

IDS 2935 Water for the Future

Quest 2

I. Course Information

Spring 2023

Meeting Day/Time: Tuesday and Thursday period 7 (1:55 – 2:45) Fine Arts B 0103

Breakout sessions: Friday period 7 (Architecture 0215), Friday period 8 (Weimer 1092), or Friday period 9 (Weimer 1092)

3 credits

Prerequisites: none

Primary General Education Designation: Biological Sciences

Secondary General Education Designation (if seeking): No Secondary Designation

Writing Designation (if seeking): No writing designation

A minimum grade of C is required for general education credit

Instructor

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Office hours: Friday 10:00 am - 12:00 pm via Zoom (<https://ufl.zoom.us/j/98700865323>)

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Course Description

This Quest 2 course focuses on the pressing question of how to best manage freshwater resources to meet the growing needs of society while maintaining healthy freshwater ecosystems. Fresh water is essential for human life and economic prosperity. Unfortunately, human demands on freshwater ecosystems have had severe adverse effects on freshwater habitats and the organisms that live in them. Biodiversity loss and habitat alteration have affected the ability of freshwater ecosystems to provide critical services such as waste purification.

This class will focus on concepts, terminology and processes in freshwater science that are related to water sustainability and how they contribute to biodiversity, ecosystem services, and human well-being. Successfully addressing water sustainability issues requires fundamental scientific approaches (e.g., from biology, geology, and chemistry) as well as approaches from other disciplines (e.g., environmental policy, economics, and engineering). We will draw from these approaches to inform students' understanding of water sustainability, approaches to managing water resources, and their ecological and economic consequences.

Each week the course will focus on a different topic that is critical to addressing the overarching question of water sustainability. The course will also focus on exploring two freshwater case studies, one focused on the Laurentian Great Lakes and one focused on the Florida Everglades. Throughout the course, students will analyze and evaluate scientific studies focused on freshwater ecology and water

resources. They will also weigh the costs and benefits of different approaches to water resource management and construct informed arguments for effective approaches that balance the growing needs of society while maintaining healthy freshwater ecosystems.

This course will also include two experiential learning activities including a tour of a local wastewater treatment facility and a sampling trip to a wetland on campus. Students will use freshwater ecology methods to sample the wetland and will analyze and evaluate the scientific data collected during this activity.

Required & Recommended Course Materials (to purchase/rent)

There are two required books for this course:

Drying Up: The Fresh Water Crisis in Florida by John M. Dunn, University Press of Florida, 2019

The Great Lakes Water Wars by Peter Annin, Island Press, 2018

Materials and Supplies Fees: n/a

II. Coursework & Schedule

1. List of Graded Work

Assignment	Description	Requirements	Points
Reading reflections (4)	There will be four reading reflections focused on a portion of each of the two books. These reflections will focus on how the books have affected your understanding of water sustainability or freshwater ecosystems as well as how we can best solve water sustainability issues.	500-750 words Rubric below	20 (5 each)
Reading questions (8)	Prior to most class discussions you will answer a set of reading questions. These questions are designed to help you summarize the main points of each paper and think critically about the experimental design and strength of the evidence prior to the class discussions. You will also formulate new hypotheses and think about how you would design a follow-up experiment.	Answer each question in a few sentences Rubric below	10 (1.25 each)
Discussion posts (5)	For some of the readings (typically review papers) or media (podcasts/videos) you will discuss your thoughts impressions or questions about the material in an online discussion. You will create two posts, and at least one should be a response to a question from the instructor or other students.	Rubric below	5 (1 each)
Class participation	Actively participate in class activities and class discussions.	Rubric below	10

Group Presentations (2)	Create a presentation with other members of your group that addresses water sustainability issues from the perspective of your assigned stakeholder group. What are the major issues your group is concerned with? What solutions could be beneficial?	8-10 minutes Rubric below	10
Exam 1	This exam will cover material from weeks 1 - 5		10
Exam 2	This exam is cumulative and will cover material up to week 11		15
Final Exam	This exam will cover material from the entire course		20

