UMBRA INSTITUTE
PERUGIA, ITALY

ENV-PUBH-PSCI 320 Water Resources: Environment, Health, and Power

Course Syllabus
Spring 2026

Instructor: Neto Leão, PhD

Credits: 3
Contact Hours: 45
Prerequisites: None

Office Hours: By appointment via email. Remote meetings take place at Jitsi on Moodle
Course Type: Standard Course
Lab Fee: USD$135

Course Description

Water plays a central part in our lives. Almost all human activities are dependent on water and the functioning of ecosystems; the well-being of the environment, industries, and the economy; agriculture and food production, and beyond. This course aims to understand the science behind human-aquatic relationships. The interdependencies and linkages between water, the environment, and human activities demands a transdisciplinary approach. Thus, this course is based on three epistemic pillars: Environmental Studies, Political Science, and Public Health.
"The looming global water crisis", "billions without clear water", "investments in desalination plants", are just a few of the headlines making the news every day, all over the world. From children dying from water borne illnesses and US cities running out of water to melting glaciers and rising ocean levels, water has become a fundamental political issue.
Scientists teach us that water can neither be created nor destroyed. We will therefore ask when and how water becomes scarce. Scarcity is an economic category and caused when something is made into a resource, i.e., paid for. The industrial mode of production and resulting social perception of the world around us converts natural abundances into scarce economic resources.
We will debate the literature on water from a planetary perspective and yet, immerse ourselves in the local situation. We will focus on Lago Trasimeno and the vernacular fishing activity still present in the region. Why has the lake fish lost its place at the dinner table of local families? How do global markets affect local activities? What are the alternatives to protect people's water and the activities that derive from it? The qualitative research will provide the basis for the field trips, when students will be exposed to the lake and its history, will meet local fishermen and their traditional activities, and will experience the preparation and the traditional tastes of lake food.

Learning Outcomes

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

1. *compare* the cultural and biological significance of water in the context of promoting public health and protecting the environment;
2. *list* some of the connections between water and the following: health, food, economics, trade, development, energy, food, and land use;
3. *identify* the ways water scarcity has made water an important economic resource and how the political uses of water have shaped Italy, Italian culture, and Italy's demographics;
4. *provide* innovative strategies for promoting sustainable water use that could be transferred from the Italian to the American context to increase sustainability without negatively affecting environmental justice;
5. *evaluate* qualitative analysis of the data relative to community engagement projects at Lake Trasimeno;

Course Materials

Readings

A course reader, including all the indicated readings, will be available. The course's Moodle site is the primary location for readings and assignments.

Assessment

Attendance	10%
Field Notes Journal	20%
Weekly Moodle Quizzes	20%
Course Journal	20%
Final Paper (in three stages)	30%

Grading

Letter grades for student work are based on the following percentage scale:

Letter Grade Range	Numerical Score Equivalent	Student Performance
A	93% - 100%	Exceptional
A-	90% - 92%	Excellent
B+	87% -89%	Superior
B	83% - 86%	
B-	80% - 82%	
C+	77% - 79%	Satisfactory
C	73% - 76%	
C-	70% - 72%	
D+	67% - 69%	Low Pass
D	63% - 66%	
D-	60% - 62%	
F	59% or less	Fail (no credit)

Course Requirements

Grades are based on a combination of participation, in-class assessments, service learning, and exams.

Attendance (10%) — Attendance is an essential part of this course. If you attend all the meetings, you will receive 10% for this part of your grade. There are no make-ups offered for attendance.

Field Notes Journal (20%)	Field notes journal entries refer to the written account derived from data collected during observations of the visit to Lago Trasimeno. The entry should be written with full sentences in the Course Journal notebook. It will be graded on the week of the second course journal checking (Week 11).
Moodle Quizzes (20%)	Students will be assigned one short quiz, opened every Tuesday morning until the following Monday. Students can take the same quiz as many times as they want. The quiz will be on Moodle. The quizzes will assess the students' understanding of the readings and discussions for that week.
Course Journal (20%)	Students will need a notebook, which they will use as a personal space in which to reflect on course material and ideas. In-class assignments (e.g. summaries of assigned readings, analyses of primary sources, mental maps, reflections, predictive exercises) will be regularly scheduled and graded twice throughout the semester, i.e. before the mid-semester break (Week 6) and at the end of the course (Week 11). Each of these checks is worth 10% of your grade, for a total of 20%.
Final Paper (30%)	A 2,000-word paper on any topic covered in the course. The essay is an in-depth study based on sources beyond the reading list. The paper is graded on three different occasions according to the three specific stages of your writing process. See the full prompt on Moodle for more information.

