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ESFS 350: Water Essentials: Sustainable Use of a Limited Resource Course Syllabus Fall Semester 2017

Instructor: Brooke Porter, Ph.D.

Credits: 3

Contact Hours: 45

Prerequisites: None

Class hours: TBA

Office hours: Immediately after class

Lab/site fee: TBA

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 explore the interdependencies and linkages between water and human activities. The course will take a critical look at water sustainability through various lenses, including food systems, terrestrial and marine resources, and other industries.

Course Objectives

This course will ask students to:

- Understand the interdependencies and linkages between water and trade, development, and the environment.
- Identify linkages between energy, food, land use, and water.
- Analyse and compare the cultural and biological significance of water.
- Examine the political use of water.
- Explore how water use has shaped Italy and Italian culture.
- Develop innovative strategies for promoting sustainable water use, including at the consumer level, in one or more areas of land use, food, and energy.

Course Materials

Mandatory course reader

Assessment

10% Participation

15% Service Learning Project

15% Field Journal

30% Mid-Term Exam

30% Final Exam

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Grading 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

Mid-Term (30%): The mid-term exam will cover all topics presented in the first half of the course. It will consist of multiple choice questions, and short answers. The exam will take approximately 90 minutes to complete and is closed book/closed notes. No alternative exam dates will be offered.

Final Exam (30%): The final exam will cover all topics presented in the second half of the course. It will consist of short answers and a short essay. The exam will take approximately 90 minutes to complete and is closed book/closed note. This is the only time the exam will be given. No alternative exam dates will be offered.

Service Learning Project (15%): POST Laboratory

Students will collaborate with POST, the Science and Technology Centre in Perugia (www.perugiapost.it) led by Director Enrico Tombesi, to design a two-hour interactive science-based educational workshop for high school students. The topic will be on the concept of the water footprint and water usage in the home. Please see the course syllabus appendix for more information on the service learning project.

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 that day's assignments), asking questions, responding to questions, offering your own insights and opinions, and attentive listening to others.

Field Journal (15%): Students will also be asked to keep a field journal to document observations during the research component, field trip and service learning components.

Please Note: No food or drinks are allowed in the classroom. Mobile telephones, laptop computers, and any other electronic appliances must be turned off during the class period, whether in the classroom or at the sites.

Required Readings: Reading assignments should be done for the class day they are assigned, filling in the required homework. The instructor will assess student preparation in class by asking direct questions. Failure to respond or inadequate responses will lower student participation points.

Attendance: Class attendance is mandatory. Students are allowed two "free" absences during the semester, which they do not need to justify. Each additional absence, unless it is for a very serious reason,

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will lower your final grade by one grade level (e.g., a final grade of a B+ would be lowered to a B). It is also the policy of the Institute that any student who has eight or more absences automatically fails the class.

Please Note: Presence during mandatory field trips is especially important for students' performance in this class. Missing a mandatory field trip, unless for a very serious reason that is communicated to Umbra staff in a timely manner, will lower students' final grade by one grade level (e.g., a final grade of a B+ would be lowered to a B).

Course Schedule

Week 1

Class 1

A world of water

Lecture themes: This lecture provides an introduction to the course topics including an overview of the course structure. The instructor will familiarize students with global water systems. A basic overview of the biological significance of water will be covered. Students will be given a small research assignment that asks them to identify their main source of drinking water from their home town at a local and regional/state level. The service learning component of the course will be introduced and the accompanying schedule distributed.

Class 2

Social constructs of water

Lecture themes: The instructor will use UNESCO heritage sites in Italy such as Venice and its lagoon and the aqueducts of Vanvitelli, Roman baths, among others, as an introduction to the sociocultural significance of water. Students will also present the body of water that serves as their drinking water source.

Required readings: Canuti (2000, p. 117-125).

Week 2

Class 1

History & heritage

Lecture themes: This lecture will explore how water affects civilizations. Addressing the biological need for water and beyond, the instructor will explore how water-weather events including drought, tsunamis and hurricanes impact global populations.

Required readings: Spalding et al. (2014); Zhu et al. (2016); Sutton-Grier (2015).

Class 2

History & heritage

Lecture themes: The instructor will shift the discussion to a local level focusing on bodies of water in and connected to Italy. This lecture will introduce the role of water in Italian culture and agriculture. The class will take a short walking tour of Perugia to explore sites, including the Fontana Maggiore, Etruscan Well, and Aqueduct Street (Via dell'Acquedotto).

Required readings: Zappelli (2013, p. 34), (Gambini & Santanicchia 2009, p. 14); Angelakis et al. (2013).

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Week 3

Class 1

Watershed basics: part I

Lecture themes: Watersheds are foundational systems of water transport which take water that is "shed" from sky to sea, and everywhere in between. Size and scale of watersheds will be discussed as they relate to terrestrial topography. Students will be asked to debate scales and labels associated with watersheds.

Required readings: Lorenzoni et al. (2006); Pettine et al. (1996). Please note, during the next lecture students will be asked to prepare a short 300-500 word presentation on a watershed issue.

Class 2

Watershed basics: part II

Lecture themes: Anthropogenic impacts to watersheds will be discussed, including diversion, agricultural, and pollution among others. Students will be asked to share a three-minute presentation on a watershed issue that has personally affected them.

Required readings: Patterson et al. (2003); Mollema (2012); relevant news article or supporting evidence for 3-minute presentation.

Week 4

COMBINED LECTURE (about 3 hours):

Sustainability and water tourism

Lecture themes: The instructor will ask students to consider lessons learned from food systems, to energy, and to politics and ask students to debate what sustainable water tourism looks like applying previously covered topics. Trasimeno destination will be used as an example microcosm for water systems.

