



**FFSS 320/ENV 320 - Water Resources: Environment, Society, and Power**  
**Course Syllabus**  
**Fall Semester 2021**

**Credits:** 3

**Contact Hours:** 45

**Class Hours:** Mon., Wed. 10:00am-11:30am; plus 60 minutes expected classwork online a week

**Office Hours:** Mon., Wed. 9:15-10:15am, Faculty Office, first floor, Umbra Institute

**Course Type:** Standard course

**Lab Fees:** € 25.00

**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 ways in which water influences our lives and to explore the interdependencies and linkages between water and human activities. Through a combination of both the social and natural sciences, the course will take a critical look at water-resource sustainability. Using a transdisciplinary approach water and water resources will be explored through social and environmental constructs as well as socioecological lenses.

## Learning Outcomes and Assessment Measures

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

<b>Learning Outcomes</b>	<b>Assessment Measures</b> <b>Course requirements that will be used to assess students' achievement for each learning outcome</b>
Understand interdependencies between water, society and the environment	Participation in class discussions Field Lab Assessment Midterm/Final Exams
Identify linkages between energy, food, land use, and water	Assessment - Social Activism Urban Garden Field Labs In-class discussions Midterm/Final Exams
Examine cultural and political relationships with water systems	Assessment - Identification of Hometown Drinking Water Urban Garden Field Labs Midterm/Final Exams
Examine biological factors in freshwater ecosystems	Field trip laboratory In-class formal debate Midterm/Final Exams
Explore how water systems have shaped Italy and Italian culture	Service-learning laboratory In-class discussions Midterm/Final Exams
Develop innovative strategies for promoting sustainable water use	Assessment - Intercultural Sustainability & Innovation Urban Garden Field Labs Midterm/Final Exams

## Course Materials

### Readings

All readings will be posted as individual pdfs on Moodle.

### Films

TBA

### Other

Students are required to maintain a guided field journal during the semester.

## Assessment

Participation	10%
Field Journal	15%
Assessments (3)	30%
Orto Field Lab	10%
Mid-term Exam	15%
Final Exam	20%

## 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.

### *Participation (10%)*

Class participation grades are based on oral contributions to the collective learning experience of the class. Participation means active engagement in the course: being consistently prepared for class having carefully read the assigned readings, asking questions, responding to questions, listening attentively to others, and offering your own insights and opinions.

### *Assessments (30%)*

Some lectures will include small in-class assignments or pop quizzes. In addition, there will be 7 take-home assessments. These assessments serve to reiterate the objectives of the course and are important for the overall development of the students. Students will be provided with a grade on each assessment.

### *Field Lab (10%)*

Students will collaborate with Orto Sole undertaking a water irrigation project experiment. Students will place and compare ollas and make-shift ollas as potential irrigation systems at the urban community garden in Perugia. Please see the service-learning Syllabus Appendix at the end of the syllabus for more information. Students will complete self-evaluations and a relevant assessment (Orto Stories).

### *Reflective Field Journal (15%)*

Students will be required to keep a reflective field journal during the semester. Important items to document include daily interactions with water, reflections on lecture material, and observations during the field trip and service-learning components as they relate to materials discussed in class. To receive full points, students must make at least two in-depth entries per week. In most cases, journal prompts will be given in class. A rubric will be provided during the first class.

### *Mid-Term Exam (15%)*

The mid-term exam will cover all topics presented in the first half of the course. It will consist of multiple choice, true/false and short answer questions created by the students. The exam will take

approximately 60-90 minutes to complete and is closed book/closed notes. No alternative exam dates will be offered.

#### *Final Exam Project & Activity (20%)*

The final exam will cover all topics presented in the course. The project, designed to create nonlinear, visual ways to understand, produce new and transfer learned knowledge, will be introduced at the beginning of Week 8. This assignment will account for half of the final grade (10% of the total grade). The other half of the final exam will consist of a problem-solving activity. This component of the exam will take approximately 90 minutes to complete and is closed book/closed note. This is the only time the exam activity will be given. No alternative exam activity dates will be offered.

#### Course Content Disclaimer

There is some sexual content based on graffiti discussed during a lecture regarding gender and Roman baths.