Additional Course Information

This course combines a field trip to Lago Trasimeno to observe *pesca tradizionale* (traditional fishing) with the ARBIT community engagement. Students will be expected to prepare for the field trip as well as complete a Field Notes Journal relating to the field trip.

Attendance Policy

Attendance is expected and mandatory for classroom times and co-curricular activities. All students are allowed 2 unexcused absences, which do not need to be justified. It is the student's responsibility to keep them in case of real necessity. i.e., sickness or any other unforeseen inconvenience that may prevent students from being in class. More than 2 absences will affect your final grade by 2% per absence up to a maximum of 10%. Excessive unexcused absences (8 or more) may result in a failing grade or disciplinary action. It is the student's responsibility to be aware of the number of absences or late arrivals for each course, and to ask the instructor when in doubt.

If students miss class, they are responsible for obtaining class notes from other students and/or for meeting the professor during office hours. Any work missed in class because of an excused absence may be made up within one week of the return to the class. Any work missed that was a quiz or other test must be made up outside of class time and will, in the interest of intellectual honesty, be a slightly different test than the one given in class.

Presence during mandatory field trips is especially important. Missing a mandatory field trip for a course, unless for a very serious reason that is communicated to Umbra staff in a timely manner, will lower the students' grade by half a letter grade (i.e., a final grade of a B+ would be lowered to a B).

Legitimate reasons for an excused absence or tardiness includes: death in immediate family, religious observances, illness or injury, local inclement weather, medical appointments that cannot be rescheduled

Absences relating to illness may be excused by the Director but only if a medical certification is provided.

Students who request an approved absence to observe a religious holiday must submit a formal request to the Institute's Director within one week after the add/drop period when course schedules, including

any field trips, are finalized. No exceptions will be made after this deadline.
Except in the case of medical emergencies, absences are not accepted when tests are scheduled; tests cannot be made up. Furthermore, scheduled times and dates indicated for exams, quizzes, oral presentations, and any other graded assignments cannot be changed for any reason. Even if more sections of the same class are activated, students may only take exams during the scheduled times and dates for the section they are enrolled in.

Academic Integrity
All forms of cheating (i.e., copying during exam either from a fellow student or making unauthorized use of notes) and plagiarism (i.e., presenting the ideas or words of another person for academic evaluation without acknowledging the source) will be handled according to the Institute Academic Policy, which can be found in the Umbra Institute Academic Policies and Conduct Guidelines.

Classroom Policy
Students are expected to follow the policy of the Institute and demonstrate the appropriate respect for the historical premises that the school occupies. Please note that cell phones must be set on silent mode before the beginning of each class. Computers and other electronic devices cannot be used during class lectures and discussions, unless there has been a specific academic accommodation.

As an instructor and as a person, I am dependent on both my computer and my telephone. That said: An ever-increasing body or research shows that open laptops and telephones in the classroom create distraction (both visual and auditory) for those using them and those around them. You can type faster than you can write, and as a result you end up processing less when you're simply typing notes. For this reason, I have a physical notebook policy: I ask you to leave your computers in your bags and phones in your pockets and use a regular notebook. There are four exceptions: 1) if you have an accommodation; 2) if you're using a tablet to take notes, 3) if you make an office hours appointment with me to discuss the use of a computer; or 4) if we have an in-class tutorial about online research tools.

U.N. Sustainable Development Goals
This course contributes to the achievement of one or more goals of U. N. Agenda for Sustainable Development

Schedule of Topics, Readings, and Assignments

WEEK 1

Meeting#1	**Course Introduction**
Meeting#2	**History of the Ideas of Water** Readings Tvedt, Terjeand; Oestigaard, Terje. (2010). A History of the Ideas of Water: Deconstructing Nature and Constructing Society. *A History of Water Volume 1: Ideas of Water from Ancient Societies to the Modern World*. I.B.Tauris: New York, pp. 1-31.

WEEK 2

Meeting#3	**Reflections on the Notion of 'Scarcity' in Economics: the case of water** Readings Samuel, S.; Robert, J. (2010). Water Can and Ought to Run Freely: Reflections on the Notion of 'Scarcity' in Economics, in Mehta, L. *The Limits to Scarcity: Contesting the Politics of Allocation*. London, Washington: Earthscan, pp. 109-126.
Meeting#4	**Converting abundance into scarcity** Readings Shiva, V. (2016). Converting abundance into scarcity, in Shiva, V. *Water wars: privatization, pollution, and profit*. Berkeley, California: North Atlantic Books, pp. 54-84.