2. Weekly Course Schedule

Week/ Date	Activity	Topic/Assignment	Assigned Work Due
Week 1: Jan 10, 12, 13	Topic	Human water use	
	Summary	This week will focus on the availability of fresh water on earth. How do freshwater resources vary in space and time? What are the major reasons that humans withdraw water and how does water contribute to human health and economic prosperity? What sources of water do humans use?	
	Readings/Works	Review paper: Gleick, P. H., & Cooley, H. (2021). Freshwater Scarcity. Annual Review of Environment and Resources, 46, 319-348. Great Lakes Water Wars: Chapters 1 – 2 (33 pp.)	
Week 2: Jan 17, 19, 20	Topic	The water cycle and climate change	
	Summary	This week will focus on the water cycle. How does water move on, above, and below the surface of the earth? How have humans altered this cycle and how will it be impacted by climate change? What are the effects of water scarcity on freshwater organisms?	
	Readings/Works	Podcast: Science Vs – Climate Change (46:54) Primary Literature: Dekar, M. P., & Magoulick, D. D. (2013). Effects of predators on fish and crayfish survival in intermittent streams. Southeastern Naturalist, 12(1), 197-208. Great Lakes Water Wars: Chapters 3 – 5 (71 pp.)	
	Assignment	Reading questions for Dekar and Magoulick 2013	Friday
	Assignment	Discussion post focused on Science Vs – Climate Change	Sunday
Week 3: Jan 24, 26, 27	Topic	Human modification of flows, hydrology	
	Summary	This week will focus on water flow and flow variability. Is flow variability important for freshwater ecosystems? What are the ecological effects of dams as well as their costs and benefits to society?	

Week/ Date	Activity	Topic/Assignment	Assigned Work Due
	Readings/Works	Primary Literature: Mims, M. C., & Olden, J. D. (2013). Fish assemblages respond to altered flow regimes via ecological filtering of life history strategies. <i>Freshwater Biology</i> , 58(1), 50-62. Great Lakes Water Wars: Chapters 6 – 7 (30 pp.)	
	Assignment	Reading questions for Mims and Olden 2013	Friday
Week 4: Jan 31 Feb 2, 3	Topic	Water infrastructure	
	Summary	This week will focus on water infrastructure in the United States. Where does our water come from? How do we control water running off of human dominated landscapes? How is wastewater treated to reduce pollutants? What is the condition of our water infrastructure?	
	Experience	Tour of GRU's Main Street Water Treatment Facility in Gainesville	Friday
	Readings/Works	Review paper: Dudgeon, D., Arthington, A. H., Gessner, M. O., Kawabata, Z. I., Knowler, D. J., Lévêque, C., ... & Sullivan, C. A. (2006). Freshwater biodiversity: importance, threats, status and conservation challenges. <i>Biological reviews</i> , 81(2), 163-182. Great Lakes Water Wars: Chapters 8 – 9 (27 pp.)	
	Assignment	Reading reflection on Great Lakes Water Wars chapters 1 - 7 (R)	Sunday
	Assignment	Discussion post on Dudgeon et al. 2006	Sunday
Week 5: Feb 7, 9, 10	Topic	Freshwater biodiversity	
	Summary	This week will focus on freshwater biodiversity. What are the major groups of organisms that live in freshwater environments? How much biodiversity is present in freshwater ecosystems compared to terrestrial and marine habitats?	
	Readings/Works	Primary literature: Perron, M. A. C., & Pick, F. R. (2020). Stormwater ponds as habitat for Odonata in urban areas: the importance of obligate wetland plant species. <i>Biodiversity and Conservation</i> , 29(3), 913-931. Great Lakes Water Wars: Chapters 10 – 12 (52 pp.)	
	Assignment	Reading questions for Perron and Pick 2020	Friday