#### Additional Course Information

This course utilizes the urban community garden, Orto Sole for the purposes of a field lab and learning. On various dates (depending on the weather), the class will walk to the garden for field lab sessions.

#### Attendance Policy

**Absences for Covid-related circumstances: in order to keep the entire Umbra community healthy and to comply with local laws, you may not enter the Umbra premises if you have a temperature of 37.5 °C (99.5 °F) or higher. We also ask students that display strong cold or flu-like symptoms to take proper precautions and not risk spreading any type of illness. Students may attend classes remotely and without academic penalty via Zoom in case of self-isolation or illness during the Fall 2021 semester.**

Class attendance (in person or through live connection) is mandatory. Students are allowed two “free” absences, which do not need to be justified. However, it is considered common courtesy to inform the instructor of your absence when possible. It is the students’ responsibility to keep them in case of real necessity (sickness or any other unforeseen inconvenience that may prevent students from being in class). Each additional absence, unless for a very serious reason, will lower the students’ grade by one grade level (i.e., a final grade of a B+ would be lowered to a B). If students miss class, they are responsible for obtaining class notes from other students and/or for meeting the professor during office hours. It is also the policy of the Institute that any student who has eight or more absences automatically fails the class. 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.

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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.

Presence during mandatory field trips is especially important for student performance in class. Missing a mandatory field trip, unless for a very serious reason that is communicated to the professor and Umbra Academic Director in a timely manner, will lower students' final grade by one grade level (i.e., a final grade of a B+ would be lowered to a B).

#### 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 turned off before the beginning of each class. The use of **computers and other electronic devices** is subject to the professor's discretion during class lectures and discussions.

Note: This course may have one or more meetings in the didactic garden located in Via delle Prome 17.

## Schedule of Topics, Readings, and Assignments

### WEEK 1

Mon., Sept. 20	<p><i>Course Introduction: structure, format and non-use of traditional methods</i></p> <p><u>Activities</u> Student bios Introduction to the service-learning</p> <p><u>Online resources</u> <a href="http://www.fao.org/fao-stories/article/en/c/1185405/?fbclid=IwAR24NYA4qaL1zgnGH7qDO3WmloRi3fr8Ilfe9KGCvOZXekA6Bjoe_0kRN2k">http://www.fao.org/fao-stories/article/en/c/1185405/?fbclid=IwAR24NYA4qaL1zgnGH7qDO3WmloRi3fr8Ilfe9KGCvOZXekA6Bjoe_0kRN2k</a> What does water mean to you? <a href="https://soundcloud.com/unfao/water-to-me">https://soundcloud.com/unfao/water-to-me</a></p> <p><u>Videos</u> Water Footprint: <a href="https://youtu.be/b1f-G6v3voA">https://youtu.be/b1f-G6v3voA</a></p> <p><u>Journal prompt</u> What does water mean to you?</p>
Wed., Sept. 22	<p><i>A Framework for learning: Social Constructs of Water.</i></p> <p><u>Activities</u> Comparative exploration of water tenancy in Italy</p> <p><u>Readings</u> Greider, T, &amp; Garkovich, L., <i>Landscapes: The Social Construction of Nature and the Environment</i>, 1994 Armeni C. <i>The Right to Water in Italy</i> 2015. (<a href="http://www.ielrc.org/content/f0801.pdf">http://www.ielrc.org/content/f0801.pdf</a>)</p> <p><u>Online resources</u> <a href="https://grist.org/article/research-casts-doubt-on-epa-drinking-water-standard/?utm_content=buffer2dd45&amp;utm_medium=social&amp;utm_source=facebook.com&amp;utm_campaign=buffer&amp;fbclid=IwAR26NLTrsOUny550I45b3_X1FjuW1N1XelxLw2P_r2-haNXaaM2R4TaZSt8">https://grist.org/article/research-casts-doubt-on-epa-drinking-water-standard/?utm_content=buffer2dd45&amp;utm_medium=social&amp;utm_source=facebook.com&amp;utm_campaign=buffer&amp;fbclid=IwAR26NLTrsOUny550I45b3_X1FjuW1N1XelxLw2P_r2-haNXaaM2R4TaZSt8</a></p> <p><u>Videos</u> No Wai Ka Wai - <a href="https://www.kamakakoi.com/nowaikawai">https://www.kamakakoi.com/nowaikawai</a></p> <p>A Guide to drinking Fountains in Rome (Nasoni)   Walks of Italy - <a href="https://youtu.be/zKMK0nbYJV0">https://youtu.be/zKMK0nbYJV0</a></p> <p><u>Journal prompt</u> Observation - how are people 'experiencing' the fontana? Are there factors influencing their realities?</p> <p><b>ASSESSMENT 1 INTRODUCTION – YOUR LOCAL WATERING HOLE</b></p>

