Course title: Water planning and management

Course code: WSW 181	**No. of credits:** 3	**LTP distribution:** 42-0-0	**Learning hours:** 42

Pre-requisite course code and title (if any): None

Department: Department of Regional Water Studies

Course coordinator(s): Ms. Ranjana Ray Chaudhuri, Dr Nirupam Dutta	**Course instructor(s):** Ms. Ranjana Ray Chaudhuri, Dr Nirupam Dutta

Contact details:

Course type: Compulsory Core	**Course offered in:** Semester 1

Course description

World population is set to increase further in the coming decades and shift of population from rural to urban areas will make urban areas more stressed in terms of water demands and sanitation needs. Intensive planning is required in the water sector to meet future water needs, restore water quality of fresh water reserves many of which are currently compromised. In addition climate change is likely to modify the current precipitation patterns, thereby putting more pressure due to extreme events of drought or floods on rising urban sprawls. Together with all comprehensive water resource planning, efficient water management tools and decision making involving all stake holders shall play a key role if long term planning is to succeed, only then will sustainable water use and equitable water distribution become a reality. This course is a stepping stone towards that direction and the various modules included are chosen so as to give an insight into the nature of current challenges faced by water planners and water managers

Course objectives

- Introduce students to the stages/evolution of water planning
- To explore critically river basin planning strategies and assess whether the planning process could meet the expected water demands in various fields.
- To understand the participatory and integrated water resource planning process, to critically examine the planning processes and understand how planning responds to water related disasters.

Course content

Module	**Topic**	**L**	**T**	**P**
1A	**Role of Planning Commission in Planning and Management of Water Resources in India- Initial Years (1952-early 70s)** Assessment of existing water resources and planning for development of water resources – implementation of multipurpose river valley projects, major and medium canal irrigation projects, green revolution, gradual development of tube-well irrigation, issues with plan implementation, technical and economic performance, equity, accountability and institutional issues, case studies	4	0	0
1B	**Role of Planning Commission in Planning and Management of Water Resources- Later Years (1974 onwards)** Setting up of Command Area Development Programme in 1974 as a "last mile" approach, major vs. minor irrigation debate, groundwater vs. surface water irrigation debate, focus on development of water resources for dryland agriculture (watershed), increasing project overruns	4	0	0
2	**Reforms in the Water Planning and Management Processes – (Late 1990s onwards)** Need for fast completion of delayed major and medium projects-Accelerated Irrigation Benefits Programme (AIBP), concerns for over-exploitation of groundwater resources, impact of climate change on available water potential, stress on development of water resources for non-agricultural sectors, restructuring of guidelines for major and medium irrigation projects, participatory watershed development programmes, water user organisations, micro-irrigation-more crop & income per drop, proposed project on interlinking of rivers for redistribution of water resources	6	0	0
3.	**Traditional Methods of water management and sustainability** Critical discussion of various (traditional) knowledge systems for water management in different ecological zones in South Asia Traditional knowledge and conflict resolution	6	0	0

4.	**Disaster Management** Conceptual issues - hazards, vulnerabilities, risks, exposure, capacities, disasters – Types of disasters ,Trends of disasters and their impacts – catastrophic disasters - disaster management cycle , Disaster Management in India **Hydro-meteorological disasters and its management** Water related disasters – Trends of water related disasters- Floods, Droughts, Cyclones, Other water related disasters - rain-induced landslides-cloudbursts-sea and river erosion – avalanche – GLOFs, Disasters arising out of water pollution and water borne diseases , Climate change and its impact on hydro-meteorological disasters Global, regional and national trends	8	0	0
5.	**Regional planning and planning for sustainable habitat-** River basin planning (water allocations to different sectors), land use planning, city water and sanitation plans, tier I and tier II cities	6	0	0
6.	**Water and energy** Energy requirement for water in urban, agriculture and industry sector Generation of energy from water-waves, currents, tides, hydro Water usage in industries, pollution-Impact on water resources	8	0	0
	Total	**42**	**0**	**0**

Evaluation criteria

Minor 1	20%
Minor 2	20%
Tutorial and Quizzes	10%
End-term exam	50%

Learning outcomes

- Students by the end of the course will be aware of evolution in planning and management process for water resources as envisaged and formulated by the state on the advice of Planning Commission.
- They will understand the evolution of water planning from the development phase to strategic planning phase, the need for sustainable economic development of water, assessment of coping strategies for disaster management.
- They will be able to evaluate alternate water management strategies and suggest methods to protect ecologically sensitive areas.
- They will develop an understanding of water use allocation.

Pedagogical approach

Course shall be conducted using black board, power point presentations, MS Excel. Effort shall be made to through case studies to highlight the incorporation of adaptability and resilience in water planning for various parts of the water use system as it is this vision of long term planning and management which will assist in handling crises scenarios in the future.

Materials

Textbooks

Jain S.K. and Singh V.P. (2006). *Water Resources Systems Planning and Management*, Reed Elsevier India Pvt. Ltd., New Delhi.

Agarwal, A., & Narain, S. (1997). *Dying Wisdom: Rise, fall and potential of India's traditional water* harvesting *systems* (Vol. 4): Centre for Science and Environment New Delhi. Chapter 2. Pp 25-268.

Suggested Readings

1. Five Year Plan Documents (1st Five Year Plan- 12th Five Year Plans)
2. Evaluation Studies of Different National Programmes for development of water resources
3. David S. (1998). *Water Supply Management*, Kluwer Academic Publisher, Dordrecht
4. Terminology on Disaster Risk reduction, International Strategy on Disaster Reduction, 2009
5. National Policy on Disaster Management, 2009
6. Tenth Five Year Plan 2002-2007, Chapter on Disaster Management- A Development Perspectives
7. Report of the High Powered Committee on Disaster Management, National Centre of Disaster Management, 2001
8. Disaster Management in India, Ministry of Home Affairs, Government of India, 2011

Journals

9. Economic and Political Weekly
10. Journal of Water Resources Planning and Management

Additional information (if any)

Student responsibilities
Attendance and class participation will be given utmost importance. All assignments should be submitted as per the given timeline. Students will be expected to take up assignments which will compare implications of planning and management on water infrastructure between different states, cities and countries.

Course reviewers

1. Dr. S.K. Jain, Scientist, National Institute of Hydrology, Roorkee, Uttarakhand, India
2. Prof V.P.Singh, Professor of Biological and Agricultural Engineering, Texas A&M University, College Station, Texas, USA