CVEN 664
"WATER RESOURCES ENGINEERING PLANNING AND MANAGEMENT"
FALL SEMESTER 2016

TEXAS A&M UNIVERSITY, ZACHRY DEPARTMENT OF CIVIL ENGINEERING

Instructor:
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Office Hours: To be decided by class poll at http://doodle.com/poll/vbu927an6yrsugr5

Lectures: Mon/Wed/Fri 10:20 – 11:10 AM; Room 219, Civil Engineering Bldg.

Texts and Materials: There are multiple required "texts" for the course. (1) The following book is available in the campus bookstore and may also be purchased at off-campus and online retailers:

Thompson, Stephen A. *Water Use, Management, and Planning in the United States.* Academic Press, San Diego, California, 1999. ISBN: 0-12-689340-3

(2) Some required readings are available online from the TAMU libraries electronic journals collection, which may be accessed from http://library.tamu.edu. (3) Some readings will be posted on the class websites. These selections are specified below in the syllabus and/or may be specified by announcements in class.

Course Description: *From the TAMU Graduate Catalog:* "Managing water resources; the planning process, systems analysis methods; institutional framework for water resources engineering; comprehensive integration of engineering, economic, environmental, legal, and political considerations in water resources development and management. Prerequisite: Graduate classification in engineering or approval of instructor."

This course is an introduction to the qualitative aspects of water resources planning and management. It is intended as a companion course to CVEN 665 "Water Resources Systems Engineering," which is quantitative in nature. As a first-year graduate level course, it is expected that students arrive with some background in hydrology, fluid mechanics, and fundamental engineering concepts. However, we will start from the most basic concepts of what a water resources system is and proceed from there. As a qualitative course, there will be a significant amount of reading, writing, and class discussion required from all students. This work is in lieu of the mathematical work to which many of you may be more accustomed. My expectation is that you will pursue these activities with vigor and an open mind. As we will discuss, one of the objectives of the course is to explore the many non-technical aspects of water resources and to help students to feel comfortable with these issues. It is very often the non-technical issues in which water resources practitioners spend much of their time and energy. Of particular importance will be developing an ability to use "systems theory" to understand conflict in water resources systems and suggest appropriate measures to manage and/or resolve conflict.

Learning Outcomes: After completing this course students should…

(1) Be able to articulate systems concepts in general and as applied to water resources;
(2) Understand the nature of the following water resources systems objectives, be able to describe the practical analytical techniques applicable to each objective, and be able to identify relationships among objectives when applied to an unfamiliar water resources system:
    a. M&I water supply,
    b. Irrigation,
    c. Hydropower,
    d. Waste assimilation,

e. Recreation,
f. Navigation, and
g. Ecological needs;

(3) Be able to describe the rational planning model and determine objective tradeoff relationships given example data;
(4) Be able to articulate the various legal doctrines governing water resources systems and describe the institutions responsible for policy and regulation of these systems at state, national, and international levels;
(5) Understand the importance of climate variability and climate change for water resources systems, be able to diagnose these effects for a specific system, and be able to suggest preliminary planning and management accommodations to these effects;
(6) Know basic ideas about the process of modeling water resources systems, understand basic simulation and optimization techniques, and know the names and basic capabilities of several common models used in water resources practice;
(7) Be able to name basic components of emergency and security planning and response for water resources systems;
(8) Have completed a review project discussing an emergent issue in water resources planning and management;
(9) Know several journals important in the water resources field and how to readily access them; and
(10) Have reviewed multiple case studies of important water resources systems and be able to describe the important issues, stakeholders, and planning and management processes for those systems.

Grading: There will be one written midterm exam. This exam will be performed individually (i.e., each student will work alone), and may use one or several formats (e.g., in-class, take-home, open-book, closed-book, etc.). The tentative date is given in the course schedule below.

A second midterm exam will be conducted as an oral exam. Each student will meet individually with the instructor for 15 minutes to discuss what she/he has learned in the class and how this learning will be useful in her/his career.

