



Water: Science, Ethics and Policy

ENSP340
Fall 2019

T/Th 3:30-4:45pm
Room SYM 0215

Syllabus

Instructor

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Office Hours

Tues, Wed and Thurs. by appointment.

Overview of the Course

This course will apply an interdisciplinary approach to the challenge of freshwater availability and sustainability, a topic of broad environmental and social significance as the world faces issues of sustainability in the 21st century.

It is becoming abundantly clear that the world is facing a crisis regarding the supply of freshwater available to meet the needs of humans and ecosystems. Conflicts over water have become more intense in the past several decades, with competing users vying for an adequate supply of water. Water is also critically linked to issues of energy consumption, climate change, and the degradation of freshwater ecosystems. This course will introduce students to this complex topic through the lenses of law and policy, ethics, and science while fostering collaboration, cooperation, and problem-solving within the classroom.

This course will be grounded in concepts of sustainability and resilience and will use the UN Sustainable Development Goals as a frame for learning and discussion. Students will begin the course with a study of hydrology and water use and availability to place the water issues in the course in context. Students will then consider how the legal system defines and allocates water rights both nationally and internationally. We will also consider the water "ownership" issue from an ethical perspective and explore other ethical and economic issues that arise in water management. We will then cover the many facets of water quality from source water protection to public health crises. While we will cover water allocation and water quality separately, we will witness and discuss the integration of quantity and quality throughout the semester. We will conclude with an exploration of current issues and conflicts in water management.

Several in-class and out-of-class assignments will be assigned throughout the course, with the objective of providing students applied experience in resolving multi-disciplinary water resources related problems.

Goals/Learning Outcomes of the Course:

By the end of this course, students will be able to:

- Conduct interdisciplinary research on a real world environmental problem
- Analyze a real world environmental problem through the lenses of science, ethics, and law and understand that these disciplines are inextricably linked in the analysis of environmental problems
- Collaborate with classmates to resolve water resource issues and conflicts presented in class as case studies
- Communicate evidence-based positions on water issues both orally and in writing
- Understand the current scarcity of freshwater resources and the depth of this problem as it relates to ensuring sustainable water supplies for the future.
- Understand the concepts of sustainability and resilience, the UN Sustainable Development Goals and the intersections of these issues with water scarcity.
- Contemplate and develop answers to the following questions:
 - What is water (i.e., a commodity, a human right)?
 - Who or what has the right to water (i.e., all people, all species, ecosystems)?
 - Who should have a say in water management decisions?
 - How should competing uses of water be balanced?
 - What are the most sustainable solutions to the growing demand for water?
 - How can remaining water pollution problems be solved?
 - How do water issues connect with other global sustainability and resilience issues?

Required Course Materials:

Christian-Smith, Juliet and Peter H. Gleick, *A Twenty-First Century U.S. Water Policy*, New York: Oxford University Press, 2012 (ISBN 978-0-19-985944-3).

All other materials will be available through ELMS, <http://elms.umd.edu> or on Web links provided on the list of reading assignments below. To access book excerpts, go to the Course Reserves tab in ELMS. Articles can be found at the Files tab. These materials will be designated with "ELMS" in the list of assignments below. Web links should be self-explanatory.

Suggested Resources:

Circle of Blue, www.circleofblue.org (free subscription service available)

Class preparation:

The course is organized in a seminar format. Generally, lectures will be supplemented by discussion and debate about the readings and issues presented. Because readings will be a topic of discussion during class, students should come prepared to discuss the assigned readings. In addition, students will occasionally be assigned Problem/Role Play Exercises in advance of class. Student groups will discuss the Exercises and will be responsible for reporting their findings and conclusions to the rest of the class. The assigned readings will help students to be prepared for these exercises.

