

GEO 345: Water Resources

Course Information and Syllabus, Spring 2009

Schedule: T-R, 9:30-10:50pm
Location: 170 Fillmore
Email: seanb@buffalo.edu

Instructor: Dr. Sean J. Bennett
Office: 126 Wilkeson Quad
Office Hours: W, 2:00-4:00pm; R, 11:00am-12:00pm

Course Description: Water and water resources are critical issues for the sustenance of nearly every society. This course examines the occurrence, use, management, and conservation of water and water resources in the U.S. and around the world. It further discusses the environmental, economic, and social implications of floods, droughts, dams, and water usage as well as current issues in water quality, water pollution, and water resource regulation. Students will gain an understanding of the environmental, societal, and political impacts of water, water resources, and changes in water supply and availability, and they will be introduced to current and emerging trends in water resource issues, development, and technology.

Course Syllabus, Suggested Readings, and Assessment Schedule

Date	No.	Topic	Readings		
			Jones	Thompson	Hornberger et al.
<i>Part 1: Hydrologic Basis of Water Resources</i>					
1/13	1	General Concepts in Hydrology	1	1	1
1/15	2	Global Hydrologic Cycle	2	1	1
1/20	3	Precipitation	2, 5	1	2
1/22	4	Evapotranspiration	3, 5	1	2
1/27	5	Infiltration and Runoff I	3	1	8
1/29	6	Infiltration and Runoff II	3, 6	1	9
2/3	7	Streamflow and Watersheds I	6	1	3, 4, 5
2/5	8	Streamflow and Watersheds II	6	1	3, 4, 5
2/10		EXAM 1: Topics 1-8			
2/12	9	Groundwater	3	1	6, 7
<i>Part 2: Water Resource Usage and Issues</i>					
2/17	10	Water Supply and Demand in the U.S.	2	2, 4	
2/19	11	Water Supply and Demand: LA & NYC	2	2, 4	
2/24	12	Irrigation and Agriculture	7	7	
2/26	13	Water Allocation Law in the U.S.		3	
<i>Part 3: Water and Society</i>					
3/3	14	Flood Hazards and Hydrology	4	10	5
3/5	15	1993 Flood of the Mississippi River	4	10	
3/10		NO CLASS			
3/12		NO CLASS			
3/17	16	Flood Hazard Planning and Protection	4, 10	10	
3/19	17	Dams and Reservoirs I	7, 9	6, 8	
3/24		EXAM 2: Topics 9-17			
3/26	18	Dams and Reservoirs II	7, 9	6, 8	
3/31	19	Drought	4, 10	10	
<i>Part 4: Water Quality and Resource Management</i>					
4/2	20	Geochemistry of Fresh Water	8	9	
4/7	21	Water Quality and Pollutants I	8	9	
4/9	22	Water Quality and Pollutants II	8	9	
4/14	23	Water Quality and Ecology	8	9	
4/16	24	Water Resources and Economic Development	11	5	
4/21	25	Water Resources and Politics	11		
4/23		EXAM 3: Topics 18-25			

Required Text: J.A.A. Jones, *Global Hydrology: Processes, Resources, and Environmental Management*, Prentice Hall, New York, 399 pp., 1998 (ISBN: 9780582098619).

Recommended Texts:

S.A. Thompson, *Water Use, Management, and Planning in the United States*, Academic Press, San Diego, 371 pp., 1999 (ISBN: 9780126893403).

G.M. Hornberger, J.P. Raffensperger, P.L. Wiberg, and K.N. Eshleman, *Elements of Physical Hydrology*, The Johns Hopkins University Press, Baltimore, 312 pp., 1998 (ISBN: 9780801858574).

Additional Literature: Supplemental lecture material shall be derived from the following books.

T.V. Cech, *Principles of Water Resources: History, Development, Management, and Policy*, 2nd edition, John Wiley & Sons, Hoboken, 468 pp., 2005.

S.L. Dingman, *Physical Hydrology*, 2nd edition, Prentice-Hall, Inc., New Jersey, 646 pp., 2002.

T. Dunne and L.B. Leopold, *Water in Environmental Planning*, W.H. Freeman and Company, New York, 818 pp., 1978.

P.H. Gleick, editor, *Water in Crisis: A Guide to the World's Fresh Water Resources*, Oxford University Press, New York, pp. 1-113, 1993.

Resources: All required and recommended textbooks will be made available at the Undergraduate Library Reference Desk for two-hour in-house use. All graphics shown in class, as well as exam questions and announcements, will be posted on *UBlearns* in PDF format prior to lectures.

Assessment: Students will be required to complete three (3) essay exams (each exam is worth 32% of the final grade; for total 96%) and to attend and participate in class discussions (worth 4% of final grade), although attendance will not be taken. For each lecture, two (2) essay questions will be distributed to the class via *UBlearns* every week. For each exam, sixteen (16) essay questions will have been distributed. From these sixteen (16) questions, eight (8) will appear on the exam, and each student shall be required to answer four (4) of the eight (8) questions.

Make-up Exams: Any student missing an exam will be required to take a make-up exam. If a student can provide written documentation of severe illness or other extenuating circumstance from a medical doctor or similar professional, s/he shall write a make-up exam comprised of essay questions as described above ("Excused Make-up"; eight (8) of the sixteen (16) questions will appear on the exam, and each student shall be required to answer four (4) questions of these eight (8)). All others shall write an exam comprised of four (4) essay questions chosen by the Instructor rather than chosen by the student ("Unexcused Make-up"). The Instructor reserves the right to refuse any and all documentation of illness or circumstance.

All make-up exams shall be administered during Final Exams Week (Thursday, April 30 through Thursday, May 7, 2009), on a date to be determined by UB. No exceptions to this date will be given. Failure to take a make-up exam on the prescribed date will result in a "0" grade for the exam. All responsibility for make-up exams resides with the student.

Grades: Below is a table that lists University letter grades (last column) and the equivalent percentages I will use for grading. All numerical grades will be rounded up or down to the nearest integer. The Instructor reserves the right to adjust the scores of any exam or the cumulative average in the students' favor if necessary, i.e. I reserve the right to add a few percentage points to every student's grade. No work for extra credit shall be given. An "Incomplete" grade will not be given to students who have missed exams.

Grading Matrix:

Three (3) exams, each worth 32% of grade (total of 96%)

Attendance and participation, worth 4%

Numerical value		Equivalent University letter grade
greater than or equal to (%)	and less than (%)	
85	100	A
80	85	A-
77	80	B+
73	77	B
70	73	B-
67	70	C+
63	67	C
60	63	C-
55	60	D+
50	55	D
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