

CRSS 3050: WATER QUALITY

FALL SEMESTER, 2022

4 credit hours

Lectures on Monday and Friday at 1:50 PM – 2:40 PM

Labs on Wednesday at 1:50 PM – 3:50 PM

Athens Campus: 3203 Miller Plant Sciences Building

Griffin Campus: 275 Redding Building

Tifton Campus: 534 NESPAL Building

Prerequisites

CHEM 1211 and (PHYS 1111 or 1211) and MATH 1113

Instructors

Dr. Dory Franklin, Professor

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Athens Campus

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Dr. Qingguo (Jack) Huang, Professor

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Griffin Campus

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Dr. George Vellidis, Professor

Crop & Soil Sciences Dept.

Office 133, Engineering Building

Tifton Campus

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Office Hours

Please make an appointment if you would like a face-to-face meeting with one of the instructors.

Otherwise, we are always available by phone or email.

Course Description

The course covers the key environmental concepts and parameters important to understanding water quality. We will use the laboratory activities to provide you with experiential learning and teach you how to conduct the analytical laboratory techniques used to quantify water quality parameters such as nutrient, bacterial indicators, and dissolved oxygen concentrations. We will learn to make design decisions based on water quality parameters. We will also explore how past and current societies dealt and deal with the consequences of environmental degradation.

Learning Objectives

Provide students with an appreciation of the complexity of environmental systems, a good understanding of the fate and transport of substances that contaminate our surface and subsurface water systems, the ability to measure environmental parameters, analyze them, interpret them, and evaluate their environmental importance. Other learning objectives include:

- extend critical thinking and problem-solving abilities; and
- improve written and oral communication skills.

Note

The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

Tentative Course Outline

Total: 30 lecture periods, 14 lab periods

Before Thanksgiving: 26 lecture periods, 13 lab periods

After Thanksgiving: 4 lecture periods (includes Friday Schedule on Tuesday, 06 December), 1 lab period

Section 1: Introduction

1. Course overview (All)
2. Water quality (Huang)
3. Water cycle and hydrology (Huang)
4. Watersheds (Vellidis)

Section 2: Physical and Carbonate Water Quality Parameters

1. Physical characteristics (Huang)
2. pH, and Carbonate Equilibrium (Huang)
3. Alkalinity and Hardness (Huang)

Section 3: Waterborne Pathogens

1. E. coli (Vellidis)
2. Other pathogens (Vellidis)

Section 4: Nutrients and Water Quality

1. Nitrogen, nitrogen cycle (Franklin)
2. Phosphorus, phosphorus cycle (Franklin)
3. Nutrient criteria in lakes, streams, and groundwater (Franklin)
4. TMDLs (Vellidis)

Section 5: Dissolved Oxygen and Chlorophyll

3. Dissolved oxygen (Vellidis)
4. BOD and COD (Vellidis)
5. Chlorophyll (Vellidis)

Section 6: Other Contaminants

1. Hormones and emerging sources (Franklin)
2. Metals (Huang)

Section 7: Materials Balance

1. Unit conversions (Vellidis)
2. Steady state conservative systems (Vellidis)
3. Steady state non-conservative systems (Vellidis)
4. Non-steady state non-conservative systems (Vellidis)

Planned Laboratories (Dates will be a function of how we progress through the course material.)

- Visit Waterbodies
- Total Suspended Solids and Turbidity
- Alkalinity
- *E. coli*
- Dissolved Nitrogen and Phosphorus
- BOD (Biochemical Oxygen Demand)

We will be conducting laboratories to reinforce the materials presented in the class and to provide experiential learning. A comprehensive laboratory report summarizing the lab's activities and including data from the labs will be due one week after the lab. Laboratory reports must be prepared using an appropriate reporting style to receive full credit. A laboratory report guide and examples of reports will be available on ELC. Please USE THEM. The lab reports are your opportunity to demonstrate to us that you understand the material and to demonstrate that you can analyze information, appraise the information, assess the pros and cons, make judgments, and defend your decisions.