Week/ Date	Activity	Topic/Assignment	Assigned Work Due
Week 6: Feb 14, 16, 17	Topic	Threats to freshwater biodiversity	
	Summary	This week will focus on the value of biodiversity in freshwater ecosystems and major threats to this diversity. What proportion of freshwater organisms are at risk of extinction? What are the services that diverse freshwater ecosystems provide to society?	
	Readings/Works	Primary literature: DuBose, T. P., Atkinson, C. L., Vaughn, C. C., & Golladay, S. W. (2019). Drought-induced, punctuated loss of freshwater mussels alters ecosystem function across temporal scales. <i>Frontiers in Ecology and Evolution</i> , 7, 274. Great Lakes Water Wars: Chapters 13 and 17 (22 pp.) (Chapters 14 – 16 are optional)	
	Assessment	Exam 1	Tuesday
	Assignment	Reading questions for DuBose et al. 2019	Friday
Week 7: Feb 21, 23, 24	Topic	Great Lakes case study	
	Summary	This week will focus on freshwater in the Laurentian Great Lakes. On Tuesday, course material will focus on Great Lakes ecology. On Thursday, students will participate in a class discussion. On Friday, students will work in groups to present Great Lakes water sustainability issues and solutions from the point of view of one stakeholder group (e.g., shipping industry, environmental NGO, indigenous tribe, fishing industry), drawing on materials from Great Lakes Water Wars and other assigned readings.	
	Assignment	Group presentation	Friday
	Assignment	Reading reflection on Great Lakes Water Wars chapters 8 – 17 (R)	Sunday
Week 8: Feb 28 Mar 2, 3	Topic	Invasive species in freshwaters	
	Summary	This week will focus on invasive species and the invasion process in freshwater ecosystems. What are the ecological and economic impacts of freshwater invasive species? What vectors are important for invasive species introduction	

Week/ Date	Activity	Topic/Assignment	Assigned Work Due
		and spread in freshwaters? How can we best manage invasions and prevent new ones?	
	Readings/Works	Podcast: Gastropod – Dinner plate invasion: lionfish, tiger shrimp and feral pigs, oh my! (43:44) Primary literature: Walsh, J. R., Carpenter, S. R., & Vander Zanden, M. J. (2016). Invasive species triggers a massive loss of ecosystem services through a trophic cascade. <i>Proceedings of the National Academy of Sciences</i> , 113(15), 4081-4085. Drying Up: Chapters 1 – 2 (27 pp.)	
	Assignment	Reading questions focused on Walsh et al. 2016	Friday
	Assignment	Discussion post focused on Gastropod – Dinner plate invasion	Sunday
Week 9: Mar 7, 9, 10	Topic	Nutrients, eutrophication, and toxic algal blooms	
	Summary	This week will focus on nutrients and the causes and consequences of cultural eutrophication. What are the major sources of nutrient pollution? Why do excess nutrients lead to toxic algal blooms? How do algal blooms affect freshwater organisms and human health? How can we restore eutrophic ecosystems?	
	Readings/Works	Primary literature: Bogard, M. J., Vogt, R. J., Hayes, N. M., & Leavitt, P. R. (2020). Unabated nitrogen pollution favors growth of toxic cyanobacteria over chlorophytes in most hypereutrophic lakes. <i>Environmental science & technology</i> , 54(6), 3219-3227. Drying Up: Chapters 3 – 4 (31 pp.)	
	Assignment	Reading questions focused on Bogard et al. 2020	Friday
SPRING BREAK			
Week 10: Mar 21, 23, 24	Topic	Water pollution (other chemicals) and water law in the USA	
	Summary	This week will focus on forms of pollution other than nutrients including pesticides, pharmaceuticals, salt, and heavy metals. Where do these pollutants come from and how do they affect freshwater organisms and human health? This	

