



**CIVE 441 WATER QUALITY ANALYSIS AND TREATMENT**  
**Lecture: M-W 1:00-1:50 pm Engineering B 02**  
**Lab: W 2:00-4:50 pm or 3:00-5:50 pm, Scott 268**  
**Spring 2018**

**Instructor:** Dr. Susan De Long

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**Office hours:** TBA, see CANVAS course homepage

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**Office hours:** Tues and Thurs 11 am – 12pm Cassini Design Studio in Scott

**Course Description:** This laboratory course covers basic physical, chemical and biological methods for the characterization of water and wastewater. The course format includes two lectures followed by the laboratory session providing students with hands-on experience.

**Prerequisites:** CIVE 440 or CIVE 438 or concurrent registration to either.

**Course Objective:**

- to build fundamental knowledge and skill in the characterization of water and wastewater and to apply these in hands-on design of basic water treatment processes.

**Learning Objectives:** Upon completion of this course students will be able to:

- conceptually explain and carry out various water quality analyses.
- critically analyze water quality data
- design and evaluate the efficiency of a basic water treatment system.
- synthesize experimental results in the form of a professional report and oral presentation.

**Textbook:** Sawyer, C.N.; McCarty, P.L. and Parkin, G.F. 2003. Chemistry for Environmental Engineering and Science, 5<sup>th</sup> Edition, McGraw-Hill.

\* Supplemental reading will be handed out in class or posted on CANVAS.

\* Students are required to purchase an appropriate lab notebook to record their data.

\*A good reference available through the library is Spellman, Frank R. 2013. Handbook of Water and Wastewater Treatment Plant Operations. 3<sup>rd</sup> Edition, CRC Press.

**Safety in the Lab:** Students must follow all safety instructions carefully. Appropriate attire is required for work in the lab. Shorts or cut-offs, short sleeved shirts and open toed shoes are not allowed in the laboratory. Many of the chemicals we will be working with are dangerous; goggles and gloves must be worn at all times when in the lab.

**Participation and Good Lab Citizenship:** Active participation to this course is critical for success. You will be working with other students and sharing the lab, hence good citizenship is essential in the laboratory. Please keep your workspace clean and put away items and clean glassware as appropriate.

### **Grading:**

- Protocols – 10 %
- Lab Reports – 25 %
- Homework – 10%
- Quizzes – 10%
- Midterm Exam – 20 %
- Final Report and Presentation – 20%
- Participation and good citizenship/lab practices – 5%

**Lab Reports and Protocols:** For each week following the corresponding lecture, **every student** is required to read the assignments and write-up a step-by-step procedures/methods document for the week's experiment. These write-ups will be checked prior to starting the Wednesday lecture. For each week following the corresponding experiment, **each lab group** is required to submit a lab report. The due dates for the procedures and lab reports are indicated in the schedule table provided on CANVAS. The guidelines for these reports as well as the final report are also provided on CANVAS.

**Final Report and Presentation:** Students will be assigned a design project and will design a basic water treatment system and test its efficiency by conducting analyses that were learned during the course of the semester. At this point it is expected that students have understood the physical/chemical/biological nature of various water quality constituents and can describe precisely how their treatment system addressed each of them and why (or why not) it improved each aspect of the water quality. Originality of the design will improve the grade of the report and presentation. After the experiments are completed, each group will prepare a professional final report (~10 pages (1 inch margins, double spacing, 12 point font size) excluding cover page and appendix, with a binder) and present their project (problem statement, design approach, findings, etc.) on the last day of the class. Each group will prepare a 20 minute power point presentation. The presentation guidelines are provided on CANVAS.

**Homework and Quizzes:** Several short (~15 minutes) quizzes and homework will be given during the semester. The quizzes will cover the lecture material, homeworks, lab exercises and reading assignments/protocols. The quizzes will be administered during the Wednesday lectures. The due dates of the homework are a week after they are assigned unless otherwise specified.

**Midterm Exam:** One midterm exam will be given on **April 18<sup>th</sup>** during the lecture. It will include all the topics covered in class. It will be composed of problems and main concepts covered in the lectures, quizzes, homework and lab sessions.

**Grading scale:** Grades will be determined by the +/- grading system as described in the CSU catalog. The scale to be used: A<sup>+</sup> ≥ 97; A ≥ 94; A<sup>-</sup> ≥ 90; B<sup>+</sup> ≥ 87; B ≥ 84; B<sup>-</sup> ≥ 80; C<sup>+</sup> ≥ 75; C ≥ 70; D ≥ 60; F < 60.

\*Grades will be posted regularly in CANVAS so that students may keep up to date with their standing in the course.

**Honor Code:** As developed and endorsed by the 38<sup>th</sup> Senate of the Associated Students of Colorado State University on Sept 10<sup>th</sup> 2008, "*Academic Integrity Policy of the Colorado State University General Catalog (Page 7) and the Student Conduct Code*" will be adopted by this course and the students are required the acknowledge and practice the honor code as stated below:

“As a student at Colorado State University, I recognize my active role in building a Campus of Character. This includes my commitment to honesty, integrity, and responsibility within the campus community. As such, I will refrain from acts of academic dishonesty. Furthermore, reflecting upon this commitment, I find it my prerogative to conduct myself in a dignified and inclusive manner, taking the initiative to do justice within my institution, be considerate to my peers, and persevere both academically and personally”

Also CSU standards regarding academic integrity may be found in the General Catalog, online at <http://www.catalog.colostate.edu/front/policies.aspx>.

### ***General Class Conduct/Remarks:***

- All the quizzes and exams are closed books and closed notes. Only **FE approved basic calculators** that have no programming and solver capabilities are allowed.
- Students have **one week** to discuss their quiz/exam/homework after they are returned.
- If a student has a conflict with the exam, the instructor should be notified at least **two weeks** prior to the exam date. Make-ups will not be given for missed exams without a prior **notice and an official document**, or with an **official document** for **emergencies**.
- Students are highly encouraged to utilize the office hours to discuss any issues and difficulties with course material.
- Only the students who have participated in laboratory exercises may submit a report and hence receive a grade.
- No make-ups will be given for the missed lab sessions. However other assignments may be given to substitute a lab **with proper documentation** explaining the absence.
- Each member of the group should participate fully and fairly to conduct of the experiments and preparation of reports and presentation.
- Learning to work in teams is essential for success for this class and for your future careers. Be respectful to each other. However if issues arise that cannot be handled within the group, students should immediately notify the instructor.
- Please turn off your cell phone or put it on mute during class.
- Talking to classmates and reading materials other than those appropriate for this class during lecture disrupts the normal learning environment and hence is not allowed.
- You may consume drinks during the lecture, but please do not have food. No food or drinks are allowed during the lab sessions for safety reasons.
- Course related announcements and reading materials will be posted on CANVAS, hence students should check it regularly.
- E-mails regarding the course should contain CIVE 441 in the subject line, and a proper salutation in the main text of the e-mail. I will do my best to answer your e-mails promptly when these requirements are met. Please e-mail me directly (i.e., not through CANVAS) to facilitate a quick response.