Each student will individually prepare a written critique of an existing water resources plan. The critique will be evaluated anonymously by another student, and the original writer will then revise and respond to the evaluation. The grade for this assignment for each student will be determined based upon all work done (i.e., original critique, review, and response).

Students will be required to give an in-class oral presentation on a case study of a specific water resources system. This presentation will be prepared as a group project, and the grade for the assignment will be determined as a composite of the instructor's and fellow students' evaluations. These presentations will be scheduled in Week 9 of the semester.

The final component of the semester grade will be a presentation on an emergent water resources issue. This will also be a group effort, and the grade again will be determined as a composite of the instructor's and fellow students' evaluations. This presentation will be delivered during the final exam period for the class.

Calculation of the semester grade will be determined as:

Written Midterm Exam	20%
Oral Midterm Exam	20%
Water Resources Plan Critique/Response	20%
Case Study Oral Presentation	20%
Emergent Issue Oral Presentation	20%

Letter grades will be assigned using a traditional 10 point scale (e.g., 90-100 = A, 80-89=B, etc.), at minimum. At the instructor's discretion, numerical ranges for letter grades may be lowered (i.e., in students' favor).

Class website: http://ceprofs.tamu.edu/kbrumbelow/CVEN664/CVEN664_WRPM_Brumbelow.htm
and eCampus. Please check regularly for announcements.

Semester Schedule: Below is the tentative schedule for the course this semester. Modifications to this schedule may be announced in class at any time. Please note the reading assignments and complete them *before* the relevant lecture. Readings marked *{wh}* are posted on the course website "Handouts" page; readings marked *{ej}* are available online in the TAMU Libaries electronic journals collection.

Week	Dates	Topic and Reading Assignments
1	Aug 29	Introduction *Thompson, Chap. 2*
	Aug 31	Initial review of WR case studies: student groups *Case study readings {wh}*
	Sep 2	Review of hydrology; Systems concepts and WR *Thompson, Chap. 1*
2	Sep 5	Systems concepts and WR (cont.)
	Sep 7	Systems concepts and WR (cont.)
	Sep 9	Water supply *Thompson, Chap. 4, pp. 173-200, 211-226*
3	Sep 12	Water Supply (cont.)
	Sep 14 to Sep 16	Irrigation *Thompson, pp. 227-244, and skim the following document:* *Allen, R.G., et al. Crop evapotranspiration - Guidelines for computing crop water requirements. FAO Irrigation and Drainage Paper 56. http://www.fao.org/docrep/X0490E/X0490E00.htm.*
4	Sep 19	Flood Control/Floodplain Management **{Likely assignment of Case Study Project}** *Thompson, pp. 307-326*
	Sep 21	Flood Control/Floodplain Management (cont.)
	Sep 23	Hydropower *Thompson, pp. 245-260* *Georgakakos, A.P., et al. 1997. Control model for hydroelectric energy-value optimization. J. Water Resour. Plng. and Mgmt., 123(1), 30-38. {ej}*
5	Sep 26	Waste assimilation/Water quality *Thompson, Chap. 9*
	Sep 28	Waste assimilation/Water quality (cont.)
	Sep 30	Ecological needs *Thompson, pp. 270-272*
6	Oct 3	Ecological needs (cont.)
	Oct 5	Recreation and Navigation *Thompson, pp. 260-270* *Sanders, L.D., et al. 1991. Comparable estimates of the recreational value of rivers. Water Resour. Res., 27(7), 1387-1394. {ej}* *Ward, F.A., et al. 1996. The economic value of water in recreation: Evidence from the California drought. Water Resour. Res., 32(4), 1075-1082. {ej}*
	Oct 7	Planning process and multi-objective analysis *Thompson, pp. 200-209*
7	Oct 10	Planning process and multi-objective analysis (cont.)
	Oct 12	Planning process and multi-objective analysis (cont.)
	Oct 14	**Written Midterm Exam (tentative date, subject to change)**
8	Oct 17	WR Law **{Likely assignment of Plan Critique Project}** *Thompson, Chap. 3*
	Oct 19	WR Law (cont.)
	Oct 21	U.S. Federal government institutions *Review Thompson, Chap. 2*
9	**Oct 24**	**Class presentations: Case studies**
	Oct 26	**Class presentations: Case studies**
	Oct 28	**Class presentations: Case studies**
10	Oct 31	U.S. Federal government institutions (cont.) **{Likely assignment of Emergent Issue Project}**

