

CCOL-AD 30: Water Science and Management

Spring 2017 – (MEETINGS TBA); 4 Credits

No prerequisites

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Description

From space, there is no view of Earth without blue – water is everywhere. From the ground however, there are many places – and many times – where there isn't enough to go around. Water is critical to our bodies, to the growth of our food, and to flushing away the wastes of human, economic, and industrial development. However, as the number of human feet on the planet increases and their economic footprints grow, the sliver of Earth's water that is available to us is spread thinner, and the distinction between water as a human need and right, and water as a scarce and precious resource, is blurred. To understand how to manage water in a way that respects both its scarcity (managing for efficiency) and the needs of those who use it (managing for equity), it is important to understand the myriad modes and scales through which water shapes the world we live in.

This course confronts the present and future challenge of sharing water resources that are abundant for some and scarce for others. We will start with the science of water, what it provides for us and how it constrains us. We will examine perceptions of scarcity through film and field trips. We will consider the way we use water and the tools we have for sharing it and valuing it. Finally, we'll draw on games and role play to draw out the challenges of managing water conflict and achieving equitable, efficient use of water resources.

Textbook:

Water Resources (2010). Shimon C. Anisfeld

Additional readings, including scientific articles and book chapters, are made available on NYU Classes or are available for free download through the NYU Library

Instructor: Andrew Bell is Assistant Professor of Environmental Studies, with research focusing on coupled natural-human systems.

Office Hours: M,T,W, 4-6pm. Sign up for a slot in advance at goo.gl/3ezETN

Disability Disclosure Statement: Academic accommodations are available to any student with a chronic, psychological, visual, mobility, learning disability, or who is deaf or hard of hearing. Students should please register with the Moses Center for Students with Disabilities (CSD), per the procedure at <https://students.nyuad.nyu.edu/campus-life/community-standards/policies/reasonable-accommodations-for-a-disability/>

Grading and Student Expectations

Item	% of grade**
Weekly assignments	30
In-class midterm	20
Short papers	30
Final paper panel presentation	5
Final paper submission	10
Field trip participation	10

Assignments and exams will be given a numeric score from 0-100. Late submissions will be penalized 5 points per whole/partial day late.

*****The astute counter will note a sum of 105% across assignments. Careful attention to complete all class work and activity can bring a bump of up to 5% ... enough to turn a C- to a C, a B to a B+, or an A- to an A.***

It is NYU policy that all work is expected to be your own. Plagiarism of any kind will result in a failing grade for the class, and referral to an academic dean. Plagiarism includes: copying sentences or fragments from any source without quotes or references; not citing every source used in your papers; citing internet information without proper citation; presenting someone else's work as your own; or copying verbatim from any source. You are subject to NYU-AD guidelines for Academic Integrity:

<https://students.nyuad.nyu.edu/campus-life/community-standards/policies/academic-integrity/>

Weekly assignments

These will take the form of short answer questions; summaries of readings, films, and field trips; and numerical problems as appropriate. Assignments will be posted after the 2nd meeting of the week, online in NYUClasses, and will be due by the end of the Thursday after (i.e., you will have approximately 9 days for each assignment, with office hours right in the middle of that period). Submission is via the NYUClasses page.

Weekly assignment responses should not used verbatim in formal short papers, but where appropriate, students should consider adapting their assignment responses to support and flesh out arguments in their short papers.

Attendance and active participation in class will be necessary to successfully complete the assignments. There will be a total of 7 assignments over the semester. Your grade will reflect the average of your highest 6 assignment scores.

In-class Midterm

In the 2nd meeting of the week of March 11th, there will be an in-class midterm, inclusive of material covered up to the end of the previous week.

Field trips

There will be a total of 4 field trip opportunities planned for the semester (all currently TBA), which will likely include visiting i) a restored mangrove site; ii) the al-Ain Oasis; iii) a desalination plant, and iv) a wastewater treatment plant. Each field trip will include a short written quiz or summary, submitted through NYU Classes. Students must sign up for and participate in TWO field trips to receive the full 10% credit.

Film Screenings

We will complement our studies during scheduled meetings with films that capture particular views of scarcity across recent decades. These four films will be screened once in an evening session (to be scheduled during the first week of classes) but students are welcome to view them on their own, in their own time. These films are Chinatown (1974), Dune (1985), Waterworld (1995), and Even the Rain (2011).

Short Papers and Final Paper

There are three short papers (4 pages in length, plus references) spaced across the semester, with thematic foci as defined below. Students may identify particular issues or cases within the themes outline below, and should expect to support their papers with some additional sources, but the goal of the writing is to take a position on one of the issues and develop a clear and critical argument (as opposed to in-depth research).

Students will receive written feedback on each short paper within one week of submission. Students will select one of their three short papers to develop into a longer, final paper (6-8 pages), which they will present in thematic panel sessions during the last week of the seminar, and submit at the end of classes.

