Fall 2008
W&FCON 597P Water Resources Management and Policy

Course Teacher: Dr. Timothy Randhir, Department of Natural Resources Conservation
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Texts:

1. Textbooks: Thompson, Stephen N. Water Use, Management, and Planning in the United States.
Grigg, N.S. Water Resources Management: Principles, Regulations, and Cases.

2. Selected papers are posted on Ereserves at http://ereserves.library.umass.edu . The rest of materials will be on reserve at the library front desk.

Course help: Students needing special help are encouraged to contact Prof. Randhir.

Course Objectives: a) to develop skills in addressing problems dealing with water resources; b) to understand the breadth of issues related to water resources management and planning; and c) to develop a trans-disciplinary perspective in evaluating and managing water resources.

Date	***Lecture Topic***	***References***
9/3	Course Outline	
	1. Basics of Water Resources	
	1.1 Water in Earth - Atmosphere System	Mays: Chapter 1, pages 1.8-1.19. (*EReserves*)
	1.2 Water structure and measurement	Mays: Chapter 1, Section 1.32 (*EReserves*); Thompson: Chapter 9, pages 274-276. Thompson: Chapter 1, pages 3-5.
9/8	1.3 Water in the Hydrologic Cycle	Thompson: Chapter 1, pages 5-22.
	1.4 Water Balance at varying scales	Thompson: Chapter 1, pages 22-24; Mays: Chapter 1, section 1.3.3. (*EReserves*)
	1.5 Climate Change	Thompson: Chapter 1, pages 24-29.
9/10	1.6 Water in Ecosystems	Grigg: Chapter 2: pages 55-59.
	1.7 Water infrastructure and systems	Grigg: Chapter 3.
9/15	1.8 Water resources management	Helweg: Chapter 1 and 2. (*EReserves*)
	CS: Planning and Managing Water Infrastructure	Grigg: Chapter 12
	2. Water Law	
9/17	2.1 State Laws governing surface waters	Thompson: Chapter 3, pages 72-92. (*EReserves*)
	2.2 Laws governing groundwater use	Thompson: Chapter 3, pages 92-95. (*EReserves*)
9/22	2.3 Federal Laws governing water quantity	Thompson: Chapter 3, pages 96-104. (*EReserves*)
	2.4 Federal Laws governing Water	Alley, Chapter 6 (*EReserves*)

	Quality	
9/24	2.5 Transboundary Water Issues	Thompson: Chapter 3, pages 105-112. (*EReserves*)
	CS: Water Administration: Allocation, control, transfers, and compacts	Grigg: Chapter 15
	3. Water Economics	
9/29	3.1 Water markets	Thompson: Chapter 5, pages 145-152;
	3.2 Water Demand and allocation	Mays: Chapter 3.
10/1	3.3 Water Pricing	Biswas: Chapter 13
	3.4 Cost-Benefit Analysis	Thompson: Chapter 5, pages 153-168;
	CS. Water management in western United States	Grigg: Chapter 24
	4. Water Resources Assessment	
10/6	4.1 Information Management	Helweg: Chapter 3.
	4.2 Water Quality Monitoring	Biswas: Chapter 6. (Chapman in *EReserves*)
10/8	4.3 Water Quality Prediction and Management	Biswas: Chapter 7. (Jokiel in *EReserves*)
	CS: Reservoir Operations and Management	Grigg: Chapter 13
10/14	4.4 Water Resources Modeling	Helweg: Chapter 6.
10/15	4.5 Project Planning: Evaluation of alternatives	Helweg: Chapter 7
	4.6 Systems Analysis and Decision Support Systems	Grigg: Chapter 5.
	CS: Flood control, Floodplain management, and storm water management	Grigg: Chapter 11
	5. Management and Planning Principles	
10/20	5.1 Planning and decision making process	Grigg: Chapter 4.
10/22	5.2 Financial Planning and Management	Grigg: Chapter 7.
10/27	5.3 Water Industry: Management and Structure	Grigg: Chapter 1 (*EReserves*) Grigg: Chapter 8.
	CS: Regionalization of water management	Grigg: Chapter 21
10/29	5.4 Water Conservation and Efficiency	Grigg: Chapter 17
11/3	5.5 Integrated Approaches: Watershed Management	Heathcote: Chapter 1. (*EReserves*)
	CS: River Basin Planning and conservation	Grigg: Chapter 19