Week/ Date	Activity	Topic/Assignment	Assigned Work Due
		week will also focus on water law in the USA. What is the law governing water quality in USA? How do we regulate water quantity?	
	Readings/Works	Primary literature: Elbrecht, V., Beermann, A. J., Goessler, G., Neumann, J., Tollrian, R., Wagner, R., ... & Leese, F. (2016). Multiple-stressor effects on stream invertebrates: a mesocosm experiment manipulating nutrients, fine sediment and flow velocity. <i>Freshwater Biology</i> , 61(4), 362-375. Drying Up: Chapters 5 – 7 (53 pp.)	
	Assignment	Reading questions focused on Elbrecht et al. 2016	Friday
Week 11: Mar 28, 30, 31	Topic	Assessing freshwater environmental quality	
	Summary	This week will focus on methods for biological assessment. How can we use freshwater organisms to assess environmental quality?	
	Experience	Students will visit a wetland to sample macroinvertebrates, the most common taxonomic group used in biological assessments.	Friday
	Readings/Works	Review paper: Richter, B. D. (2010). Re-thinking environmental flows: from allocations and reserves to sustainability boundaries. <i>River Research and Applications</i> , 26(8), 1052-1063. Drying up: Chapter 8 – 10 (46 pp.)	
	Assignment	Reading reflection on Drying UP: The Fresh Water Crisis in Florida chapters 1 – 7 (R)	Sunday
	Assignment	Discussion post focused on Richter 2010	Sunday
Week 12: Apr 4, 6, 7	Topic	Assessing freshwater environmental quality continued	
	Summary	This week will focus on methods for biological assessment. How can we use freshwater organisms to assess environmental quality?	
	Experience	Students will examine and identify the macroinvertebrates collected the previous week. Macroinvertebrates will be sorted into sensitive and tolerant groups to assess environmental quality.	Friday
	Readings/Works	Drying up: Chapter 11 – 12 (31 pp.)	

Week/ Date	Activity	Topic/Assignment	Assigned Work Due
	Assessment	Exam 2	Thursday
Week 13: Apr 11, 13, 14	Topic	Small waters, big impacts & Freshwater fisheries	
	Summary	This week will focus on small freshwater habitats such as headwater streams and vernal pools that are often not protected by policy but can have large ecological impacts. This week will also focus on freshwater fisheries and overexploitation. How important are freshwater fisheries economically and as a food resource? Are we overfishing freshwaters? What are the ecological consequences of overexploitation? How can we regulate fisheries?	
	Readings/Works	Primary literature: Taylor, B. W., Flecker, A. S., & Hall Jr, R. O. (2006). Loss of a harvested fish species disrupts carbon flow in a diverse tropical river. <i>Science</i> , 313(5788), 833-836. Drying up: Chapter 13 – 14 (24 pp.)	
	Assignment	Reading questions focused on Taylor et al. 2006	Thursday
Week 14: Apr 18, 20, 21	Topic	Everglades case study	
	Summary	This week will focus on freshwater in the Everglades. On Tuesday, course material will focus on Everglades ecology. On Thursday, students will participate in a class discussion. On Friday, students will work in groups to present Everglades water sustainability issues and solutions from the point of view of one stakeholder group (e.g., environmental NGO, consumers/residents, farming industry), drawing on materials from <i>Drying Up: The Freshwater Crisis in Florida</i> and other assigned readings.	
	Assignment	Group presentation	Friday
	Assignment	Reading reflection on <i>Drying UP: The Fresh Water Crisis in Florida</i> chapters 8 – 14 (R)	Sunday
Week 15: Apr 25	Topic	Interactions between drivers of change	
	Summary	This week will focus on the combined effects of different stressors on freshwater ecosystems	

Week/ Date	Activity	Topic/Assignment	Assigned Work Due
	Readings/Works	Review paper: Reid, A. J., Carlson, A. K., Creed, I. F., Eliason, E. J., Gell, P. A., Johnson, P. T., ... & Cooke, S. J. (2019). Emerging threats and persistent conservation challenges for freshwater biodiversity. <i>Biological Reviews</i> , 94(3), 849-873.	
	Assignment	Discussion post focused on Reid et al. 2019	Tuesday
May 5	Assessment	Final exam 10 am – 12 pm	Friday

III. Grading

3. Statement on Attendance and Participation

Attendance and Participation:

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

- **Attendance:** Attendance will be taken daily and recorded in the Canvas gradebook. You are allowed three “personal days” for the semester, after which each absence that does not meet university criteria for “excused” will result in a two-point deduction from your final grade.
- **Participation:** Consistent informed, thoughtful, and considerate class participation is expected and will be evaluated using the rubric below. The instructor will inform you of your participation grade to date when mid-term exams are returned and schedule a conference if you are earning below 70% of the possible points.
- **NOTE:** If you have personal issues that prohibit you from joining freely in class discussion, e.g., shyness, language barriers, etc., see the instructor as soon as possible to discuss alternative modes of participation.