### WEEK 2

Mon., Sept. 27	<p><i>Water and Politics</i></p> <p><u>Readings</u> Wilson, P. <i>The Politics of Concrete: Institutions, Infrastructure, and Water Policy</i>, 2015</p>
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	<p><u>Activity</u> Concrete concept mapping</p> <p><u>Video</u> Flint's Fight for America's Children <a href="https://www.tedmed.com/talks/show?id=627338">https://www.tedmed.com/talks/show?id=627338</a></p> <p><u>Journal prompt</u> Water and power</p> <p><b>ASSESSMENT 1 DUE – YOUR LOCAL WATERING HOLE</b></p>
Wed., Sept. 29	<p><i>Water resources</i></p> <p><u>Readings</u> Hathaway, Agroecology and permaculture: Addressing key ecological problems by rethinking and redesigning agricultural systems, 2016</p> <p><u>Activity</u> Orto work session</p> <p><u>Journal prompt</u> Rethinking irrigation</p> <p><b>ASSESSMENT 2 INTRODUCTION – ORTO STORIES</b></p>

### WEEK 3

Mon., Oct. 4	<p><i>Invasion Biology</i></p> <p><u>Activities</u> Invasive species debate</p> <p><u>Readings</u> Piscia et al., The invasion of Lake Orta (Italy) by the red swamp crayfish <i>Procambarus clarkii</i> (Girard, 1852): a new threat to an unstable environment, 2011</p> <p>Lorenzoni, M., Mearelli, M., &amp; Ghetti, L., Native and exotic fish species in the Tiber River watershed (Umbria–Italy) and their relationship to the longitudinal gradient, 2006</p> <p><u>Journal prompt</u> The importance of labels</p>
Wed., Oct. 6	<p><i>ARPA Guest Lecture – Diatoms</i></p> <p><b>MIDTERM ASSESSMENT INTRODUCTION</b></p> <p><u>Journal prompt</u> Reflect on the lecture</p>

### WEEK 4

Mon., Oct. 11	<p><i>Social Constructs of Water: History, recreation and recreational 'use'</i></p> <p><u>Video</u> Aqueducts: Technology and Uses - Ancient Rome Live <a href="https://youtu.be/s5AT0XY2Hi0">https://youtu.be/s5AT0XY2Hi0</a></p>
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	<p><u>Readings</u> Pain, S., <i>The emperor's new loos</i>, 2016</p> <p><u>Journal prompt:</u> Consider the interconnectedness of water and recreation</p>
Wed., Oct. 13	<p><i>Social Constructs of Water: Gender.</i></p> <p><u>Activities</u> Solve Labuan's gendered water issues</p> <p><u>Readings</u> Cole, <i>Water Worries: An Intersectional Feminist Political Ecology of Tourism and Water in Labuan, Banjo, Indonesia</i>, 2017</p> <p><u>Journal prompt</u> Water as a gendered resource</p> <p><b>DIY MIDTERM INTRODUCTION</b></p>

#### WEEK 5 - MIDTERM

Mon., Oct. 18	<p><i>Orto Workday</i></p> <p><u>Journal prompt</u> Spreading awareness about water related issues – challenges and successes</p>
Wed., Oct. 20	<p><i>DIY MIDTERM</i></p> <p><u>Activities</u> Midterm Bingo</p> <p><u>Journal prompt</u> Mid-semester inputs</p> <p><b>DIY MIDTERM DUE</b></p>