Guest Lecturers

Experts in various aspects of environmental sciences will occasionally present lectures. Students will be notified in advance of appearance by guest lecturers. Attendance is mandatory during guest lectures.

Textbooks and Teaching Materials:

A text book is not required for the course. We will be providing reading selected readings which we will then discuss in class.

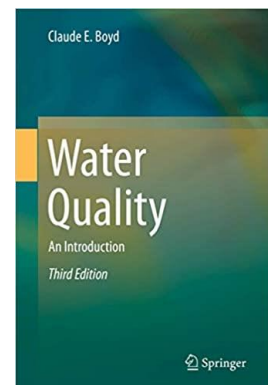
Suggested Reading: *Water Quality: An Introduction* by Claude E. Boyd, 2000, Kluwer Academic Publishers.

From Amazon.com

\$54.00 - \$82.20 + shipping in hardcover

eTextbook – \$24.10 to rent, 64.99 to purchase

Additional reading materials will be supplied by the instructors and will include benchmark research articles and other appropriate materials.



Grading

The grade you receive in this course will be determined from your performance on two announced exams, weekly quizzes, homework assignments and lab reports, a comprehensive final exam, and class participation. These factors will be weighted as follows:

- Announced Exams 20%
- Homework Assignments/Lab Reports 60%

- Final Exam 15%
- Class participation 5%

Active class participation is important for you to achieve the learning goals of the class even if circumstances require us to move to virtual teaching during the semester. To receive maximum credit for class participation you must:

- Attend every class period (lecture or laboratory) even if the class moves to a virtual platform;
- Arrive on time and remain for the entire class period;
- You are actively engaged and attentive throughout the class period; and
- Participate in the class discussion and ask and answer questions.

Per Board of Regents policy, we reserve the right to drop students from the class roll who miss more than 5 class periods except in cases of illness (note from a medical doctor) or family emergency. Such students will be given a WF grade.

Final grades will be assigned as follows:

- A 93 and above
- A- 90-92
- B+ 87-89
- B 83-86
- B- 80-82
- C+ 77-79
- C 73-76
- C- 70-72
- D+ 67-69
- D 63-66
- D- 60-62
- F 59 and below

Up to thirty percent of the grade on submitted assignments will be based on quality of communication. Neatness, spelling, grammar, punctuation, and clarity of writing are evidence of written communication quality.

Policy for Late Assignments and Missed Exams and Quizzes

- Labs cannot be physically made up as they require significant preparation by staff. However, lab activities will be recorded and made available on ELC. Lab reports for missed labs will not be accepted and will be assigned a grade of zero except in case of documented illness (doctor's note) or extenuating circumstances.
- There will be no make-ups for exams. Any missed exam will be recorded as a zero except in case of documented illness or extenuating circumstances.
- Homework assignments will be accepted up to one week beyond the due date. The penalty for submitting a late assignment is one letter grade.
- Homework assignments may be submitted late without penalty in case of illness, extenuating circumstances, or if prior arrangements are made with the instructors. All late assignments are due within a week of the original due date or within a week of when a student returns from an illness.

Food and Drink in the Classroom

University policy prohibits tobacco products, food or drink in all labs and classrooms.

Academic Honesty

Students are reminded that they are bound by the University's Academic Honesty Policy. We take this very seriously. A Culture of Honesty, the University's policy and procedures for handling cases of suspected dishonesty, can be found at: <https://honesty.uga.edu/>

The UGA Student Honor Code states: "I will be academically honest in all of my academic work and will not tolerate academic dishonesty of others."

All academic work must meet the standards contained in "A Culture of Honesty." Each student is responsible for informing themselves about those standards before performing any academic work.

For this course, all lab reports and other assignments can be discussed with your classmates but any work you turn in must be your own.

Plagiarism of online and other sources will not be tolerated. Any assignment that includes plagiarized materials will be assigned a grade of zero. A second infraction will result in referral to UGA's Office of Academic Honesty.