E-mail List/ELMS: An e-mail list will be set up for this class through ELMS. E-mail addresses are pulled from the University Directory listing. Please be sure that your preferred and current e-mail address is listed in the Directory. You can check and update this information by going to Testudo (www.testudo.umd.edu/apps/saddr/). I will be posting course documents and information on the ELMS system, so it is important that you use this system and that you are checking your e-mail for any announcements or assignments. **This is also how I will communicate with the class regarding any class cancellations, changes in meeting times, or room changes.**

Grading including Major Scheduled Grading Events:

You will have the opportunity to earn up to 1000 points based on the following:

<u>Type of work</u>	<u>Points/unit</u>	<u>Due Date</u>
Class participation	50	
Papers and Homework		
• Water Source Paper	150	Tu Sept 17
• News article Summary and Presentation	50	Varies
• Analysis of Water Solution/Conflict- Paper/Debate	200 (150+50)	Tu Nov 19
• Debate Analysis and Reflection	50	Th Dec 5
Mid-term exam	250	Tu Oct 1
Final Exam	250	Tu Dec 18
TOTAL	<u>1000</u>	

Your total grade will be out of 1,000 points. Grades will be awarded by converting the points earned into a percentage. 100-98% = A+, 97-92 = A, 91-90 = A-; 89-88 = B+, 87-82 = B, 81-80 = B-; 79-78 = C+, 77-72 = C, 71-70 = C-; 69-68 = D+, 67-62 = D, 61-60 = D-; ≤ 59 = F. You are advised to keep all graded work throughout the semester in case you have a question about your final course grade. Also, keep a personal record of your accumulated points as the semester progresses.

Papers and Homework

All written assignments except the news article assignment will be turned in through the ELMS system. Additional details about all of these assignments will be posted on ELMS.

Water Source Paper: This assignment will ask you to identify and analyze the source of the water in your hometown. You will then be asked to analyze the source of water for another city and to compare the two sources in terms of water quality, quantity, service, and pricing.

News Article Summary and Presentation: For this assignment, you will find and present a news article to the class that is related to course content. For each class meeting time (other than exam dates and guest lectures), I have assigned one or two students to present news articles to the class. You will be required to find a recent article that relates to the topic of lecture that day, summarize the article in a brief oral presentation to the class, make connections to course content, and pose two questions to the class to stimulate discussion. You may use PowerPoint for this assignment if you wish. More details about this assignment will be provided.

Analysis of Water Solution/Conflict – Paper & Debate: For this assignment, you will be assigned to a particular water conflict or proposed water solution that has been a source of recent controversy. There will be approximately 4 students assigned to each topic. You will write a short individual paper that provides background information on the solution/conflict and an evaluation from the lenses of science, ethics, and policy. Each group of 4 students will then be divided into 2 teams of 2 for purposes of conducting a debate on the topic. 2 students will take the position of each side of the debate.

Debate Analysis and Reflection: For this assignment, you will listen to the debates and will make an informed written opinion about your views on the outcome of the debates. This written assignment will also give you the opportunity to reflect on course content.

Campus Policies

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations
- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please visit www.ugst.umd.edu/courserelatedpolicies.html for the Office of Undergraduate Studies' full list of campus-wide policies and follow up with me if you have questions.

Course-Specific Policies

Laptops are permitted in class for note-taking purposes only. I expect you to make the responsible and respectful decision to refrain from using your cellphone in class. If you have critical communication to attend to, please excuse yourself and return when you are ready. For more information about the science behind the policy watch: <http://youtu.be/WwPaw3Fx5Hk>

For this course, some of your assignments will be collected via Turnitin on our course ELMS page. I have chosen to use this tool because it can help you improve your scholarly writing and help me verify the integrity of student work. For information about Turnitin, how it works, and the feedback reports you may have access to, visit [Turnitin Originality Checker for Students](#).

Late Policy

All papers and assignments are due on the designated date. Unless you see me in advance of the due date and obtain an approved extension, 5 percent of the total possible points will be deducted from your score for every day the paper or assignment is late, including weekend days. (So, for example, on a 100-point scale, a student who would have earned a 94 on a timely paper will earn 89 if the same paper is turned in one date late, 84 if turned in 2 days late, etc.). Late discussion questions will receive 0 points.

Attendance and Absences

In accordance with University policy, students are expected to attend classes regularly and on-time. Please email me ahead of time if you will need to miss class. An absence will only be considered "excused" under the circumstances described by the University's attendance policy, available at: <https://president.umd.edu/sites/president.umd.edu/files/files/documents/policies/V-100G.pdf>.