#### SEMESTER BREAK (Oct. 25-29)

#### WEEK 6

Mon., Nov. 1	<p><i>Bottled Water</i></p> <p><u>Activity</u> Gallery walks</p> <p><u>Readings</u> Bhandari et al., Transgenerational effects from early developmental exposures to bisphenol A or 17<math>\alpha</math>-ethinylestradiol in medaka, <i>Oryzias latipes</i>, 2015</p> <p>Wagner, M., &amp; Oehlmann, J. Endocrine disruptors in bottled mineral water: total estrogenic burden and migration from plastic bottles, 2009</p>
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	<p><u>Journal prompt</u> Bottled water</p> <p><b>ASSESSMENT 3 INTRODCUTION ONLINE ACTIVISM</b></p>
Wed., Nov. 3	<p><i>Italian 'water culture'</i></p> <p><u>Activities</u> Water panel</p> <p><u>Readings</u> Black, R., <i>Acqua Minerale Di Sangemini: The Italian Mineral Water Industry Finds a Place at the Table</i>, 2009</p> <p><u>Journal prompt:</u> Reflect on the panel experience</p>

**WEEK 7**

Mon., Nov. 8	<p><i>Assessment 3 presentations</i></p> <p><u>Activities</u> Orto Work Session</p> <p><u>Journal prompt</u> Fostering caring in the community</p> <p><b>ASSESSMENT 3 DUE ONLINE ACTIVISM</b></p>
Wed., Nov. 10	<p><i>Water and Power: Case study Vajont Dam.</i></p> <p><u>Videos</u> <a href="https://www.youtube.com/watch?v=hjVJhe60hHQ">https://www.youtube.com/watch?v=hjVJhe60hHQ</a></p> <p><u>Readings</u> Kilburn, C. R., &amp; Petley, D. N, <i>Forecasting giant, catastrophic slope collapse: lessons from Vajont, Northern Italy</i>, 2003</p> <p><u>Journal prompt</u> Fatalism (God's will) and water resources</p>

**WEEK 8**

Mon., Nov. 15	<p><i>Watershed Issues: Microplastics</i></p> <p><u>Activities</u> Gallery walks</p> <p><u>Readings</u> Talvitie, J., Mikola, A., Koistinen, A., &amp; Setälä, O, <i>Solutions to microplastic pollution–Removal of microplastics from wastewater effluent with advanced wastewater treatment technologies</i>, 2017</p> <p><u>Journal prompt</u> Contaminated</p> <p><b>FINAL PROJECT - INTERCULTURAL SUSTAINABILITY &amp; INNOVATION</b></p>
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Wed., Nov. 17	<p><i>Watershed Issues: Pollution</i></p> <p><u>Activities</u> Lego Serious Play</p> <p><u>Readings</u> Danovaro, R. et al., Sunscreens cause coral bleaching by promoting viral infections, 2008</p> <p><u>Journal prompt</u> Lego Serious Play experience</p>
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**WEEK 9**

Mon., Nov. 22	<p><i>Water &amp; Climate.</i></p> <p><u>Activity</u> Focus group discussion</p> <p><u>Readings</u> Mollema, P., et al., Climate and water budget change of a Mediterranean coastal watershed, Ravenna, Italy, 2012</p> <p>Rasul, G., &amp; Sharma, B. The nexus approach to water–energy–food security: an option for adaptation to climate change, 2016</p> <p><u>Journal prompt</u> Changing behavior and inspiring action</p>
Wed., Nov. 24	<p><i>Wine and Water.</i></p> <p><u>Activities</u> Role play</p> <p><u>Readings</u> Zhu et al., A model-based assessment of adaptation options for Chianti wine production in Tuscany (Italy) under climate change, 2016</p> <p><u>Journal prompt</u> Wine or water?</p>

**WEEK 10**

Mon., Nov. 29	<p><i>Water and Power: Innovations from the past, solutions for the future</i></p> <p><u>Activities</u> Tragedy of the Commons Orto Project Summary</p> <p><u>Videos</u> City Lab [City Lab]. (2018, Jan 17). Portland's Autonomous Infrastructure: Hydropower [Video File]. Retrieved from <a href="https://youtu.be/NO45Si6hNB0">https://youtu.be/NO45Si6hNB0</a></p> <p><u>Readings</u></p>
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	<p>Gain, Animesh K., et al. "Social-ecological system approaches for water resources management." <i>International journal of sustainable development &amp; world ecology</i> 28.2 (2021): 109-124.</p> <p>Jacobson, &amp; Delucchi, Providing all global energy with wind, water, and solar power, Part I: Technologies, energy resources, quantities and areas of infrastructure, and materials, 2011</p> <p><u>Journal prompt</u> What does water mean to you?</p>
Wed., Dec. 1	<p><i>Final Project Presentations</i></p> <p><b>ASSESSMENT 3 DUE</b></p>