Required readings: Farrell, & Twining-Ward (2005); Waligo et al. (2013).

Marine resource use & conflicts of interest

Lecture Themes: Use of marine resources often ends in extraction of the resource. This lecture will focus on marine tourism and a non-extractive use of water resources. Conflicts of interest, including seafood extractive uses of certain fish for food and ornaments, as well as seafood consumption in coastal tourism settings, will be discussed.

Required readings: Burzigotti (2003); Fabinyi (2010); Giardino et al. (2010).

Please note: This week the class will meet only one time at Umbra for a longer period

Friday: Lake Trasimeno Field Trip

Students will be asked to record observations in a field journal during the experience and later take a critical look at the sustainability of the Pesca Turismo industry at Trasimeno.

Week 5

Class 1

Service Learning POST Visit

Lecture themes: The instructor will accompany students for an initial POST visit. POST staff will illustrate POST philosophy and mission and introduce the laboratory location. Students will engage in designing interactive discussion and relevant materials in English.

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Class 2

Water & politics

Lecture themes: This lecture will introduce power and politics associated with water usage. To follow up and foster interactive learning, students will break up in pairs and make a list of five stakeholders in the Lago Trasimeno watershed. Stakeholder groups will be compared and discussed as a class.

Required readings: Gambini & Santanicchia (2009, p. 9-36), WWAP (2010, p. 1-4).

Week 6

Class 1

Water & politics

Lecture themes: The instructor will build on the previous lecture with examples of the interrelationship between water and power. Water use at a regional level will then be discussed. Students will be asked to read a piece of legislation. After analysing the legislation, students will be asked to debate the legislation and suggest amendments that would improve sustainability.

Required readings: Marra (2007); Massarutto, & Ermano (2013).

Class 2

Water as energy

Lecture themes: This lecture will explore the various ways in which water is used as energy. Hydropower, wave power, and steam power, among others, will be discussed. The instructor will shift the discussion to a local level using the Vajont Dam as an example.

Required readings: Jacobson, & Delucchi, (2011); Kilburn, & Petley (2003); Kosnik (2008).

Week 7

Class 1

Mid-term exam review

Class 2

Mid-term exam

Week 8

Class 1

Water systems threats

Lecture themes: The instructor will introduce examples of environmental threats to water ways and concepts, including native, non-native, introduced and invasive species that can have an impact on the local environment, affecting both humans and natural ecosystems. The class will also discuss how these categories are created, and if they are consistent and/or useful.

Required reading: Chew, & Laubichler (2003); Davis et al. (2011); Piscia et al. (2011); Simberloff, & Vitule (2014).

Class 2

Environmental issues & water systems

Lecture Themes: Plastics and pharmaceuticals, agricultural runoff, and other nonpoint source pollution find their way into streams and oceans, in some cases creating dead zones. As a result, many end up in the human food chains. This lecture explores recent efforts and bans aimed to improve overall ocean health and ways in which students can modify their own behaviors to have a positive impact on the oceans.

Required readings: Danovaro et al. (2008); Bhandari et al. (2015); Wagner, & Oehlmann (2009).

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Week 9

Class 1

Service Learning POST Visit

Lecture Themes: Students will return to POST to develop the laboratory.

Class 2

Screening: “End of the Line”

Film summary: “The film provides a dramatic expose of those in the fishing industry and politicians who are failing to protect the world’s fish stocks. Scientists predict that if we continue fishing as we are now, we will see the end of most seafood by 2048.” Students will be asked to reflect on solutions for mitigating fisheries.

Required readings: UNESCO (2012, p. 51-54), Gill et al. (2010).

Week 10

Class 1

In-class discussion of “**End of the Line**”

Water systems & food

Lecture themes:

The instructor will introduce the role of water in food. Comparisons between plant and animal-based diets will be made and the students will be asked to consider the water footprint of their diets.

Required readings: Black (2009); McWilliams (2009), pp. 155-184

Class 2

Water systems & food

Lecture themes: Unlike some places, a substantial part of Italy's agriculture is naturally-irrigated. This lecture will explore how different agriculture techniques are used in Italy and will ask students to consider differences in landscape comparing Italian lawns to those commonly seen in the USA.

Required readings: Bazzani et al. (2004); Milesi (2005).

Week 11

FRIDAY MORNING LECTURE (about 3 hours)

Lecture Themes: Students will conduct the workshop at POST followed by a discussion. After a short break for lunch the lecture will resume with a guided visit to the Museo delle acque.

Please note: This week the class will meet only one time for a longer period

Week 12

Class 1

Sustainability of the water resources

Lecture Themes: Overfishing and destructive fishing is rampant. Research has shown that a reduction in catch as a result of declining fisheries promotes the use of destructive fishing techniques. Some of the more popular seafood, such as shrimp, is extracted with alarming bycatch rates. This lecture takes a critical look at the environmental effects of fishing gears and explores eco-conscious alternatives.

Required readings: Fabinyi (2007); Tlusty, & Thorsen (2016).

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Class 2

Fisheries management & Mediterranean fisheries

Lecture Themes: This lecture will explore the challenges and issues associated with global fisheries management. Cases from the Mediterranean fisheries will be introduced to help students understand challenges at national and regional levels.

Required readings: Colloca et al. (2013); Smith, & Garcia (2014).

Week 13

Class 1

Climate change

Lecture themes: Climate change has become an important topic on the international agenda as changes in weather patterns influence livelihoods and ecosystems. Global trends will be examined, and students will be asked to present solutions for mitigating climate change.

Required readings: UNESCO (2012, p. 51-54), Gill et al. (2010).

Class 2

Final exam review

December 11-15, Monday-Friday

Final exams and Special Academic Events Week. Appointments to be announced later in the semester.

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