

EEE 360
Water Quality and Treatment Laboratory
Fall 2025

INSTRUCTOR: Dr. Amisha D. Shah

Office: HAMP 3145A

E-mail: adshah@purdue.edu

Phone: 765-496-2470

Office Hours: MWF (4:30 PM – 5:30 PM); other times by appt.

TEACHING ASSISTANT:

E-mail:

Office Hours:

PEER TA:

E-mail:

COURSE TIME AND LOCATION:

Class time: MF 3:30 – 4:20 pm

Lab time (Section 008): T 9:30 – 11:20 AM

Class location:

Lab time (Section 009): T 3:30 – 5:20 PM

Class location:

COURSE DESCRIPTION:

Overall: 2 h lecture, 2 h lab, and 3 credits. Prerequisites: None

This course aims to teach students how to measure important water quality constituents related to wastewater and drinking water treatment and develop various chemical, physical, and biological processes used to treat these waters. The laboratory procedures will encompass traditional but also advanced techniques used by water utilities, industries, and regulatory agencies. The analytical techniques and biological assays used to assess chemical and biological constituents in water will encompass titrimetric, colorimetric, or plating methods. Other lab procedures will simulate various treatment processes including ion exchange, coagulation, lime softening, coagulation, chlorination, and pH adjustment.

REQUIRED MATERIAL:

No textbook is required for this class. All relevant notes and handouts will be provided in class and posted on Brightspace. Please check Brightspace periodically (at least once a week). Additional information will also be provided through your university e-mail account. It is advised that you check this e-mail account frequently, as well to receive important updates regarding the course.

LEARNING OBJECTIVES:

There are several learning objectives for this class. They include the following:

1. Interpret the lab protocol and perform the laboratory experiment during class

2. Interpret experimental data and explain the role of experimental error and variability
3. Process, analyze, and present data
4. Formulate and explain conclusions from technical data
5. Summarize the quantitative results and propose strategies to manage the environmental problems that stem from it.

COURSE PREREQUISITES:

- CHM 11200 or 11600 or 11610, CHM 11620 or 11630 or 12400 or 12600 or 12901 or 13600 or C1020, CHM C1220 or C1060, CHM C1260
- CE/EEE 350 (Introduction to Environmental Engineering) be taken prior to this course where overlapping topics will be discussed (e.g. chemical reaction kinetics, mass balances, etc.).

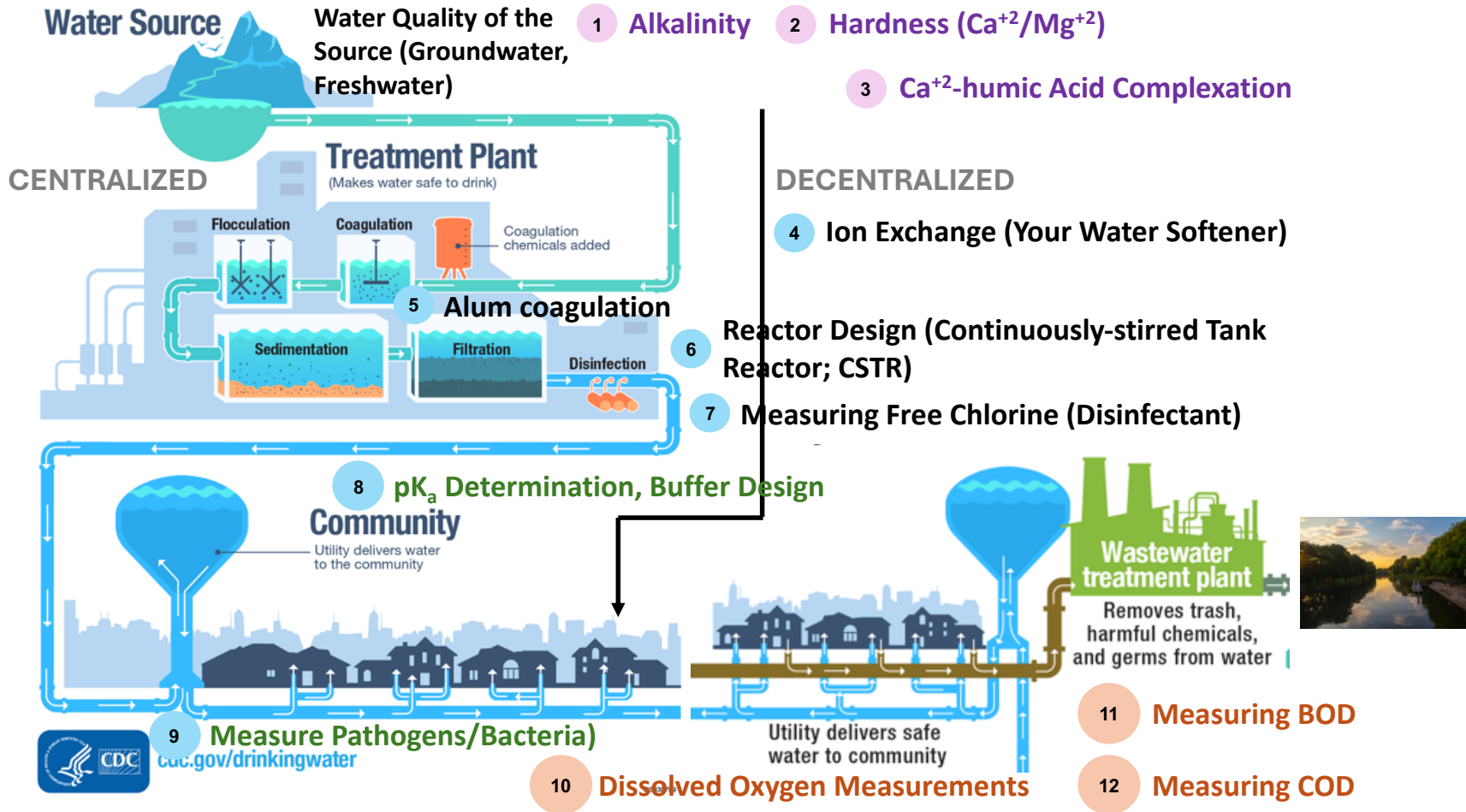
COURSE OUTLINE:

The course will be comprised two lecture periods and a two-hour laboratory session each week in which 12 total lab modules will be run. For the majority of the labs, you will work in groups of two to three, except for lab three where you will not perform the lab but will be given a video demonstration of the lab. There will be a **laboratory report** assigned for each lab module and for most cases, the laboratory report will be due after one week (the following Monday night @ 11:59 pm). The important dates for the specific lab modules and the due dates for the lab reports are listed below:

Dates	Lab Number	Lab Module Topic	Lab Report Due (@ 11:59 pm)
Aug 26	0	Preparatory lab (assign lab coats, show lab)	
Sept 02	1	pH measurement, acid-base titrations, alkalinity	Sept 08
Sept 09	2	Ca and Mg measurement by EDTA Chelation/Titration, Lime softening	Sept 15
Sept 16	3	Ion selective electrodes Ca^{2+} -humic acid complexation	Sept 22
Sept 23	4	Ion Exchange (Cu^{2+} – Na^+)	Sept 29
Sept 30	5	Alum Coagulation, Turbidity	Oct 06
Oct 07	6	Completely Mixed Systems in Series, First Order Decay	Oct 20
Oct 14		No Lab (October Break)	
Oct 21	7	Chlorine analysis by the DPD Colorimetric Method	Oct 27
Oct 28	8	UV/Vis Spectroscopy, Buffer Design, pK_a Determination	Nov 03
Nov 04	9	<i>E. Coli</i> Measurement and Disinfection	Nov 10
Nov 11	10	Dissolved Oxygen, Henry's Law (O_2 probe and Winkler)	Nov 17
Nov 18	11	Biochemical Oxygen Demand (BOD)	Nov 24
Nov 25		No Lab (Thanksgiving Break)	
Dec 02	12	Chemical Oxygen Demand (COD)	Dec 08

Dec 08-12		QUIET WEEK - Last lab report due	
Dec 15-20		FINAL EXAM WEEK – No exam	

LAB MODULE ORGANIZATION:



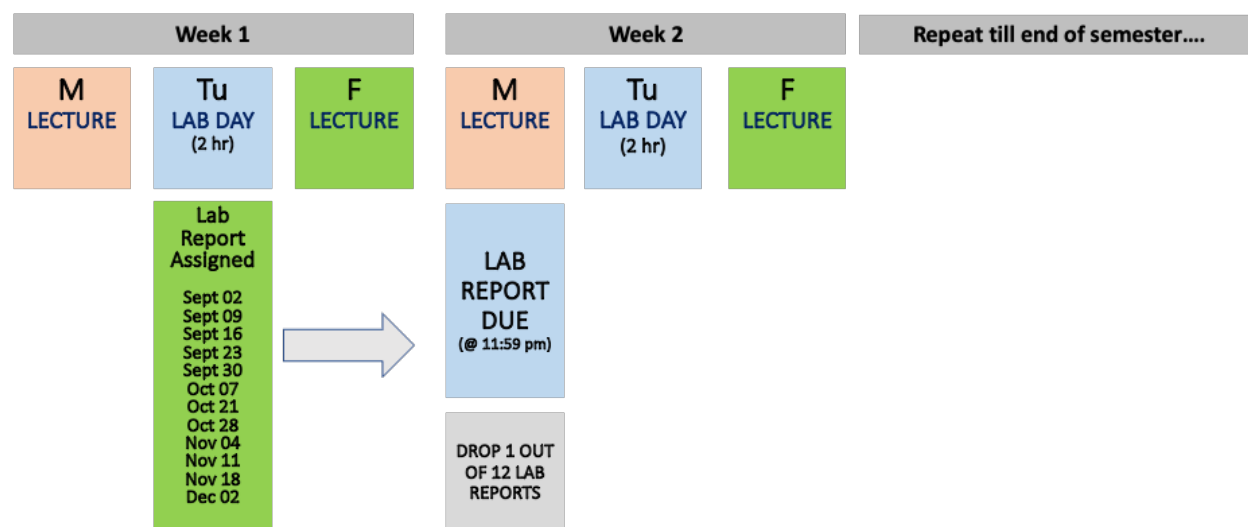
COURSE STRUCTURE

The course will be structured so that the first and last day of the week (MF) will include lectures and in-class problems that are related to the lab that you will complete, whereas the third day (Tu) will be the day where you perform the lab during a 2-hr lab session.

For the entirety of the semester, you will complete the lab during the lab session with (1) one partner, (2) two partners, or (3) your whole class (this will only occur for one lab session). You will switch lab partners three times during the course of the semester, so that you will work with a different group every three to four labs. Groups will be assigned based on the Qualtrics survey that you complete during the first day of class.

For the assignments, the course will be comprised of completing a laboratory report each week. Therefore, you will be assigned **a total of 12 laboratory reports, but you may drop one of your lowest score lab reports such that it will not contribute to your final grade.** The lab report will be assigned after you complete the lab each Tuesday and will be due the following Monday @ 11:59 pm. **All lab reports will be completed individually but you will share the data that you obtain with your partner(s) or the full lab group.**

The schematic below provides a figurative summary of the class structure, assignments and due dates.



EVALUATION AND GRADING

Evaluation Item	Contribution to Final Grade (%)
Participation (lab class)	mandatory
Participation (Lecture)	30
Lab Reports	70

Participation (lab class): **You are required to attend all lab sessions.** If you are unable to attend a lab session because you are sick or for other valid reasons that allow for “excused absences” (see later section), you will be required to make up the lab at a later date and subsequently write the lab report after you have completed the lab. **You are required to tell Prof. Shah and cc the TA before the lab starts that you will need to miss the lab for valid reasons. You are allowed to make-up two labs maximum,** unless an “excused absence” requires more time, and Prof. Shah will discuss this issue with the student on a case-by-case basis.

For each lab class that is missed and not made-up, a student’s final grade will drop by 10%. If more than two lab sessions are missed and not made-up, a student will receive a failing grade (F) for the class.

Participation (lecture): This portion of the grade will be evaluated by your attendance in class, which is required. **You must attend class for the entirety of the semester (excluding the first day of class) but may miss/drop FOUR (4) classes with no consequences to your overall grade.** It is assumed that you will use these missed classes for any reason but that will include professional development activities (e.g. **internship interviews, taking the FE exam, field trips, etc.**). Class attendance will be assessed by signing an attendance sheet that Prof. Shah will have nearby.

Lab Reports: **Lab reports should be completed individually, but the data obtained from the lab should be collected and shared with your lab partner(s). You are welcome to work together to interpret the data, but the final output presented in the lab report should be your own. For example, your data plots can be the same, but any interpretations of the data MUST be your own.** Each lab report should be written using any word processing program of your choice (e.g. Microsoft Word, etc.). Lab reports will be due on the following Monday @ 11:59 pm, the day before the next lab. If a lab is missed due to an excused absence, you will need to make-up the lab at a later date. The lab report will subsequently be due the week after this new lab time.

AI Policy for Lab Reports: Each lab report should be constructed using your own thoughts translated into writing material. However, it is not possible to ignore that AI tools will play an important part in your professional development moving forward. They along with any other material can help assist in accelerating your learning and product development.