### FINAL EXAMS

Dec. 6-10	<p>The Final Exam and Special Academic Events Calendar will be provided later in the semester.</p> <p><b>FINAL PROJECT DUE</b></p>
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## Bibliography

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**ESFS 350: Water Resources: Environment, Society, & Power**  
**Field Lab Project**  
**Syllabus Appendix**  
**Fall 2021**

**Field Lab Project Overview**

**Community Partner**

ARPA Umbria (Agenzia Regionale per la Protezione Ambientale dell'Umbria) is the regional environmental protection agency of Umbria. Established in 1998, its main functions include:

- testing and evaluating the chemical, physical, and biological factors impacting air, water, and soil quality;
- providing technical-scientific support to prevent pollution;
- managing monitoring networks; and
- creating information systems and environmental databases.

Wetlands are one of the most vulnerable ecosystems with the highest rate of disappearance in recent decades. Attention to wetland conservation and management has grown for their importance as biodiversity resources and for their central role for the functions of aquatic ecosystems. In cooperation with other local partners and stakeholders, ARPA Umbria opened the Center on Climate Change and Biodiversity Trasimeno to focus specifically on biodiversity studies of lakes and wetlands.

**Learning Goals**

Students will participate in a one-day field trip to Lake Trasimeno to learn about the socio-ecological systems at Trasimeno Lake. Students will observe scientific protocols used by ARPA Umbria biologists to continue their efforts to analyze the ecological status of the lake's freshwater ecosystems and to observe current. Building on the previous guest lecture, ARPA Umbria experts will first illustrate Lake Trasimeno's environmental condition, present the activities and programs that ARPA is developing to study wetlands and bioindicators (i.e., diatom algae). After the demonstration, you will join local fishermen from the Lake Trasimeno Fishermen Cooperative aboard their fishing vessels to gain a better understanding of their fishing practices and conduct qualitative research based on a pre-designed research question.

**Student Learning Outcomes**

Through this project, students will be able to:

- critically analyze local water issues and be able to compare these to the global level,
- identify appropriate scientific methods for analyzing lake water quality,
- practice qualitative research methods and analyses,
- develop awareness and skills in intercultural communication, and
- gain a better understanding of the host culture and community.

### **Organization, Expectations, and Roles**

A significant amount of time will be dedicated to the field lab in class. Students will also be required to do research and/or prepare materials outside of class. With the help of the professor, students will be responsible for deciding how to divide the various tasks to ensure each person contributes equally throughout the project. Each student will have:

1. A field journal where he/she will record observations during the field trip experience. The professor will collect the field journals at the mid-term and final exams but may ask for them at random points throughout the course.
2. An individual research project based on data gathered during the field trip.

### **Grading Rubric**

The field lab project is worth a total of 10% of the final course grade, which will be divided into two categories, each worth 5% of the final project grade:

1. Qualitative research approach and execution
2. Participation and self-evaluation during preparation and workshop delivery

**ESFS 350: Water Resources: Environment, Society, & Power**  
**Service-learning**  
**Syllabus Appendix**  
**Fall 2021**

**What is service learning?**

Service learning is a type of experiential education integrated into a course in which:

- students engage in an organized activity or project aimed to address a community need that is identified in collaboration with the community partner;
- students critically reflect on the link between the experience in the community, course content, and the learning goals; and
- there is reciprocal learning both by the students and by the community partners.

Students will need a certain degree of flexibility, creativity, and self-initiative to realize a service learning project. Organization and open communication in-class with the professor and classmates will be key to student success.

**Community Engagement Presentations**

During Special Academic Events Week, the class will present a 15-minute summary of the project experience to the Umbra community during the Community Engagement Presentations on Tuesday, April 23. Students will receive guidelines and presentation order after the mid-semester break.