	Nov 2	U.S. State government institutions *Amer. Soc. Civil Eng. 2006. State Water Resources Planning in the United States. {wh}*
	Nov 4	U.S. State government institutions (cont.)
11	Nov 7	International institutions, agreements, and practices
	Nov 9	Variability and Change in WR systems
	to	*Thompson, pp. 326-339*
	Nov 11	*Excerpts from: Palmer, W.C. 1965. Meteorological drought. Research paper no. 45{wh}* *Brumbelow, K., and A. Georgakakos. 2007. Consideration of climate variability and change in agricultural water resources planning. J. Water Resour. Plng. and Mgmt., 133(3), 264-285. {ej}*
12	Nov 14	Variability and Change in WR systems (cont.)
	Nov 16	Security of WR Systems and Planning for Emergencies
	to	*Bristow, E., and K. Brumbelow. 2006. Delay between sensing and response in water contamination events. J. Infrastruct. Sys., 12(2), 87-95. {ej}*
	Nov 18	*Bristow, E., K. Brumbelow, and L. Kanta. 2007. Vulnerability assessment and mitigation methods for interdependent water distribution and urban fire response systems… {wh}*
*** Oral midterm exam will be by appointment with Dr. Brumbelow during period Nov 21 to Dec 7**		
12.33*	Nov 21	Security of WR Systems and Planning for Emergencies (cont.)
	Nov 23	*Reading Day – No class*
	Nov 25	*Thanksgiving Holiday – No class*
13.33*	Nov 28	Sustainable Development and WR *Howard, C.D.D. 2002. Sustainable development – Risk and Uncertainty. J. Water Resour. Plng. and Mgmt., 128(5), 309-311. {ej}* *McCuen, R.H. 2003. Smart growth: Hydrologic Perspective. J. Prof. Issues Eng. Educ. Pract., 129(3), 151-154. {ej}* *Daly, H.E. 1992. From empty-world economics to full-world … {wh}*
	Nov 30	Sustainable Development and WR (cont.)
	Dec 2	Sustainable Development and WR (cont.)
14*	Dec 5	Revisitation of Initial Case Studies
	Dec 7	Revisitation of Initial Case Studies (cont.)
Tues, Dec 13		**Class presentations: Emergent issue projects (8:00 – 10:00 AM)**

ADA Statement: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit http://disability.tamu.edu.

Academic Integrity Statement: "An Aggie does not lie, cheat, or steal or tolerate those who do." Students are expected to understand and abide by the Aggie Honor Code presented on the web at: http://aggiehonor.tamu.edu/. No form of scholastic misconduct will be tolerated. Academic misconduct includes cheating, fabrication, falsification, multiple submissions, plagiarism, complicity, etc. These are more fully defined in the above web site. Violations will be handled in accordance with the Aggie Honor System Process described on the web site. Cheating on quizzes and exams will not be tolerated. Cheating will be reported and handled in accordance with the Aggie Honor System Process. Some or all examinations will be closed book; "looking at another student's examination or using external aids (for example, books, notes, calculators, conversation with others, or electronic devices)" during these examinations is a violation of Texas A&M Aggie Honor Code, Cheating, unless specifically allowed in advance by the instructor.
Unless specifically allowed in advance by the instructor, all assignments and homework in this class are expected to be completed based on individual effort. Copying the work of others, including homework, is a violation of Texas A&M Aggie Honor Code, Cheating.