WEEK 3

Meeting#5	**Water politics: commons or commodity?** Readings Barlow, M. (2013). Water – commons or commodity, in Barlow, M. *Blue future: protecting water for people and the planet forever*. Toronto: House of Anansi, pp. 85-110.
Meeting#6	**Reclaiming the water commons** Readings Barlow, M. (2013). Reclaiming the Water Commons, in Barlow, M. *Blue future: protecting water for people and the planet forever*. Toronto: House of Anansi, pp. 147-165.

WEEK 4

Meeting#7	**The sacred waters** Readings Shiva, V. (2016). The Sacred Waters, in Shiva, V. *Water wars: privatization, pollution, and profit*. Berkeley, California: North Atlantic Books, pp. 268-282. Sultana, F.; Loftus, A. (2020). *Water Politics Governance, Justice and the Right to Water*. Routledge: New York, pp. 42-53.
Meeting#8	**H2O is not the only water**

	Readings Illich, I. (1992). H20 and the Waters of Forgetfulness, in Illich, I. *In the Mirror of the Past: Lectures and Addresses 1978-1990*. New York, London: Marion Boyars, pp. 145-158.

WEEK 5

Meeting#9	**The right to water in a global context: challenges and transformations in water politics** Readings: Sultana, F.; Loftus, A. (2020). *Water Politics Governance, Justice and the Right to Water*. Routledge: New York, pp. 1-14.
Meeting#10	**Water rights** Readings: Shiva, V. (2016). Water Rights: The State, the Market, the Community, in Shiva, V. *Water wars: privatisation, pollution, and profit*. Berkeley, California: North Atlantic Books, pp. 54-84.

WEEK 6

Meeting#11	**Visit to the Pozzo Etrusco (Etruscan Well), the Fountain, and the Aqueduct of Perugia.** Readings Gunzburg, D. (2013). The Perugia Fountain: an Encyclopaedia of Sky, Culture and Society, in Campion, N.; Greene, L. *Sky and Symbol*. Ceredigion: Sophia Centre Press, pp. 103-118.
Meeting#12	**Research day**: in class time to prepare the Outline for the Final Paper Grading of the Course Journal #1 and of Reflective Field Journal Students have until Sunday to turn in the outline of the final paper (see the full prompt on Moodle).

SEMESTER BREAK

WEEK 7

Meeting#13	**Collapse of biodiversity in the Aquatic Environment** Readings Marques, L. (2021). Collapse of Biodiversity in the Aquatic Environment, in Marques, L. *Capitalism and Environmental Collapse*. Switzerland: Springer, pp. 275-298.
Meeting#14	**Fishing for Biomass** Readings Samuel, S. Bavington, D. Fishy Biomass. *Conspiratio*, Fall 2022, p.122-145.

WEEK 8

Meeting#15	**Lago Trasimeno fishing activity: social-economic history** Readings Riganelli, G. Birth and exploitation of common goods in Perugia in the Middle Ages: the case of the "comunantia fructus acqua lacus", of the community of the "Chiugi Perugino" and of the "pedate del lago" *Conspiratio*, Fall 2023, p. 127-139. Ciani, A.; Pazzaglia, A.; Rocchi, L.; Velatta, F.; Natali, M. (2013). The Sustainable Development of Trasimeno Lake, in Luo, Z. *Mechanism Design for Sustainability: techniques and cases*. New York, London: Springer, pp. 193-220. Recommended readings: Klitzing, A. (2020). *Along the Tevere: A Gastro-Historic Portrait of the Region.* Technological University Dublin. DOI: 10.21427/MGYD-R438.
Meeting#16	**Lago Trasimeno: hydrological history** Readings R. Burzigotti, W. Dragoni, C. Evangelisti & L. Gervasi. (2014). The Role of Lake Trasimeno (central Italy) in the History of Hydrology and Water Management, *International Water History Association*, 3, pp. 1-20. To watch: Documentary: Il Lago Malato di Ugo Gregoretti, (1957, Lago Trasimeno) – to watch. Documentary: Terra e Acqua di Neto Leao, Isabelle Cedotti e Attilio del Vinco, (2019).