Grade Appeals

If you would like to **appeal any grade** that you have received in this course, you may file an appeal **within one week** of the return of the assignment. Please submit the entire exam, homework, or paper and attach a typed explanation of the reason why you think your grade should be changed.

Academic Accommodations

If you have a documented disability, please contact Disability Support Services 0126 Shoemaker Hall to apply to DSS for accommodation request forms which you can provide to me (and your other instructors) as proof of your eligibility for accommodations. The rules for eligibility and the types of accommodations a student may request can be reviewed on the DSS website at <http://www.counseling.umd.edu/DSS>. Please submit your paperwork to me as soon as possible and well before any due date or exam to ensure that any accommodation needs can be satisfied.

Names/Pronouns and Self Identifications

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). The pronouns someone indicates are not necessarily indicative of their gender identity.

Visit trans.umd.edu to learn more.

Additionally, how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity, is your choice whether to disclose (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all of your fellow Terps.

Respect in the Classroom

In order to learn, we must be open to the views of people different from ourselves. In this time we share together over the semester, please honor the uniqueness of your fellow classmates and appreciate the opportunity we have to learn from one another. Please respect each others' opinions and refrain from personal attacks or demeaning comments of any kind.

Instructor responsibilities:

- Start and end class on time.
- Treat all students with courtesy and respect.
- Be open to constructive input from students in the course.
- Ensure that opportunities to participate are enjoyed equally by all students in the course.

Student responsibilities:

- Come to class on time, and refrain from packing up belongings before class ends.
- Read all of the assigned readings for that class period ahead of time, and be prepared to discuss the topics of the day.
- Turn off all electronic devices that might create a disruption in class.
- Be quiet and give full respectful attention while either instructor or another student is speaking.
- When speaking, use courteous, respectful language and keep comments and questions relevant to the topic at hand.

Get Some Help!

You are expected to take personal responsibility for you own learning. This includes acknowledging when your performance does not match your goals and doing something about it. Everyone can benefit from some expert guidance on time management, note taking, and exam preparation, so I encourage you to consider visiting <http://ter.ps/learn> and schedule an appointment with an academic coach. Sharpen your communication skills (and improve your grade) by visiting <http://ter.ps/writing> and

schedule an appointment with the campus Writing Center. Finally, if you just need someone to talk to, visit <http://www.counseling.umd.edu>.

Everything is free because you have already paid for it, and **everyone needs help**...all you have to do is ask for it.

Basic Needs Security

If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live and believe this may affect your performance in this course, please visit go.umd.edu/basic-needs for information about resources the campus offers you and let me know if I can help in any way.

Schedule of Readings and Assignments

Week	Date	Topic	Reading/Assignment (to be read for this class)
Introduction to Water			
1	8/27	Introduction to the Course & Water Issues	Review syllabus 17 Countries, Home to One-Quarter of the World's Population, Face Extremely High Water Stress
	8/29	Water History; Ideas of Nature	National Geographic, Kingsolver, <i>Water is Life</i> (ELMS, Files tab) Either: <ul style="list-style-type: none"> • Hardin, The Tragedy of the Commons • Ostrom, Beyond Markets and States Or: <ul style="list-style-type: none"> • Sylvan (1973). Is there a need for a new, an environmental ethic? • Aldo Leopold, "The Land Ethic"
2	9/3	Introduction to Sustainability, Resilience and the SDGs	The Community Resilience Reader: Essential Resources for an Era of Upheaval (Chapters 7 and 8, pp. 131-161, ELMS, Course Reserves) NEWS ARTICLE ASSIGNMENT HANDED OUT
	9/5	Freshwater Availability and Use	<i>Water Policy</i> , pp. 3-20 UN World Water Development Report 2019, Prologue (pp. 11-33 ELMS, Files) Water Budgets, USGS What is a Water Footprint, Water Footprint Network "The Human Sponge" by Fred Pearce from When the Rivers Run Dry ELMS, Course Reserves WATER SOURCE PAPER ASSIGNMENT HANDED OUT
3	9/10	Hydrology Guest Lecture	Cech, <i>Principles of Water Resources</i> , Chapter 3 (ELMS, Course Reserves) Harter, Basic Concepts of Groundwater Hydrology (ELMS, Files)