Therefore, if you use AI tools in your writing, you must acknowledge or disclose any material that has been assisted by using AI tools. You can disclose this information in a similar manner as you would for giving credit to any other author that you quote directly. If you do use content taken from AI tools, it is also recommended that you document this information separately on your computer, as we may ask you to provide this content later when grading.

Remember that plagiarism where you take words, ideas, and data from someone else without giving them credit, is strictly prohibited. In addition, it is required that you are able to claim intellectual authorship of your work, even if you incorporate AI tools. Therefore, think carefully about how you want to incorporate AI tools into your writing. If your voice is not seen, then the ultimate product is not yours.

To handle any issue of plagiarism, lab reports will be submitted in Brightspace, and we will use “Turnitin” software via Brightspace to check if any the written material is likely taken from ChatGPT or openAI applications. **If any material considered to be taken by AI tools is not correctly acknowledged and/or overwhelms the product such you can no longer claim intellectual**

authorship (> 50% of the final lab report), you will receive a 50% (-50 points) deduction on your lab report.

Re-grade Policy

If you believe a grading error has been made on any lab report, you must notify the instructor via email within 24 hours of receiving the grade. Within this e-mail, please explain why you have requested a re-grade for the exam or assignment. Once the re-grade has been accepted, the instructor reserves the right to carefully re-grade the entire exam or assignment.

Late Policy

Lab reports will be completed outside of class and will incur a **20% deduction for each business day (24 hrs) it is late**. If the problem assignment is submitted **more than three (3) business days (72 hrs)** after it is due, **it will not be accepted**. If you plan to submit the assignment after the deadline, please inform the instructor as soon as possible.

Final Course Grade

Final grades will be based on your total points earned for the course; the grading scale is shown below. There is no “curve” for this course. As such, you are not in competition with your colleagues.

≥ 93.0 %	A	≥ 77.0 %	C+
≥ 90.0 %	A-	≥ 70.0 %	C
≥ 87.0 %	B+	≥ 67.0 %	D+
≥ 83.0 %	B	≥ 60.0 %	D
≥ 80.0 %	B-	< 60.0 %	F

Attendance

You are expected to attend all lectures (MF, 3:30 – 4:20 AM) and lab sessions (T, 9:30-11:30 AM or 3:30-5:20 PM). **Unexcused absences from the lectures/lab sessions will result in a lower grade for the course.**

This course follows the [University Academic Regulations regarding class attendance](#), which state that students are expected to be present for every meeting of the classes in which they are enrolled. Attendance will be taken at the beginning of each class and lateness will be noted. When conflicts or absences can be anticipated, such as for many University-sponsored activities and religious observations, you should inform me of the situation as far in advance as possible. For unanticipated or emergency absences when advance notification is not possible, contact me as soon as possible by Purdue email or phone. For absences that do not fall under excused absence regulations (see below), this course follows the following procedures:

1. Do not come to class if you are feeling ill but DO email me at adshah@purdue.edu, with the subject line: EEE 360 absence. I do not need details about your symptoms. Just let me know you are feeling ill and cannot come to class. If it is an emergency, please follow the University regulations on medical care (see below).
2. Unless it falls under the University excused absence regulations (see below), any work due should be submitted on time via our course Brightspace.
3. If that day's class involves assessed work such as a test or presentation, you and I will plan if and how you can make up the work, following the assignment guidelines. This plan must be

done before the next class period, so again, email me immediately when you know that you will miss the class.

4. The most important consideration in any absence is how it will affect your achievement of the assignment objectives and the course learning outcomes.

For cases that fall under **excused absence regulations**, you or your representative should contact or go to the [Office of the Dean of Students \(ODOS\) website](#) to complete appropriate forms for instructor notification. Under academic regulations, excused absences may be granted by ODOS for cases of grief/bereavement, military service, jury duty, parenting leave, or certain types of medical care. The processes are detailed, so plan ahead.

OTHER IMPORTANT ITEMS

Classroom Guidance Regarding Protect Purdue

Any student who has substantial reason to believe that another person is threatening the safety of others by not complying with Protect Purdue protocols is encouraged to report the behavior to and discuss the next steps with their instructor. Students also have the option of reporting the behavior to the [Office of the Student Rights and Responsibilities](#). See also [Purdue University Bill of Student Rights](#) and the Violent Behavior Policy under University Resources in Brightspace.

Academic Integrity

Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either emailing integrity@purdue.edu or by calling 765-494-8778. While information may be submitted anonymously, the more information is submitted the greater the opportunity for the university to investigate the concern. More details are available on the Academic Resources table on your Brightspace homepage.