Rubrics:

Reading Reflections Rubric

Criteria	Points
Content <ul style="list-style-type: none">• Demonstrates a thorough understanding of the water sustainability issues addressed in the reading• Connects content of the reading to other material from the course• Uses course content to argue for solutions to water sustainability issues	2.0 points
Reflection <ul style="list-style-type: none">• Identifies how water sustainability issues relate to their own lives and practices• Evaluates how their perspectives have changed as a result of the reading and other course materials	2.0 points
Organization/clarity/grammar <ul style="list-style-type: none">• Logical ordering of ideas, effective transitions, coherence, and conciseness• Correct word usage, spelling, proper sentence/paragraph structure, and formatting	1.0 points
Total Points: 5.0	

Reading Questions Rubric

Criteria	Ratings		Points
Response to questions	1.0 points Answers to questions are accurate and arguments are convincing. Demonstrates an understanding of the main findings in the paper and their significance. Proposed follow-up study would effectively test the new hypothesis identified.	0.0 points No submission or much information missing or inaccurate.	1.0 points
			Total Points: 1.0

Online Discussion Rubric

Criteria	Ratings		Points
Discussion posts	1.0 points Two discussion posts submitted. Posts are fully developed including thorough explanations, appropriate details, and insight (this usually requires a couple of paragraphs to accomplish). Some contributions are original (perspective not previously posted). At least one post is a response to the posting of others.	0.0 points No submission or little development of thoughts.	1.0 points
			Total Points: 1.0

Class Participation Rubric

	High Quality	Average	Needs Improvement
Informed: Shows evidence of having done the assigned work.	4	2	0
Thoughtful: Shows evidence of having understood and considered issues raised.	4	2	0
Considerate: Takes the perspective others into account.	2	1	0
			Total Points: 10.0

Group Presentation Rubric

Criteria	Points
Stakeholder Perspective <ul style="list-style-type: none"> Clearly identifies issues from the perspective of the stakeholder group Describes how different management practices would affect the interest of the group Identifies solutions that would be beneficial to the group 	1.0 points
Content <ul style="list-style-type: none"> Introduction is attention-getting and lays out the problem well Presents relevant and accurate scientific information to back up arguments Demonstrates an understanding of the research Clear conclusions and management recommendations 	1.0 points
Organization <ul style="list-style-type: none"> Logical ordering of ideas that the audience can follow Effective transitions between major points The purpose of each slide is clear Speakers stay within time limit 	1.0 points
Delivery <ul style="list-style-type: none"> Adequate volume Appropriate pace Eye contact with audience Enthusiasm for the topic 	1.0 points
Visual Aids <ul style="list-style-type: none"> The use of visual aids is effective Amount of text is appropriate Figures and text can be seen easily Graphics or figures add to the impact of the slide 	1.0 points
Total Points: 5.0	

4. Grading Scale

For information on current UF policies for assigning grade points, see <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>.

A	94 – 100% of possible points		C	74 – 76.9%
A-	90 – 93.9%		C-	70 – 73.9%
B+	87 – 89.9%		D+	67 – 69.9%
B	84 – 86.9%		D	64 – 66.9%
B-	80 – 83.9%		D-	60 – 63.9%
C+	77 – 79.9%		E	<59.9

IV. Quest Learning Experiences

5. Details of Experiential Learning Component

This course will include two experiential learning activities. In week 4, the class will take a tour of GRU's Main Street Water Treatment Facility in Gainesville to gain a better understanding of our water infrastructure. Students will also identify additional water infrastructure around Gainesville (e.g., stormwater ponds), and students will share photos of infrastructure they found and discuss its purpose and impact on water resources. In week 11, students will sample a freshwater ecosystem, Lake Alice, and assess its environmental quality using benthic invertebrates as biological indicators. These activities are planned to occur during the regular class time (R7-8). If this is not possible, and activities must be scheduled outside of the regular class time, the instructor will provide an alternative activity (watching a relevant video) for students that are unable to attend.