Water Allocation Law			
3	9/12	Water in the U.S.: History and Law	<p>Cadillac Desert, Ch. 2 The Red Queen (pp. 52-103)</p> <p><i>Water Policy</i>, pp. 23-28 at top (skip table), 37-43 at top, 46-48</p> <p>IN CLASS ASSIGNMENT: Creating a Water Law System, Klein, pp. 846-47 (ELMS, Course Reserves)</p>
4	9/17	Water in the U.S.: Tribal Water Rights, Groundwater, and Public Trust doctrine.	<p><i>Water Policy</i>, pp. 90-95</p> <p>Klein, <i>Natural Resources Law, National Audubon Society</i>, pp. 648-654 (4-7 of pdf), <i>Water Follies: Groundwater</i>, 884-887 (30-31 of pdf), <i>Winters</i>, 892-896 (34-36 of pdf) (ELMS, Course Reserves)</p> <p>WATER SOURCE PAPER DUE</p>
	9/19	Water in the U.S.: Tribal Water Rights, Groundwater, and Public Trust doctrine.	<p><i>Water Policy</i>, pp. 90-95</p> <p>Klein, <i>Natural Resources Law, National Audubon Society</i>, pp. 648-654 (4-7 of pdf), <i>Water Follies: Groundwater</i>, 884-887 (30-31 of pdf), <i>Winters</i>, 892-896 (34-36 of pdf) (ELMS, Course Reserves)</p>
5	9/24	Water in the U.S.: Equitable Apportionment and Interstate disputes	<p>Water Wars Eastern Style, (ELMS, Files tab)</p> <p>Pivotal Battle Looms ... , Greenwire (ELMS, Files tab)</p> <p>Mississippi's Claim that Tennessee ... Circle of Blue) (ELMS, Files tab)</p>
	9/26	Mid-term exam review and catch up day	
6	10/1	MID-TERM EXAM	Study!
Ethics, Economics and Equity of Water			
6	10/3	Privatization, Water Markets and the Human Right to Water	<p><i>Water, Place, and Equity</i>, Chapter 7, pp. 195-220 (21-34 of pdf) (ELMS, Course Reserves) – Cochabamba, Privatization</p> <p>IFPRI, Water rights reform: lessons for institutional design, Ch. 1, pg. 3-25, Human Right to Water</p> <p>UN World Water Development Report 2019, Section 1.2 (pp. 36-38, ELMS Files), Human Right to water</p>

			<p>A Free-Market Plan to Save the American West From Drought, The Atlantic water markets</p> <p><i>Water Ethics</i>, pp. 91-103, 117-124 (ELMS, Course Reserves), water markets</p> <p><i>Water Policy</i>, 156-159</p> <p>Investing Our Way Out of the Global Water Crisis water markets</p> <p>Further reading: Social, economic, and community impacts of water markets in Australia’s Murray-Darling Basin region</p>
7	10/8	Commodification of Water: Bottled Water	<p>Walsh, A. (2011). The Commodification of the Public Service of Water: A Normative Perspective.</p> <p>Salzman, <i>Drinking Water</i>, pp. 15-24, 255-258 (ELMS, Course reserves)</p> <p>National Park Service Ends Effort to Eliminate Sale of Disposable Water Bottles</p>
	10/10	Water and Climate Change	<p><i>Water Policy</i>, Ch. 10</p> <p>The Community Resilience Reader: Essential Resources for an Era of Upheaval (Chapter 12, pp. 207-222, ELMS, Course Reserves)</p> <p>3 Things Cities Can Learn from Cape Town’s Impending “Day Zero” Water Shut-Off</p>
8	10/15	Water for Ecosystems	<p>Postel, Sandra, The Missing Piece, A Water Ethic</p> <p><i>Water Policy</i>, 142-156</p> <p>Schreiner (2013). Why Has the South African National Water Act Been so Difficult to Implement? (ELMS, Files).</p>
	10/17	Water and Climate Change	<p><i>Water Policy</i>, Ch. 10</p> <p>The Community Resilience Reader: Essential Resources for an Era of Upheaval (Chapter 12, pp. 207-222, ELMS, Course Reserves)</p> <p>3 Things Cities Can Learn from Cape Town’s Impending “Day Zero” Water Shut-Off</p>