Copyrighted Material

Please note that all materials presented by the instructor are protected by copyright unless the instructor has stated otherwise. Copyrighted materials include lectures, notes, and other material presented in class or part of the course. Students enrolled in, and authorized visitors to, Purdue University courses are permitted to take notes, which they may use for individual/group study or for other non-commercial purposes reasonably arising from enrollment in the course or the University generally.

Notes taken in class are, however, generally considered to be “derivative works” of the instructor’s presentations and materials, and they are thus subject to the instructor’s copyright in such presentations and materials. No individual is permitted to sell or otherwise barter notes, either to other students or to any commercial concern, for a course without the express written permission of the course instructor. To obtain permission to sell or barter notes, the individual wishing to sell or barter the notes must be registered in the course or must be an approved visitor to the class. Course instructors may choose to grant or not grant such permission at their own discretion, and may require a review of the notes prior to their being sold or bartered. If they do grant such permission, they may revoke it at any time, if they so choose.

Violent Behavior Policy

Purdue prohibits violent behavior and is committed to providing a safe and secure campus environment for its community members. Additional information regarding this policy can be found at: http://www.purdue.edu/policies/pages/facilities_lands/i_2_3.shtml

Students with Disabilities:

If you have a disability that requires special academic accommodation, please make an appointment to speak with me within the first three (3) weeks of the semester in order to discuss any adjustments. It is important that we talk about this at the beginning of the semester. It is the student's responsibility to notify the Disability Resource Center (<http://www.purdue.edu/drc>) of an impairment/condition that may require accommodations and/or classroom modifications.

Mental Health/Wellness Statement:

If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try [Therapy Assistance Online \(TAO\)](#), a web and app-based mental health resource available courtesy of Purdue Counseling and Psychological Services (CAPS). TAO is available to all students at any time by creating an account on the [TAO Connect website](#), or downloading the app from the App Store or Google Play. It offers free, confidential well-being resources through a self-guided program informed by psychotherapy research and strategies that may aid in overcoming anxiety, depression and other concerns. It provides accessible and effective resources including short videos, brief exercises, and self-reflection tools.

If you need support and information about options and resources, please contact or see the [Office of the Dean of Students](#). Call 765-494-1747. Hours of operation are M-F, 8 a.m.- 5 p.m.

If you find yourself struggling to find a healthy balance between academics, social life, stress, etc., sign up for free one-on-one virtual or in-person sessions in West Lafayette with a [Purdue Wellness Coach at RecWell](#). Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign up is free and can be done on BoilerConnect. **Students in Indianapolis will find support services curated on the [Vice Provost for Student Life website](#).**

If you're struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact [Counseling and Psychological Services \(CAPS\)](#) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS offices in [West Lafayette](#) or [Indianapolis](#).

Basic Needs Security:

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. There is no appointment needed and Student Support Services is available to serve students 8 a.m.-5 p.m. Monday through Friday. Considering the significant disruptions caused by the current global crisis as it relates to COVID-19, students may submit requests for emergency assistance from the [Critical Need Fund](#)

Emergency Preparation:

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted onto the course website or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your @purdue.edu email on a frequent basis.

See Purdue's Information on [Emergency Preparation and Planning](#). This website covers topics such as Severe Weather Guidance, Emergency Plans, and a place to sign up for the Emergency Warning Notification System. I encourage you to download and review the [Emergency Preparedness for Classrooms document](#).

The first day of class, I will review the **Emergency Preparedness plan for our specific classroom**. Please make note of items like:

- The location to where we will proceed after evacuating the building if we hear a fire alarm.
- The location of our Shelter in Place in the event of a tornado warning.
- The location of our Shelter in Place in the event of an active threat such as a shooting.

Nondiscrimination Policy

The nondiscrimination policy for Purdue is as stated: Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life.

Purdue University prohibits discrimination against any member of the University community on the basis of race, religion, color, sex, age, national origin or ancestry, genetic information, marital status, parental status, sexual orientation, gender identity and expression, disability, or status as a veteran. The University will conduct its programs, services and activities consistent with applicable federal, state and local laws, regulations and orders and in conformance with the procedures and limitations as set forth in Executive Memorandum No. D-1, which provides specific contractual rights and remedies. Any student who believes they have been discriminated against may visit www.purdue.edu/report-hate to submit a complaint to the Office of Institutional Equity. Information may be reported anonymously.

Syllabus Changes

While the instructor will make every effort to adhere to the syllabus in its current form, specific items of this syllabus may change during the semester. All changes will be posted through Brightspace or will be reported to the student through their university e-mail account.