	6. Water Quality	
11/5	6.1 Pollution types and processes	Thompson: Chapter 9, pages 276-291.
	6.2 Managing Point and Nonpoint Source Pollution	Thompson: Chapter 9, pages 292-297.
11/10	6.3 Water Quality in Surface Water Bodies	Mays: Chapter 9; Mays: Chapter 10 (Chapra in *EReserves*).
	CS: Watersheds and Riverine Systems	Grigg: Chapter 16
11/17	6.4 Groundwater Contamination	Mays: Chapter 11.
	6.5 Estuaries and Wetlands	Mays: Chapter 12 and 13.
11/19	6.6 Aquatic Weeds	Biswas: Chapter 11.
	CS: Water Quality Management and Nonpoint Source Control	Grigg: Chapter 14
	7. Water Quantity Management	
11/24	7.1 Urban Water Systems	Thompson: Chapter 7, pages 212-226.
	7.2 Irrigation Management	Thompson: Chapter 7, pages 227-242.
12/1	7.3 Managing Inland Fisheries	Biswas: Chapter 10.
	7.4 Energy and Water	Mays: Chapter 31; Thompson: Chapter 8, pages 246-270.
	CS: Water Management in Estuaries and Coastal Waters	Grigg: Chapter 22
12/3	7.5 Managing Water for Recreation	Thompson: Chapter 8, pages 260-269.
	7.6 Environmental values and instream flows	Thompson: Chapter 8, pages 270-272.
12/8	7.7 Planning water supply: dams and reservoirs	Thompson: Chapter 6, pages 177-199.
	7.8. Interbasin Transfers	Thompson: Chapter 6, pages 191-199.
	8. Natural Disasters	
12/10	Human ecological model of Hazards	Thompson: Chapter 10, page 308;
	Flood Management	Thompson: Chapter 10, pages 309-325.
	CS: Water supply and sanitation in developing countries	Grigg: Chapter 25
	Drought Management	Grigg: Chapter 20.
	Emerging Issues in Water Resources	Open Discussion

Course Plan:

Each topic will be taught by a variety of tools that include class short lecture, discussions, case studies, software, problem solving through project work, and digital media. There will be a course website that will have reading assignments, lecture highlights, threaded discussions, and quizzes.

Grading Policy:

The final grades will be calculated based on test scores (40%), class participation (15%), class presentation (20%), and a class project (20%). Innovation and creativity (new ideas on problem-solving or new approaches to solutions) demonstrated in the course will also be considered in grading (5%).

1. Quizzes: 40% There will be eight quizzes (evaluated as 8*5) in the course. Quiz format: True or False (10*1=10 points), short answers (5*4=20 points), and essay type (2*10=20 points).

2. Class Project: 20% (Students will identify an issue of interest. Evaluation will be based on a technical report and scientific methods used. The technical report should follow guidelines of a standard water journal)

3. Class Presentation 20% (Presenting a case study and leading a discussion on it. Case studies can be slected from listing from Grigg in the syllabus. Case study assignments need to be confirmed before 9/16.

4. Class Participation: 15% (Student will be evaluated based on the preparation for the class, leadership exhibited, enthusiasm to the subject, extent of motivation, new ideas discussed, contribution of new information to the class, frequency and quality of interaction). Both in-class and online participation will be considered.

5. Innovation and Creativity: 5% (New ideas and solutions to watershed problems expressed by the student. Students are encouraged to discuss and develop these ideas with the professor)

References:

Alley, E.R. 2000. Water Quality Control Handbook. McGraw-Hill, New York.

Grigg, Neil S. 1996. Water Resources Management: Principles, Regulation, and Cases. McGraw-Hill, New York.

Thompson, Stephen N. 1999. Water Use, Management, and Planning in the United States. Academic Press, San Diego.

Biswas, Asit K. 1997. Water Resources: Environmental Planning, Management, and Development. McGraw-Hill, New York.

Helweg, Otto J. 1992. Water Resources Planning and Management. Krieger Publishing Company, Malabar, Florida.

Mays, Larry W. 1996. Water Resources Handbook. McGraw-Hill, New York.

Heathcote, Isobel W. 1998. Integrated Watershed Management: Principles and Practices. John Wiley & Sons, Inc. New York.