9	10/22	Water and Environmental Justice	<p>Deitz and Meehan (2019). Plumbing Poverty: Mapping Hot Spots of Racial and Geographic Inequality in U.S. Household Water Insecurity</p> <p>Rodina et al. 2017. Water, equity and resilience in Southern Africa: future directions for research and practice (ELMS, Files)</p> <p>Listen to this hour-long podcast, “Valley of Contrasts,” by Antonia Cereijido for Latino USA and National Public Radio: http://latinousa.org/episode/valley-of-contrasts/</p> <p><i>Water Policy</i>, 54-60</p>
	10/24	Water Quality – Clean Water Act; Waters of the U.S. rule	<p><i>Water Policy</i>, pp. 109-123</p> <p>How a Burning River Helped Create the CWA</p> <p>The Clean Water Act Needs Positive Reform</p> <p>NEW READINGS TBD CRS Overview of Waters of the United States Rule (ELMS, Files)</p> <p>EPA, Waters of the United States Rulemaking (TBA)</p> <p>WOTUS is Restored – in half the Country</p> <p>Further Reading: Victory for Clean Water: Court Reinstates Obama WOTUS Rule for 26 States</p>
	10/29	Water Quality – Safe Drinking Water Act	<p><i>Water Policy</i>, 123-135.</p> <p>The Flint, Michigan, Water Crisis: A Case Study in Regulatory Failure and Environmental Injustice, Environmental Justice (ELMS, Files)</p> <p>EPA, Questions and Answers about EPA’s Hydraulic Fracturing Drinking Water Assessment Report</p> <p>WATER SOLUTION/CONFLICT ASSIGNMENT HANDED OUT</p>
10	10/31	International Water Law	<p>Convention on the Law of Nonnavigational Uses of International Watercourses (ELMS, Files tab)</p> <p>McCaffrey, Summary of Convention (ELMS, Files)</p>

			UN Watercourses Convention User Guide Reimagining International Water Law (ELMS, Files) <i>Water, Place, & Equity</i> , Chapter 5, pp. 117-142 (5-18 of pdf) (ELMS, Course Reserves) <i>Water Policy</i> , pp. 263-272
Water: Current Issues and Solutions			
11	11/5	Guest Lecture, UMD Extension: Wastewater Treatment & UMD CONSERVE Program	Readings TBA
	11/7	Current Issues in Water Infrastructure Desalination	CRS Report, Desalination (ELMS, Files) Energy and environmental issues in desalination (ELMS, Files) Peak salt: is the desalination dream over for the Gulf states? <i>Optional further reading:</i> Can the Middle East solve its water problem?
12	11/12	Dams	<i>Water Policy</i> , 159-164 Foley, Dam Removal, Listening In, Water Resources Research, 2017 (ELMS, Files)
	11/14	“Soft Path” Solutions	<i>Water Policy</i> , Introduction, 206-217, 288-303 Postel, S. Adapting to a New Normal in the Post-Carbon Reader.
Debates and Class wrap up			
13	11/19	Debates	Readings TBA WATER CONFLICT/SOLUTION ASSIGNMENT DUE
	11/21	Debates	Readings TBA
14	11/26	Catch-up Day	
	11/28	Thanksgiving Break No Class	
15	12/3	Debates	Readings TBA
	12/5	Review and Wrap up FINAL EXAM REVIEW	Study, review notes, and prepare questions!

			DEBATE ANALYSIS AND REFLECTION DUE
16	Tues. 12/17	FINAL EXAM, 10:30 a.m. to 12:30 p.m.	FINAL EXAM - MAJOR SCHEDULED GRADING EVENT