Friday, March 20	*Field Trip - Lago Trasimeno* Visit to Oasi La Valle (San Savino) Visit to Arbit headquarters (Castiglione del Lago) Lunch at La Capannina (Castiglione del Lago)

WEEK 9

Meeting#17	**Climate Change and Water Crisis** Readings Shiva, V. (2016). Climate Change and the Water Crisis, in Shiva, V. *Water wars: privatization, pollution, and profit*. Berkeley, California: North Atlantic Books, pp. 118-138.
Meeting#18	**Wastewater and water wasted** Readings Gonzales, M; Yanes, M. (2015). A Floating Planet, in Gonzales, M; Yanes, M. *The Last Drop: The Politics of Water* . London: Pluto Press, pp.8-25.

WEEK 10

Meeting#19	**Water Governance and Public Health** Readings:

	McCully, Betsy (2014). New York: Water Management and Metropolitan Development. In, A History of Water, Series III, Volume 1: Water and Urbanization I. I.B.Tauris: New York, pp. 357-383.
Meeting#20	**Human Parasitology: water, sanitation, and public health** Readings Pain, S., The emperor's new loos, 2016 Hotez, P. J., Human Parasitology and Parasitic Diseases: Heading towards 2050, 2019.

WEEK 11

Meeting#21	**Research Week for the Final Paper** Grading of the Course Journal #2 Students have until Sunday to turn in the 1000 words draft of the final paper (see the full prompt on Moodle).
Meeting#22	No class (MPP & FSE Capstone Trips).

WEEK 12

Meeting#23	**Italian 'water culture', mineral contents and perceptions** Readings Black, R., Acqua Minerale Di Sangemini: The Italian Mineral Water Industry Finds a Place at the Table, 2009
Meeting#24	**The message in the bottle: Human right to water and bottled water consumption** Readings Gonzales, M; Yanes, M. (2015). How Water was Privatized, in Gonzales, M; Yanes, M. *The Last Drop: The Politics of Water* . London: Pluto Press, pp. 26-39. Sultana, F.; Loftus, A. (2020). *Water Politics Governance, Justice and the Right to Water*. Routledge: New York, pp. 113-128.

WEEK 13

Final Classes & Special Academic Events

Special Academic Events

Bibliography

- Bhandari, R. K., vom Saal, F. S., & Tillitt, D. E. (2015). Transgenerational effects from early developmental exposures to bisphenol A or 17α–ethinylestradiol in medaka, *Oryzias latipes. Scientific Reports, 5,* 1-5.

- Burzigotti, R., Dragoni, W., Evangelisti, C., & Gervasi, L. (2003). The role of Lake Trasimeno (central Italy) in the history of hydrology and water management. In *IWHA 3rd International Conference, Alexandria, Egypt*.

- Chew, M. K., & Laubichler, M. D. (2003). Natural Enemies--Metaphor or Misconception?. *Science*, *301*

(5629), 52-53.

- Cho, J. Y., & Lee, E. H. (2014). Reducing confusion about grounded theory and qualitative content analysis: Similarities and differences. *The qualitative report*, *19*(32), 1.

- Cole, S. (2017). Water worries: An intersectional feminist political ecology of tourism and water in Labuan Bajo, Indonesia. *Annals of Tourism Research, 67,* 14-24.

- Colloca, F., Cardinale, M., Maynou, F., Giannoulaki, M., Scarcella, G., Jenko, K., ... & Fiorentino, F. (2013). Rebuilding Mediterranean fisheries: a new paradigm for ecological sustainability. *Fish and Fisheries*, *14*(1), 89-109.

- Davis, M. A., Chew, M. K., Hobbs, R. J., Lugo, A. E., Ewel, J. J., Vermeij, G. J., ... & Thompson, K. (2011). Don't judge species on their origins. *Nature*, *474*(7350), 153-154.

- Danovaro, R., Bongiorni, L., Corinaldesi, C., Giovannelli, D., Damiani, E., Astolfi, P., …, & Pusceddu, A. (2008). Sunscreens cause coral bleaching by promoting viral infections. *Environmental Health Perspectives, 116,* 441-447.

- Fabinyi, M. (2007). Illegal fishing and masculinity in the Philippines: A look at the Calamianes Islands in Palawan. *Philippines Studies, 55*(4), 509-530

- Fabinyi, M. (2010). The intensification of fishing and the rise of tourism: Competing coastal livelihoods in the Calamianes Islands, Philippines. *Human Ecology, 38*(3), 415-427.