Stage	Due Date	Description
Short paper 1	Week of Feb 19	4 pages plus references, articulating a clear position and argument on the topic: <i>Water as a limiting factor in development</i>
Short paper 2	Week of Mar 25	4 pages plus references, articulating a clear position and argument on the topic: <i>Hard and soft tools for solving water problems</i>
Short paper 3	Week of April 15	4 pages plus references, articulating a clear position and argument on the topic: <i>Harmonizing competing uses in space and time</i>
Final Paper Presentation	Week of May 6	~10 minutes including time for questions. Presentation should clearly introduce the topic and position, present key elements of support and analysis, and discuss limiting assumptions in your argument.
Final Paper	Week of May 6	6-8 pages plus references, developing the argument from one of the 3 short papers based on feedback from the instructor

Approximate Meeting Schedule

Week	Meeting 1	Meeting 2	Readings	Assignments Due	Notes
22-Jan		Water Science 1 - Water in physical and biological processes			
29-Jan	Water Science 2 - The hydrologic cycle	Water metrics - Quantity, quality, distribution, and scale	Anisfeld Chapter 2, 3		
5-Feb	Water metrics - Flood and Drought	Water History 1 - Shaping food, trade, and civilization	Anisfeld Chapter 4, 5 Solomon Chapter 3, 4	Assignment 1	Field Trip 1, Date and Place TBA
12-Feb	Water History 2 - Shaping cities and disease	Sector by sector 1 - Agriculture and irrigation	Anisfeld Chapter 10 Sedlak Chapters 3, 4	Assignment 2	Film 1, Screening time TBA
19-Feb	Sector by sector 2 - Domestic water use and drinking water	Sector by sector 3 - Industry and energy	Anisfeld Chapter 9, 11 Richter Chapter 3	Short Paper 1	
26-Feb	Governance 1 - Hard and soft tools for water management	Governance 2 - Water rights and allocation	Anisfeld Chapter 7 Anisfeld Chapter 12 Rogers et al. (2002) Anderies et al. (2013)	Assignment 3	Field Trip 2, Date and Place TBA
4-Mar	Spotlight - Irrigation and public goods games	Governance 3 - Water markets and trade		Assignment 4	Film 2, Screening time TBA
11-Mar	Panel discussion - Public-private partnerships (PPP) in water	In-class midterm	Nickson and Vargas (2002)		
18-Mar					
25-Mar	Climate variability and change 1	Climate variability and change 2	Anisfeld Chapter 6 Thorsteinsson et al. (2013) Allan et al. (2013) Palenzuela Chapter 1 Tortajada et al. Chapters 1, 2	Short Paper 2	Field Trip 3, Date and Place TBA
1-Apr	Spotlight - Desalination	Spotlight - Dams Governance 4 - Integrated water resource management and Participatory Irrigation Management		Assignment 5	Film 3, Screening time TBA
8-Apr	The water-energy-food nexus		Ringler et al. (2013) Pahl-Wostl et al. (2005) Anisfeld Chapter 13 Steenbergen (2006) Meinzen-Dick et al. (2014)	Assignment 6	
15-Apr	Governance 5 - Transboundary water management	Governance 6 - Groundwater management and games		Short paper 3	Field Trip 4, Date and Place TBA
22-Apr	Role play - watershed management 1	Role play - watershed management 2	Kemper et al. (2005)		Film 4, Screening time TBA
29-Apr	Role play - Basin Challenge	Role play debrief - conflict and cooperation in practice	Lawford et al. (2013)	Assignment 7	
6-May	Final paper panel sessions 1	Final paper panel sessions 2		Final Paper Submission	

Listed Readings

- Allan, C., J. Xia, and C. Pahl-Wostl. 2013. Climate change and water security: Challenges for adaptive water management. *Current Opinion in Environmental Sustainability* 5(6):625–632.
- Anderies, J. M., M. A. Janssen, A. Lee, and H. Wasserman. 2013. Environmental variability and collective action: Experimental insights from an irrigation game. *Ecological Economics* 93:166–176.
- Anisfeld, S. C. 2010. *Water Resources*. Island Press, Washington, DC.
- Kemper, K., A. Dinar, and W. Blomquist, editors. 2005. *Institutional and Policy Analysis of River Basin Management Decentralization*. World Bank, Washington, DC.
- Lawford, R., J. Bogardi, S. Marx, S. Jain, C. P. Wostl, K. Kn??ppe, C. Ringler, F. Lansigan, and F. Meza. 2013. Basin perspectives on the Water-Energy-Food Security Nexus. *Current Opinion in Environmental Sustainability* 5(6):607–616.
- Meinzen-dick, R., R. Chaturvedi, L. Domenech, R. Ghate, M. a Janssen, N. Rollins, and S. K. 2014. Games for Groundwater Governance : Field Experiments in Andhra:55.
- Nickson, A., and C. Vargas. 2002. The Limitations of Water Regulation : The Failure of the Cochabamba Concession in Bolivia 21(1).
- Pahl-wostl, C., and J. Sendzimir. 2005. The relationship between IWRM and Adaptive Water. *Water Management* 68(3):32–44.
- Palenzuela, P., D.-C. Alarcón-Padilla, and G. Zaragoza. 2015. *Concentrating Solar Power and Desalination Plants*.
- Richter, B. 2014. *Chasing Water: A Guid for Moving from Scarcity to Sustainability*. Island Press, Washington, DC.
- Ringler, C., A. Bhaduri, and R. Lawford. 2013. The nexus across water, energy, land and food (WELF): potential for improved resource use efficiency? *Current Opinion in Environmental Sustainability* 5(6):617–624.
- Rogers, P., R. De Silva, and R. Bhatia. 2002. Water is an economic good : How to use prices to promote equity , efficiency , and sustainability 4:1–17.
- Sedlak, D. 2014. *Water 4.0*. Yale University Press, New Haven, CT.
- Solomon, S. 2010. *Water: The epic struggle for wealth, power, and civilization*. Harper Collins, New York.
- van Steenberg, F. 2006. Promoting local management in groundwater. *Hydrogeology Journal* 14(3):380–391.
- Thorsteinsson, T., T. J??hannesson, and ??rni Snorrason. 2013. Glaciers and ice caps: Vulnerable water resources in a warming climate. *Current Opinion in Environmental Sustainability* 5(6):590–598.
- Tortajada, C., D. Altinbilek, and A. K. Biswas. 2012. *Impacts of Large Dams: A Global Assessment*.