6. Details of Self-Reflection Component

Students will reflect on what they have learned through the four reading reflections and case study presentations and discussions. The reading reflections will ask the students to reflect on what they think about water sustainability, freshwater ecosystems, and solutions to water sustainability issues as they read the two assigned books, *Great Lakes Water Wars* and *Drying Up: The Fresh Water Crisis in Florida*. These books focus water sustainability from the perspectives of ecology, human well-being, and environmental policy. Students will also create presentations for the class focusing on issues and solutions from the perspective of a particular stakeholder group for each of the two case studies, the Great Lakes and the Everglades. This will allow them to explore issues and solutions from different perspectives.

V. General Education and Quest Objectives & SLOs

7. This Course's Objectives—Gen Ed Primary Area and Quest

Biological Sciences + Quest 2 + Course Objectives

Biological Sciences Objectives →	Quest 2 Objectives →	This Course's Objectives →	Objectives will be Accomplished By:
Biological science courses provide instruction in the basic concepts, theories and terms of the scientific method in the context of the life sciences.	Address in relevant ways the history, key themes, principles, terminologies, theories, or methodologies of the various social or biophysical science disciplines that enable us to address pressing questions and challenges about human society and/or the state of our planet.	This course will examine major concepts, terms and theories in freshwater science, with an emphasis on human impacts to key freshwater ecological processes. This will allow students to address the pressing question of how to manage freshwater resources to meet the growing needs of society while maintaining healthy freshwater ecosystems.	This course will accomplish this objective through in-class lectures and activities that focus on these concepts, terms and theories. This will also be accomplished by reading and discussing the content of 12 peer-reviewed scientific studies.
Courses focus on major scientific developments and their impacts on society, science and the environment, and the relevant processes that govern biological systems.	Present different social and/or biophysical science methods and theories and consider how their biases and influences shape pressing questions about the human condition and/or the state of our planet.	This course will examine major scientific developments that have changed human access to and use of water resources and how these developments have altered freshwater environments and human well-being. This course will also focus on developments in the management and restoration of freshwater ecosystems.	This course will accomplish this objective through in-class lectures and activities that focus on these developments. This will also be accomplished by reading and discussing peer-reviewed scientific studies and books focused on the Great Lakes and Everglades case studies.

Biological Sciences Objectives →	Quest 2 Objectives →	This Course's Objectives →	Objectives will be Accomplished By:
<p>Students will formulate empirically-testable hypotheses derived from the study of living things, apply logical reasoning skills through scientific criticism and argument, and apply techniques of discovery and critical thinking to evaluate outcomes of experiments.</p>	<p>Enable students to analyze and evaluate (in writing and other forms of communication appropriate to the social and/or biophysical sciences) qualitative or quantitative data relevant to pressing questions concerning human society and/or the state of our planet.</p>	<p>This course will enable students to critically evaluate scientific data and evidence supporting scientific findings that relate to the overarching question of the course. In addition, students will formulate empirically-testable hypotheses based on scientific findings.</p>	<p>This course will accomplish this objective by students critically evaluating the methods and the strength of the evidence in 12 peer-reviewed scientific studies. For 8 of these studies, students will also answer a set of reading questions in which they will identify the hypothesis being tested in the study. Students will also be asked to describe a follow-up study that could be conducted and to include the hypothesis that this follow-up study would test.</p>
<p>Biological science courses provide instruction in the basic concepts, theories and terms of the scientific method in the context of the life sciences.</p>	<p>Analyze critically the role social and/or the biophysical sciences play in the lives of individuals and societies and the role they might play in students' undergraduate degree programs.</p>	<p>This course will present the scientific method and examine how it is used in the freshwater sciences. The course will also evaluate how scientific information is used in managing freshwater resources which are critical to society. This course will focus on critical evaluation of scientific data and scientific studies, which will allow students to succeed in future science courses in their degree programs.</p>	<p>Students will be introduced to the scientific method in an in-class lecture at the start of the semester. Students will examine how scientists are using the scientific method through reading and evaluating scientific studies. In addition, readings, presentations and discussions focused on the case studies will allow students to assess how scientific information is used in real-world management decisions.</p>

Biological Sciences Objectives →	Quest 2 Objectives →	This Course's Objectives →	Objectives will be Accomplished By:
	Explore or directly reference social and/or biophysical science resources outside the classroom and explain how engagement with those resources complements classroom work.	This course will engage students with water infrastructure in Gainesville and investigate how scientists use freshwater organisms to assess environmental quality in a local lake.	This course will accomplish this objective through a visit and tour of a local wastewater treatment plant. In addition, students will sample a wetland and conduct a biological assessment using freshwater invertebrates.