- Farrell, B., & Twining-Ward, L. (2005). Seven steps towards sustainability: Tourism in the context of new knowledge. Journal of sustainable tourism, 13(2), 109-122.

- Germanov, E. S., Marshall, A. D., Bejder, L., Fossi, M. C., & Loneragan, N. R. (2018). Microplastics: No small problem for filter-feeding megafauna. *Trends in Ecology & Evolution*.

- Giardino, C., Bresciani, M., Villa, P., & Martinelli, A. (2010). Application of remote sensing in water resource management: The case study of Lake Trasimeno, Italy. *Water Resources Management, 24*(14), 3885-3899.

- Gill, M., Smith, P., & Wilkinson, J. M. (2010). Mitigating climate change: the role of domestic livestock. *Animal*, *4*(03), 323-333.

- Greider, T., & Garkovich, L. (1994). Landscapes: The social construction of nature and the environment. *Rural sociology*, *59*(1), 1-24.

- Jacobson, M. Z., & Delucchi, M. A. (2011). Providing all global energy with wind, water, and solar power, Part I: Technologies, energy resources, quantities and areas of infrastructure, and materials. *Energy Policy*, *39*(3), 1154-1169.

- Kilburn, C. R., & Petley, D. N. (2003). Forecasting giant, catastrophic slope collapse: lessons from Vajont, Northern Italy. *Geomorphology*, *54*(1), 21-32.

- Lorenzoni, M., Mearelli, M., & Ghetti, L. (2006). Native and exotic fish species in the Tiber River watershed (Umbria–Italy) and their relationship to the longitudinal gradient. *Bulletin Francais de la Peche et de la Pisciculture*, (382), 19-44.

- Mollema, P., Antonellini, M., Gabbianelli, G., Laghi, M., Marconi, V., & Minchio, A. (2012). Climate and water budget change of a Mediterranean coastal watershed, Ravenna, Italy. *Environmental Earth Sciences*, *65*(1), 257-276.

- Pain, S. (2016). The emperor's new loos. *New Scientist*, *231*(3080), 34-36.

- Pettine, M., Bianchi, M., Martinotti, W., Muntau, H., Renoldi, M., & Tartari, G. (1996). Contribution of the Lambro River to the total pollutant transport in the Po watershed (Italy). *Science of the total environment*, *192*(3), 275-297.

- Piscia, R., Volta, P., Boggero, A., & Manca, M. (2011). The invasion of Lake Orta (Italy) by the red swamp crayfish *Procambarus clarkii* (Girard, 1852): a new threat to an unstable environment. *Aquatic Invasions, 6*, S45-S48.

- Rasul, G., & Sharma, B. (2016). The nexus approach to water–energy–food security: an option for adaptation to climate change. *Climate Policy*, *16*(6), 682-702.

- Scarborough, P., Appleby, P. N., Mizdrak, A., Briggs, A. D. M., Travis, R. C., Bradbury, K. E., Key, T. J. (2014). Dietary greenhouse gas emissions of meat-eaters, fish-eaters, vegetarians and vegans in the UK. *Climatic Change, 125* (2), 179-192.

- Simberloff, D., & Vitule, J. R. (2014). A call for an end to calls for the end of invasion biology. *Oikos*, *123*(4), 408-413.

- Smith, A. D., & Garcia, S. M. (2014). Fishery management: contrasts in the Mediterranean and the Atlantic. *Current Biology*, *24*(17), R810-R812.

- Tlusty, M. F., & Thorsen, Ø. (2016). Claiming seafood is 'sustainable' risks limiting improvements. *Fish and Fisheries*.

- Wagner, M., & Oehlmann, J. (2009). Endocrine disruptors in bottled mineral water: total estrogenic burden and migration from plastic bottles. *Environmental Science and Pollution Research*, *16*(3), 278-286.

- Wilson, P. I. (2015). The politics of concrete: institutions, infrastructure, and water policy. *Society & Natural Resources*, *28*(1), 109-115.

- Zaza, S., Balogh, K., Palmery, M., Pastorelli, A. A., & Strachini, P. (2015). Human exposure in Italy to lead, cadmium and mercury through fish and seafood product consumption from Eastern Central Atlantic Fishing Area. *Journal of Food Consumption & Analysis, 40,* 148-153.

- Zhu, X., Moriondo, M., van Ierland, E. C., Trombi, G., & Bindi, M. (2016). A model-based assessment of adaptation options for Chianti wine production in Tuscany (Italy) under climate change. *Regional Environmental Change*, *16*(1), 85-96.