

Course title : Application of Environmental Science				
Course code: MPD 135	No. of credits: 3	L-T-P distribution: 33-09-00	Learning hours: 42	
Pre-requisite course code and title (if any) :				
Department : Department of Policy Studies				
Course coordinator (s) : Prof V Subramanian		Course instructor (s) : Prof V Subramanian		
Contact details : subra42@gmail.com				
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. Lectures and tutorials will be supplemented with a field trip to expose the students to realities of land use, agriculture and water quality issues.				
Course objectives : The objective of the course to get the students an insight of the role of environmental science in selected fields of natural resource management in a development context.				
Module	Topic	L	T	P
1	Scientific principles Science and natural resources management Role of science and statistics and interface of environmental science and development This module is expected to let a student knows the modern approach to understand various ways of studying natural system, since sustainability involves a very large scale multi-disciplinary approach, this is the window to understand all aspects of environmental science and interlink with social and quantitative science as well.	4	0	0
2	Ecological concepts Concept of ecosystem analysis; Response of ecosystem to disturbances and changes; Evolution and time concept Ecology is the mother of environmental science and ecological system includes earth environmental processes as well. This module takes the student to the natural history of earth processes, earth and life evolution and changes in climate and ecological systems response through time. Concepts of pre-predator relation, evolution of different form of life are also discussed.	6	2	0
3	Biodiversity Sustainable development goals; International union of Conservation of Nature; concept of Sustainability; Global and regional issues on conservation of nature; Prey predator approach in biodiversity Life processes through time is a time-tested future and biodiversity is at the heart of all life processes. Various theories of biodiversity, drivers, interrelationship and impact of external environment on biodiversity are explained. Appearance and disappearance of various life forms in the light of biodiversity are mentioned with examples around the world. Role of IUCN in biodiversity conservation are discussed.	6	2	0
4	Forestry Forest types and distribution; Role of forests as carbon sink; Social forestry and forest Management; types of forests in India and forest dwellers; Modern tools in forest management; urbanization and land cover change Without forests, there is no life. Key elements of forest ecosystem as a tool in biodiversity and carbon sink are discussed, Impact of climate on forests cover and threats to forests are also covered,	5	2	0

	Various scales of forest management including involvement of forest dellers are discussed and national and international approach to conservation are covered.			
5	Agriculture Historical aspects and development for food security; present day practices; importance of water and soil in agriculture; major crops in different agro-climatic zones; issues in agricultural community in India ; chemical fertilisers and organic farming; Agriculture is the starting point of large scale landuse changes in modern times and its impact, drivers, issues in developing world are covered with examples. Potential threats to food security are discussed in the light of environmental degradation.	6	2	0
6	Water Resources Global, regional and national level scenario; Supply demand and pressure points on water and societal Issues; broad assessment of water quality and quantity; climate change and challenges for sustainability; Water being the essential element for all forms of life, issues in water sectors are discussed in terms of quantity, distribution and availability and accessibility issues and possible climate change impact on water related problems are covered. Examples from India and water for forests, biodiversity and agriculture are discussed with examples.	6	1	0
	Total	33	09	00
Evaluation procedure: Each module will be evaluated by written test, assignments or oral presentations: <ul style="list-style-type: none"> • Minor 1: 15% • Minor 2: 15% • Field Trip + Term paper: 20% • Major: 50% 				
Learning outcomes : <ol style="list-style-type: none"> 1. The students will understand the principles of environmental science. 2. The students will be familiar with basic ecological principles and their application. 				
Pedagogical approach: The course will be delivered through a mix of classroom lectures and case study discussion. The field visit and group exercises will help students understand real – life challenges and will enable them to identify practical solutions from social, environmental and economic perspective.				
Suggested Readings: <ol style="list-style-type: none"> 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, <i>Nature</i> 461, 472-475 6. Fukuoka, M (1975), One Straw Revolution, Rodale Press, New York. 7. V.Subramanian(2005) A text Book on environmental sciences, Narosa publishers. 301 pages 8. V.Subramanian(2010) Rivers of South Asia- To link or not to Link. Capital publishers. 410 pages. 				
Other supporting readings: <ol style="list-style-type: none"> 9. Linden Mayer, B. and Franklin, J. F. (2006): Conserving Forest Bio diversity, A comprehensive multiscaled approach, Island Press, Washington - Covelo - London 10. Millennium Ecosystem Assessment. (2005). Ecosystems and Human Well-Being - Synthesis. Washington, DC. 11. Begon M. et al. (2006): Ecology, From Individuals to Ecosystems, 4th edition, Blackwell Publishing, Malden - Oxford - Victoria 12. FAO CD 19: Soils of the tropics 13. Journal: Biodiversity Conservation 14. Journal: Forest Ecology and Management 15. Schumacher, E (1989), Small is beautiful – Economics as if People Mattered, Harper and Row Publishers, New York. 				

16. 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 Khara, Biodiversity Programme, GIZ, New Delhi.
2. Dr. Peter v. d. Meer, ALTErrA, Wageningen, Netherland