
DEPARTMENT OF CIVIL AND CONSTRUCTION ENGINEERING
SCHOOL OF ENGINEERING
COURSE SYLLABUS

COURSE TITLE: Environmental Engineering Lab **TERM:** Fall
YEAR: 2013

COURSE: CE 3704 **TIME:** T 4:15 – 6:45 pm
SECTION NOS.: 060 (T) and 061 (R) R 6:00 – 8:30 pm

INSTRUCTOR: Dr. M. A. Karim, P.E. **PLACE:** L-120/M-135/L-136
OFFICE LOCATION: M-162B

OFFICE HOURS: MW 01:00-03:00 pm **OFFICE PHONE:** (678) 915-3026
R 04:15-06:00 pm **HOME PHONE:** (804) 482-3674
*Other hours by appointment **E-MAILS:** mkarim@spsu.edu
makarim@juno.com

DEPARTMENTAL PHONE: (678) 915-4220; **MY WEBSITE:** <http://educate.spsu.edu/mkarim>

NUMBER OF CREDIT HOURS: 0-3-1 (Lecture-Lab-Total)

PREREQUISITS: CE 3702 (Environmental Engineering I) OR

COREQUISITS: CE 3702

COURSE DESCRIPTION: Application of basic chemistry and chemical calculations to measure physical, chemical, and bacteriological parameters of water and wastewater. Laboratory methods and interpretation of results with regard to environmental engineering applications such as design and operation of water and wastewater treatment processes, and to the control of the quality of natural waters.

REQUIRED or ELECTIVE: Required for CE Students

REQUIRED TEXT: Laboratory Manual for Environmental Engineering by M. A. Karim, Tavenner Publishing Company, First Edition, July 2013, ISBN: 978-1-937435-64-6.

REFERENCES:

1. **Chemistry for Environmental Engineering and Science** by Clair N. Sawyer, Perry L. McCarty, and Gene F. Parkin, McGraw-Hill Book Company, Current Edition (Fifth Edition, 2003; ISBN: 978-0-07-248066-5).
2. **Introduction to Environmental Engineering** by Mackenzie L. Davis and David A. Cornwell, McGraw-Hill Book Company, Current Edition (Fourth Edition, 2008; ISBN: 978-0-7-242411-9).

3. **Standard Method for Examination of Water and Wastewater**, by American Public Health Association (APHA), American Water Works Association (AWWA), and Water Pollution Control Federation (WPCF), 16th Edition, 1985.

OTHER MATERIALS: Additional handouts may be provided on the experiments as needed.

COURSE OBJECTIVES: To introduce students as to how the common environmental experiments relating to water, water quality, and wastewater are performed. This course will help students know which tests are appropriate for given environmental problems, statistically interpret laboratory results and write technical reports, and apply the laboratory results to problem identification, quantification, and basic environmental design.

COURSE LEARNING OUTCOMES: Upon successful completion of this course, students shall be able to:

1. Learn and use the water and wastewater sampling procedure and sample preservations.
2. Perform common environmental experiments relating to water, water quality, and wastewater, and know which tests are appropriate for given environmental problems.
3. Statistically analyze and interpret laboratory results.
4. Demonstrate the ability to write clear technical lab reports.
5. Use word processors and other modern software packages in writing and finishing the report.
6. Demonstrate the ability to work in groups.

COURSE REQUIREMENTS:

1. **Attendance:** Students are expected to attend class. Advance notice of an absence should be provided whenever possible. Makeup exams, quizzes, and acceptance of late assignments will be considered only for documented medical reasons, emergency circumstances, or other university sponsored activities.
2. **Laboratory Report:** Laboratory report formats will be distributed in the class that must be followed. Laboratory reports must be submitted in the next class following the class in which the experiment is performed or any other date assigned by the instructor. Laboratory safety procedures must be followed and failure to do so may result in disciplinary action and a failing grade. Informational questions and design problems may be included. Late report WILL NOT be accepted. Exceptions may be considered in case of illness, serious emergencies, or other university sponsored activities. However, appropriate evidence must be presented in order to qualify for exceptions. All reports must be printed and submitted on 8½"x11" white paper. NO hand-written report will be accepted.
3. **Laboratory Datasheet:** Each student will keep a record of data in the Laboratory Manual Datasheet. Notes in the lab datasheet must be made with a pen and must be made during the laboratory (i.e. not copied a day after you leave). Notes should never be erased. If a mistake is made, cross out the error. Never tear pages out of your laboratory datasheet. Although neatness is important, it is not the most important aspect of collecting data since it is

sometimes impossible to write neatly when actively performing an experiment. The following information should be included in your laboratory notebook for each laboratory topic:

- (1) Date
- (2) Your name and your partner's name
- (3) Title of topic/Name of the Experiment
- (4) The collected data/Data sheet
- (5) Comments and observations

Data are items of information necessary to identify and analyze the case under investigation. Data could be as simple as a drawing of the experimental setup or a list of collected measurements. To understand why a certain item of information needs to be recorded, you need to have a thorough understanding of the problem you are trying to study. Therefore, read about the method BEFORE coming to lab. There are many items of information, the importance of which may not be too clear to you until it comes time to analyze the data. A good example is temperature. The pH of a water sample will vary depending on the temperature. Another example is the age of your sample. The BOD₅ of a wastewater sample will vary depending on its age. While your primary concern in the lab will be to collect measurements, you should not forget to measure and record the not-so-obviously-needed items of information such as temperature and age of sample.

Make sure you have measured and recorded all the information you need before turning off a machine or leaving the lab. In most cases, once you leave the lab, you may not be able to go back and determine something you should have determined while the test was being conducted. Finally, examine and understand the range and accuracy of the instruments you are using to collect the data. If a lab partner reads a weight of 1.0035 g from an instrument that only reads to 1/1000 g, your partner is making a mistake. Check the data yourself, and always question data that seems unreasonable. ***Laboratory datasheet needs to be signed by the instructor in-charge before you leave the lab. Laboratory datasheets need to be submitted/shown to the instructor at the end of the semester to get the 5% points as assigned in the grading policy.***

4. **Exams/Quizzes:** All exams/quizzes are closed books and notes unless advised otherwise. NO make-up exams/quizzes will be given. Exceptions may be considered in case of illness, serious emergencies, or other university sponsored activities. However, appropriate evidence must be presented in order to qualify for exceptions. Graded exams will be returned to students; however, students need to preserve them until the grades are finalized and show them to the instructor if there are any disputes in grades.
5. **Cheating:** Cheating on assignment and particularly on the examinations will not be tolerated. If you are caught cheating, you will get zero on the exam. You will be asked to move if you are caught looking at another student's work. The instructor reserves the right to remove any student from the class if the student's behavior is of a disruptive nature or if there is an evidence of academic dishonesty.
6. **Term Paper/Presentation:** No term paper/presentation for this course. However, group experimental project(s) may be assigned, as necessary, based on the students' interest.

1. **Class/Lab Decorum:** No cell phone use, checking emails, eating, and/or multitasking are allowed during the class. For emergency, cell phone can be operated in vibration mode; however, students can receive an emergency call only stepping out of the class room. No feet on the table and/or on the nearby chair are allowed during the class. It is also encouraged not to bring any foods in the class.

7. **Honor Code:** SPSU has an Honor Code and a procedure for handling cases when academic misconduct is alleged. All students should be aware of them. Information about the Honor Code and the misconduct procedure may be found at <http://www.spsu.edu/honorcode/>.

8. **Grade Dispute/Appeal:** Final grade dispute/appeal must be submitted within a week of the final exam. The procedure has been outlined in the SPSU website that can be accessed via the link at http://www.spsu.edu/business/faq_suggestions/gafaq.htm.

