

Course title: Water resource economics				
Course code WSW 146	No. of credits: 4	L-T-P distribution: 45-11-0	Learning hours: 56	
Pre-requisite course code and title (if any): Familiarity with calculus and mathematical formalization.				
Department: Department of Regional Water Studies				
Course coordinator(s): Dr. Nirupam Datta			Course instructor(s): Dr. Nirupam Datta	
Contact details:				
Course type: Compulsory Core			Course offered in: Semester 2	
Course description The course introduces theory, principles and techniques of economics relevant to water resources and water services in decision-making. The focus is on fundamentals of theory and their application to a range of challenges in water resources management including water-service tariffs, pollution charges and other economic instruments, value of water, cost-benefits analysis of water projects and policies, valuation of non-market based aquatic ecosystem services and allocation of water across competing uses.				
Course objectives The course aims to instil a critical understanding of major economic and financial principles as relevant in the management of water in developing and developed country contexts and enable students to be able to apply these principles in example settings.				
Course content				
Module	Topic	L	T	P
1	Introduction to water economics Characteristics of water as an economic good, what determines its demand and supply, relevance and interaction of different streams of economic theory to water resources management and service provision	5	0	0
2	Market failure in the water sector Variety of market failures originating in the absence (concepts of externalities and public goods) or inadequate functioning (concepts of property rights, transaction costs, information asymmetry, market structures, uncertainty and risk) of markets. Case Studies. Use of economic instruments in theory and practice to address some of these failures with a focus on water pollution. Equity and efficiency issues of economic instruments- alternative measures of social welfare.	10	4	0
3	Economic value of water The concept of total economic value of water; principles and techniques for assigning value to market and non-market water resources and services: hedonic pricing, travel cost, contingent valuation, , choice experiments, preference elicitation – stated and revealed replacement cost, damage avoidance, and market prices	10	4	0
4	Financial and economic evaluation Theory and methods of CBA and their application to evaluation of alternative water projects and policies. Concepts covered include financial, economic and social CBA, shadow prices, opportunity costs, time preferences and discounting, net present value, internal rate of return, benefit cost ratio, and sensitivity analysis	7	3	0
5	Water pricing Economic and financial principles that guide water tariffs in different end-use sectors. Concepts of marginal pricing, price elasticity of demand, opportunity cost, shadow prices, cost-recovery, and water markets/trading subsidies. Case studies: pricing of water in agriculture, residential, and industrial sectors. Political economy of water pricing and its implication for water use. Estimation of explicit and hidden subsidies in the water sector.	7	3	0
6.	Financing Mechanisms for Infrastructure Projects With Applications to Water Sector - Seminar-Based Lectures	3	0	0
	Total	42	14	0
Evaluation criteria				
Class participation		5%		
2 minor tests		15% each		
End-term exam		50%		
Assignment		15%		
Learning outcomes				

1. Understand the importance of an economics perspective on water and its management
2. Apply economic concepts to understanding, designing, and evaluating water projects and policies
3. Distinguish between economic and financial approaches to water resources management and discern the relevance and need for each
4. Appreciate the varied and inter-disciplinary nature of water management and be able to interact with professionals in various water management positions

Pedagogical approach

The course will be delivered through class room lectures, discussion of case studies from relevant research articles and hands-on exercises based on simulated/actual case studies

Materials**Textbooks**

Conrad, Jon M. 1999 Resource Economics. Cambridge University Press.
Griffin, R.C. 2006. Water Resource Economics: The Analysis of Scarcity, Policies, and Projects. MIT Press, Cambridge, MA
Hanley, N., Shogren, J.F. and White, B. (2006) Environmental Economics: In theory and practice. Oxford University Press
Kolstad, C. 2000 Environmental Economics. Oxford University Press
Tietenberg, T. 2001 Environmental and Natural Resource Economics. Addison Wesley Publication

Suggested Readings

Brouwer R and Pearce D. 2005. Cost-Benefit Analysis and water resources management, Edward Elgar, Nirthampton. (Selected parts)
Briscoe, J. 1996. Water as an economic good: The idea and what it means in practice. A paper presented at the World Congress of the International Commission on Irrigation and Drainage, Cairo, September 1996
Coase, R. H. 1960. "The problem of social cost". Journal of Law and Economics, Vol. 3. (Oct., 1960), pp. 1-44.
Hanemann, "The Economic Conception of Water" in Peter P. Rogers, M. Ramon Llamas and Luis Martinez-Cortina (eds) Water Crisis: Myth or Reality Taylor & Francis, 2006.
Jalan J, Somanathan E and Chaudhuri S 2009. Awareness and the demand for environmental quality: survey evidence on drinking water in urban India. *Environment and Development Economics* Volume 14 / Issue 06 / December 2009, pp 665-692
Young, RA 2005. Determining the economic value of water, Concepts and methods, Resources for the Future, Washington DC. (Selected parts)
United Nations 2012. Managing Water under Uncertainty and Risk, The United Nations World Water Development Report 4 (2012), Volume 1, Chapter 10, pp 276-288.

Journals

Water Resources and Economics
Environmental and Resource Economics
Environment and Development Economics
Journal of Environmental Economics and Management
Resource and Energy Economics

Additional information

This is a preliminary reading list. A detailed list will be provided in due course

Student responsibilities

Classes will be interactive. Students are expected to be regular in attendance, participation, and submission of assignments. They must come prepared with readings when required.

Course reviewers:

Prof. Rajesh Gupta, Department of Civil Engineering, VNIT, Nagpur
Ms Divya Datta, Fellow, TERI