Course title: Economics of health and environment			
Course code: MPE 145	**No. of credits:** 3	**L-T-P:** 37-5-0	**Learning hours:** 42
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@terisas.ac.in			
Course type: Elective	**Course offered in:** Semester 4		

Course description:

Environmental hazards are responsible for an estimated 25% of the total burden of disease worldwide, and nearly 35% in developing regions according to the World Health Organization. This course introduces students to environment – health linkages and underscores the health outcomes related to exposure to air and water pollution other toxic substances, variations in the climate and food and energy sources, and environmental policy.

Increasingly there is a demand for analysts who have a fairly advanced knowledge about health and environmental economics. Upon completion of the course, students would have gained knowledge about the methods, data sources, and models and specifications used in analysis of environment and health from an economist's perspective.

Course objectives

1. To provide students with a thorough knowledge of concepts on environmental health.
2. The tools used to measure the impacts on health due to pollution

Course content

Module	Topic	L	T	P
1	Introduction to environmental health and approaches to economic evaluation of health The objective of this module is to make students familiar with the background of health economics and make students familiar of the different methodologies of cost benefit and cost-effectiveness analysis Subtopics-Basic concepts in environmental health; types of environmental hazards; attributable risk; healthy life expectancy; QALYs; DALYs.	5	1	
2	Health impacts from Air pollution The objective of this module is to let the students familiar with quantification of the damage associated with air pollution. Subtopics – types of data and specifications used; health impact of outdoor air pollution and indoor air pollution; relative risk; cost of illness; health production function gender aspects (Cross country studies will be taken from East and South Asia).	12	2	
3	Health impacts from Water pollution: The purpose of this module is to make students familiar with the quantification of damage using economic tools in the context of water. Subtopics: health impact of exposure to toxic substances; health production function Willingness to pay; (Cross country studies from South Asia).	8	1	
4	Weather related health outcomes: The students will be made familiar with the aspects of climate change and health and the methodologies used for quantification. Subtopics:	8	1	

	variations in the weather and impact on mortality; disease incidence; Economic and health effects of weather related disturbances.			
5	Environmental and health policy: The students will be made familiar with environmentally related health policies in the context of developing nations and that for India Subtopics: environmental health; global changes in environment and the third world.	4		
	Total	**37**	**5**	

Evaluation criteria:

- Class contribution [end of module 1] 10%
  Class contribution will be on individual assignment to judge the preliminary understanding they have acquired after completion of the module
- Quizzes and assignments [end of module 1 and 2] 30%
  Quizzes and assignments will be group assignments to judge the clarity of the methods they have learnt and its area of application
- Final exam [end of all the modules] 40%
- Term paper and presentation [end of module 1,2 and 3] 20%
  Students will be asked to write a term paper (in 5000 words) on a given topic. They will be assessed based on (a) research question, (b) maintaining word limit, (c) in-depth understanding of the methodology and its application, (d) strength of method and its application (e) clarity of argument and (f) proper referencing.

Learning outcomes: The students understand the basic concepts in the area of environmental health and how to quantify the health damage caused by pollution.

Pedagogical approach: class interaction, teaching and discussion, group assignment, case studies presentation

Course Reading Materials (*=compulsory readings)

I. Introduction and overview

1. Gilbreath, J. 2007. The Economics of Better Environmental Health, Environmental Health Perspectives, 2007
2. Hubbell, B. J. 2006. Implementing QALYs in the Analysis of Air Pollution Regulations,
3. Environmental and Resource Economics, 34(3), 34:365–384
4. Prüss-Üstün A., C. Mathers, C. Corvalán and A. Woodward. 2003. Introduction and Methods: Assessing the Environmental burden of disease at national and local levels,WHO.
5. Confalonieri, U., B. Menne, R. Akhtar, K.L. Ebi, M. Hauengue, R.S. Kovats, B. Revich and A. Woodward, 2007: Human health. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the
6. Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press.