Definition of Plagiarism

(https://honesty.uga.edu/Academic-Honesty-Policy/Prohibited_Conduct/)

Submission for academic advancement the words, ideas, opinions or theories of another that are not common knowledge, without appropriate attribution to that other person. Plagiarism includes, but is not limited to, the following acts when performed without appropriate attribution:

- Directly quoting all or part of another person's written or spoken words without quotation marks, as appropriate to the discipline;
- Paraphrasing all or part of another person's written or spoken words without notes or documentation within the body of the work;
- Presenting an idea, theory or formula originated by another person as the original work of the person submitting that work;
- Repeating information, such as statistics or demographics, which is not common knowledge and which was originally compiled by another person;
- Purchasing (or receiving in any other manner) a term paper or other assignment that is the work of another person and submitting that term paper or other assignment as the student's own work.

Help Outside and Within the Classroom

Help is available to you should you have difficulty with this course. Please make an appointment to see the instructors if you need help.

Students with disabilities who require reasonable accommodations in order to participate in course activities or meet course requirements should contact the instructor during regular office hours or by appointment. For more information, please visit the University's Disability Resources Center at: www.drc.uga.edu or (706) 542-8719.

Mental Health and Wellness Resources

If you or someone you know needs assistance, you are encouraged to contact Student Care and Outreach in the Division of Student Affairs at 706-542-7774 or visit <https://sco.uga.edu>. They will help you navigate any difficult circumstances you may be facing by connecting you with the appropriate resources or services.

UGA has several resources for a student seeking mental health services (<https://www.uhs.uga.edu/bewelluga/bewelluga>) or crisis support (<https://www.uhs.uga.edu/info/emergencies>).

If you need help managing stress anxiety, relationships, etc., please visit BeWellUGA (<https://www.uhs.uga.edu/bewelluga/bewelluga>) for a list of FREE workshops, classes, mentoring, and health coaching led by licensed clinicians and health educators in the University Health Center.

Additional resources can be accessed through the UGA App.

Expectations for Class Participation

Participation is graded using the criteria below. *Additional criteria may also be used.* With such a small number of students in the class, I expect everyone to receive participation grades of 8 to 10.

Grade	Criteria
0	<ul style="list-style-type: none">• Misses 4 or more class periods. Class period is defined as a lecture or lab.
2	<ul style="list-style-type: none">• Misses 3 class periods.• Is on time to class and is respectful to instructor and peers.• Not frequently involved in discussion.• Provides minimal response to questions.• <i>Demonstrates minimal involvement.</i>
4	<ul style="list-style-type: none">• Misses 2 class periods.• Is on time to class and is respectful to instructor and peers.• Adequately prepared for class.• Answers questions but does not ask questions.• Participates actively in labs but does not contribute to discussions.• <i>Demonstrates occasional involvement.</i>
6	<ul style="list-style-type: none">• Misses no more than 1 class period.• Is on time to class and is respectful to instructor and peers.• Well prepared for class.• Answers questions well and ask questions frequently.• Participates actively in labs and contributes to discussions.• <i>Demonstrates consistent involvement.</i>
8	<ul style="list-style-type: none">• Misses no more than 1 class period.• Is on time to class and is respectful to instructor and peers.• Well prepared for class.• Answers questions well and ask questions frequently.• Participates actively in labs and contributes to discussions.• Contributes well to discussion by adding relevant information learned outside the classroom.• <i>Demonstrates very active involvement.</i>
10	<ul style="list-style-type: none">• Misses no more than 1 class period.• Is on time to class and is respectful to instructor and peers.• Well prepared for class.• Answers questions well and ask questions frequently.• Participates actively in labs and contributes to discussions.• Contributes well to discussion by adding relevant information learned outside the classroom.• Contributes well to discussion in an ongoing way: responds to other students' points, thinks through own points, questions others in a constructive way, offers and supports suggestions that may be counter to the majority opinion.• <i>Demonstrates excellent involvement.</i>