	2	4
4	**Forestry** Overview over earth forests, principles and role of forestry; case study in the field of forestry (students have to work on a management problem for sub-tropical forest on the base of real data, the actual applied management system will be explained and discussed with them at the end of the exercise), group wise presentation of cases	4	0	6
5	**Organic Farming** Introduction in India's Agriculture (definition, distribution of soil and crops, yield, markets), field practical on organic agriculture in Darjeeling with Darjeeling Prerna (introduction to organic farming, certification and fair trade, field practical with local organic farmers), group wise presentation of cases.	6	2	18

	Total	18	8	32

Evaluation procedure:

Each module will be evaluated by written test, assignments or oral presentations**:**

- Module 1-3 : one written exam 50%
- Module 4 : group presentations 25%
- Module 5 : group presentations 25%

Learning outcomes :

1. The students will understand the principles of environmental science.
2. The students will be familiar with basic ecological principles and there application.
3. The students will be able to join scientific principles and field realities of rural development issues.

Pedagogical approach : The course will be delivered through a mix of classroom lectures and case studies discussion. Field visits and group exercises will help students understand real – life challenges and enable them to identify practical solutions from social, environmental and economic perspective.

Material will be provided by the faculty of the respective Module. This may only be listed shortly before the module starts. Readings know so are listed below.

Suggested Readings:

1. Cunningham and Cunningham (2007). Principles of Environmental Science, special Indian editions, Tata McGraw Education Private Limited, New Delhi
2. Driessen et al. (2001): Lecture notes on the major soils of the world, FAO 2001
3. Odum E. P. and Gray W. B. (2005). Fundamental of Ecology, Indian reprint 2007 Akash Press, New Delhi
4. Withmore, T. C. (1998). Forest Dynamics. Kapitel 7 in „An Introduction to Tropical Rain Forests“, Oxford University Press, S. 109-155.
5. Rockström et al. (2009): A safe operating space for humanity, *Nature* 461, 472-475
6. Fukuoka, M (1975), One Straw Revolution, Rodale Press, New York.

Other supporting readings:

7. Linden Mayer, B. and Franklin, J. F. (2006): Conserving Forest Bio diversity, A comprehensive multiscaled approach, Island Press, Washington - Covelo - London
8. Millennium Ecosystem Assessment. (2005). Ecosystems and Human Well-Being - Synthesis. Washington, DC.
9. Begon M. et al. (2006): Ecology, From Individuals to Ecosystems, 4th edition, Blackwell Publishing, Malden - Oxford - Victoria
10. FAO CD 19: Soils of the tropics
11. Journal: Biodiversity Conservation
12. Journal: Forest Ecology and Management
13. Schumacher, E (1989), Small is beautiful – Economics as if People Mattered, Harper and Row Publishers, New York.
14. Agricultural and Processed Food Products Export Development Authority (Govt. of India) Website (2013). http://www.apeda.gov.in/apedawebsite/organic/index.html

Additional information (if any) :

Student responsibilities :

Attendance: At-least 75% attendance will be necessary to be able to appear for the final exam.

Course Reviewers:

1. Dr. Neeraj Khera, Biodiversity Programme, GIZ, New Delhi.
2. Dr. Peter v. d. Meer, ALTERRA, Wageningen, Netherlands.