II. Air pollution and health

a. Indoor air pollution

1. Duflo, E., Greenstone, M. and R. Hanna. 2008. Indoor Air Pollution, Health, and Economic Well-Being, Surveys and Perspectives Integrating Environment and Society
2. Dasgupta, S., Huq, M., Khaliquzzaman, M., Pandey, K., and D. Wheeler. 2004. Indoor Air Quality for Poor Families: New Evidence from Bangladesh, World Bank Policy Research Working Paper 3393. Washington, DC.
3. Arcenas, A., Bojö, J., Larsen, B. and R. Ñunez, Fernanda. 2010. The Economic Costs of Indoor Air Pollution: New Results for Indonesia, the Philippines, and Timor-Leste, Journal of Natural Resources Policy Research,
2: 1, 75 — 93
4. Pitt, M., Rosenzweig, M., and M. Hassan. 2006. Sharing the Burden of Disease: Gender, the Household Division of Labor and the Health Effects of Indoor Air Pollution in Bangladesh and India. CID Working Paper No. 119, Harvard University.

b. Outdoor air pollution

1. Chay, K. and Greenstone, M. 2003. The Impact of Air Pollution on Infant Mortality: Evidence from Geographic Variation in Pollution Shocks Induced by a Recession, Quarterly Journal of Economics
2. Cropper, M. L., Simon, N. B., Alberini, A. and Sharma, P.K. 1997. The Health Effects of Air Pollution in Delhi, India (December). World Bank Policy Research Working Paper
3. Ostro, B. D., 1983. The effects of air pollution on work loss and morbidity, Journal of Environmental Economics and Management, Vol. 10(4)
4. Ransom, M. and C. A. Pope. 1995. External Health Costs of a Steel Mill. Contemporary Economic Policy, 13.

III. Water Pollution and health

1. Clasen, T. F. and L. Haller. 2008. Water Quality Interventions to Prevent Diarrhoea: Cost and Cost-Effectiveness, Public Health and the Environment, World Health Organization,
2. Dasgupta, P. 2004. Valuing health damages from water pollution in urban Delhi, India: A production function approach, Environment and Development Economics 9 (1)
3. Hutton, G., L. Haller, J. Bartram. 2007. Economic and health effects of increasing coverage of low cost household drinking-water supply and sanitation interventions to countries offtrack
to meet MDG target 10. Background document to the "Human Development Report
2006", WHO\
4. Ahmad, J., B. N. Golder, S. Misra, M. Jakariya 2002. Willingness to pay for arsenic free 'safe' drinking water in Bangladesh, (Field note / Water and Sanitation Program), New Delhi, India

IV. Weather related outcomes

a. Economic loss, mortality

i. Markandya, A and A. Chiabai. 2009. Valuing Climate Change Impacts on Human Health: Empirical Evidence from the Literature, International Journal of Environmental Research and Public Health, 6, 759-786
ii. Deschenes, O., M. Greenstone and J. Guryan. 2009. Climate Change and Birth Weight, American Economic Review Papers and Proceedings, 99(2)
iii. Kumar, R., P. Jawale and S. Tandon. 2008. Economic impact of climate change on Mumbai, India Regional Health Forum, Volume 12, Number 1.

b. Diseases

1. Sachs, J. & P. Malaney. 2002. The Economic and Social burden of Malaria, Nature 415, 680-685 (7 February 2002)
2. Tseng W., Chen, C., Ching-Cheng C., Chu, Y. 2009. Estimating the economic impacts of climate change on infectious diseases: a case study on dengue fever in Taiwan, Climatic Change, 92:123–140
3. Bosello, F., R. Roson, and R.S.J. Tol. 2006. Economy-wide estimates of the implications of climate change: Human health, Ecological Economics, Volume 58, Issue 3, 25 June 2, Pages 579-591.

V. Environmental policy and health

4. Freeman, A. M. III .2006. Valuing Environmental Health Effects: An Economic Perspective, Environmental and Resource Economics, 34(3), 347-363
5. Drabo, A. 2010 Interrelationships between health, environment quality, and economic activity: What consequences for Economic convergence?
6. Bentham, G. Global Environmental Change and Health, CSERGE Working Paper PA 93-02
7. Corvalán C. F., Kjellström T., Smith K. R. 1999. Health, Environment and Sustainable
8. Development: Identifying Links and Indicators to Promote Action. Epidemiology 10:656- 660.

Journals

Advanced Reading Material

Additional information (if any):
Student responsibilities: Attendance, feedback, discipline: as per university rules.

Course reviewers:

The course is reviewed and commented by the following experts.
1. Prof. Indrani Gupta, Institute of Economic Growth, Delhi, India
2. Dr. Susan Chen, Department of Economics, Finance and legal studies, University of Alabama, USA