8. This Course's Student Learning Outcomes (SLOs)—Gen Ed Primary Area and Quest

Biological Sciences + Quest 2 + Course SLOs

	Biological Sciences SLOs ➔	Quest 2 SLOs ➔	This Course's SLOs ➔	Assessment
Content	<p>Identify, describe, and explain the basic concepts, theories and terminology of natural science and the scientific method; the major scientific discoveries and the impacts on society and the environment; and the relevant processes that govern biological and physical systems.</p>	<p>Identify, describe, and explain the cross-disciplinary dimensions of a pressing societal issue or challenge as represented by the social sciences and/or biophysical sciences incorporated into the course.</p>	<p>Identify, describe, and explain major concepts, terminology, and processes in freshwater science that are related to water sustainability and how they contribute to biodiversity, ecosystem services, and human well-being.</p> <p>Identify, describe, and explain how water allocation, quality, and availability is influenced by the dimensions of environmental policy, economics, engineering and ecology.</p>	<p>Class participation, reading reflections, discussion posts, group presentations, exam 1, exam 2, final exam</p>
Critical Thinking	<p>Formulate empirically-testable hypotheses derived from the study of physical processes or living things; apply logical reasoning skills effectively through scientific criticism and argument; and apply techniques of discovery and critical thinking effectively to solve scientific problems and to evaluate outcomes.</p>	<p>Critically analyze quantitative or qualitative data appropriate for informing an approach, policy, or praxis that addresses some dimension of an important societal issue or challenge.</p>	<p>Analyze and Evaluate scientific studies focused on freshwater ecology and water resources.</p> <p>Weigh the costs and benefits of different approaches to water resource management and construct informed arguments for effective approaches that balance the growing needs of society while maintaining healthy freshwater ecosystems.</p>	<p>Class participation, group presentations, reading reflections, reading questions, discussion posts</p>

	Biological Sciences SLOs ➔	Quest 2 SLOs ➔	This Course's SLOs ➔	Assessment
Communication	Communicate scientific knowledge, thoughts, and reasoning clearly and effectively.	Develop and present , in terms accessible to an educated public, clear and effective responses to proposed approaches, policies, or practices that address important societal issues or challenges.	Communicate scientific information through writing and develop reasoning to support approaches, policies, or practices that influence freshwater resources. Present scientific information in an oral format	Written skills will be assessed through reading reflections and reading questions. Oral/verbal skills will be assessed through class participation and group presentations
Connection	N/A	Connect course content with critical reflection on their intellectual, personal, and professional development at UF and beyond.	Connect freshwater sciences and water sustainability with their current and future professions, lives, and roles in society.	Class participation, reading reflections, discussion posts

VI. Required Policies

9. Online Course Evaluation Process

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

10. Academic Honesty

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity." You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

11. Software Use

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate

12. Services for Students with Disabilities

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their

accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

13. Campus Helping Resources

Students experiencing crises or personal problems that interfere with their general wellbeing are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, www.counseling.ufl.edu.

Counseling Services

Groups and Workshops

Outreach and Consultation

Self-Help Library

Wellness Coaching

- U Matter We Care, www.umatter.ufl.edu/.
- Career Connections Center, First Floor JWRU, 392-1601, <https://career.ufl.edu/>.
- University Police Department: 392-1111 or 9-1-1 for emergencies.

Student Complaints:

- Residential Course: <https://sccr.dso.ufl.edu/policies/student-honor-code-studentconduct-code/>.
- Online Course: <http://www.distance.ufl.edu/student-complaint-process>

14. The Writing Studio

The writing studio is committed to helping University of Florida students meet their academic and professional goals by becoming better writers. Visit the writing studio online at <http://writing.ufl.edu/writing-studio/> or in 2215 Turlington Hall for one-on-one consultations and workshops.