9. **ADA Provisions:** “Students with disabilities, as defined by the Americans with Disabilities Act (ADA) of 1990, should contact the instructor during the first week of the semester regarding the accommodations necessary to complete the requirements of this course. The instructor, with the help of SPSU, will make reasonable adjustments to take into consideration the specific handicap of each student covered under the ADA. The students can also contact SPSU ADA coordinator at 678-915-7244 for additional help.”

GRADING POLICY: All exams, quizzes, and assignments must be completed satisfactorily in order to pass the course. The evaluation process described below is subject to change by the instructor. Changes will be announced in the class.

Class Work:

1. Laboratory Reports	- 50%
2. Exam/Quiz 1	- 20%
3. Laboratory Datasheet	- 05%
4. Final Exam/Quiz (Comprehensive)	- 25%
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TOTAL	- 100%

Total Grade:

<u>Scale, Letter Grade, and GPA</u>			
90%	-	100%	A 4.0 (Excellent)
80%	-	90%	B 3.0 (Good)
70%	-	80%	C 2.0 (Satisfactory)
60%	-	70%	D 1.0 (Passing)
	<	60%	F 0.0 (Failure)
--	--		WF 0.0 (Withdrawn after deadline)

The following symbols are approved for use in the cases indicated, but will not be included in the determination of the grade point average.

"I" This symbol indicates that the student was doing satisfactory work but, for non-academic reasons beyond his control, was unable to meet the full requirements of the course. The requirements for removal of an "I" are left to the respective institutions; however, if an "I" is not satisfactorily removed after three quarters of residence, the symbol "I" will be changed to the grade "F" by the appropriate official. (See Southern Tech policy - Removal of an Incomplete "I", on page 2).

"W" This symbol indicates that a student was permitted to withdraw without penalty. Withdrawals without penalty will not be permitted after the mid-point of the total grading period (including final examinations) except in cases of hardship as determined by the appropriate official of the respective institution.

"V" This symbol indicates that a student was given permission to audit this course. Students may not transfer from audit to credit status or vice versa.

"K" This symbol indicates that a student was given credit for the course via a credit by examination program approved by the respective institution's faculty (CLEP, AP, Proficiency, etc.)

SCHEDULE: One 150-minute class per week

TENTATIVE LABORATORY EXPERIMENTS/ACTIVITIES: The following laboratory experiments/activities are subject to change by the instructor. Changes will be announced in the class.

Class/Week	Name of the Experiment/Activity	Comments
Week 1	Orientation, introduction, lab safety, sampling techniques & sample preservation	Lab Manual
Week 2	Experiment No. 1: Determination of pH of Water Experiment No. 2: Determination of Color of Water Experiment No. 3: Determination of Turbidity of Water	Lab Manual
Week 3	Experiment No. 4: Determination of Solids of Water Experiment No. 5: Determination of Carbon Dioxide of Water	Lab Manual
Week 4	Experiment No. 6: Determination of Alkalinity of Water Experiment No. 7: Determination of Hardness of Water	Lab Manual
Week 5	Experiment No. 8: Determination of Chloride of Water Experiment No. 9: Determination of Metal (Iron or Others) of Water	Lab Manual
Week 6	Midterm Exam/Quiz 1	---
Week 7	Experiment No. 10: Determination of Coagulant Dose - Jar Test	Lab Manual
Week 8	Experiment No. 11: Determination of Break Point Chlorination	Lab Manual
Week 9	No Lab	---
Week 10	Experiment No. 12: Determination of Chemical Oxygen Demand	Lab Manual
Week 11	Experiment No. 13: Determination of Biochemical Oxygen Demand	Lab Manual

Class/Week	Name of the Experiment/Activity	Comments
Week 12	Students' Experiment/Project – Experiment/Project Selected & Designed by the Students	---
Week 13	Visit to a Local Water Treatment Plant & Laboratory	---
Week 14	Visit to a Local Wastewater Treatment Plant & Laboratory	---
Week 15	Final Exam/Quiz - Comprehensive	---