

DEPARTMENT OF CIVIL AND CONSTRUCTION ENGINEERING
SCHOOL OF ENGINEERING
COURSE SYLLABUS

COURSE TITLE: Environmental Engineering I **TERM:** Fall
COURSE: CE 3702 **YEAR:** 2013
SECTION NO.: 001 **TIME:** TR 3:00 – 4:15 pm
INSTRUCTOR: Dr. M. A. Karim, P.E. **PLACE:** M 135
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: 3-0-3 (Lecture-Lab-Total)

PREREQUISITS: ENGR 3343 (Fluid Mechanics) and CHEM 1212K (Chemistry II)

COREQUISITS: None

COURSE DESCRIPTION: Introduction to environmental engineering issues, legal aspects, engineering solutions, and basic approaches to abatement system design including water supply, water treatment, water quality management, wastewater treatment, air pollution control, solid and hazardous waste management, and environmental impacts.

REQUIRED or ELECTIVE: Required

REQUIRED TEXT: 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).

REFERENCES:

1. **Chemistry for Environmental Engineering** by Clair N. Sawyer and Perry L. McCarty, McGraw-Hill Book Company, Current Edition.
2. **Waste Management Practices, Municipal, Hazardous, and Industrial** by John Pitchel, Taylor & Francis Group, LLC, Current Edition.

OTHER MATERIALS: Handouts may be provided as needed. It is recommended that students take notes in a three ring binder since they may be receiving handouts throughout the

semester. **SPSU email** and **GeorgiaView Desire 2 Learn (D2L)** systems will be used for messages and content delivery, respectively. Students should access these sites regularly.

COURSE OBJECTIVES: To introduce students to the integrated science, engineering, design and management concepts of engineered environmental systems. The course will cover environmental regulations and standards, environmental parameters, mass balance and natural systems, water quality management, water and wastewater treatment, air pollution control, solid and hazardous waste management, and introduce contemporary global environmental engineering issues.

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

1. Interpret the Federal/State environmental regulations and standards as well as their impact.
2. Characterize source water and the best available technologies (BAT) for physical and chemical treatment of drinking water.
3. Characterize wastewater and the BAT for physical, chemical and biological treatment of wastewater.
4. Determine common air pollutants, and their pathways and the various technologies available for air pollution control.
5. Learn the definitions of solid and hazardous wastes and the methods used to characterize, handle wastes from their source to their final ultimate disposal or reuse.
6. Interpret selected contemporary global environmental issues such as global warming, stratospheric ozone, and emerging contaminants.

COURSE REQUIREMENTS:

1. **Attendance:** Students are expected to attend the 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. **Homework:** All problem assignments must be submitted in the next class following the class in which the topic is discussed or finished, or any other date assigned by the instructor. Late homework 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 homework must be submitted on 8½"x11" white paper or on engineering design paper (preferable) with a cover page. Cover page should include student's name, course number and name, assignment number, assignment date, and due date. Show the detail works for full credit. Graded homeworks will be returned to students; however, students need to preserve them until the grades are finalized and show them to the instructor if there is any dispute in grades. Homework numbers are usually in the last slide of the topic presentation.
3. **Exams/Quizzes:** All exams/quizzes are closed books and notes unless advised otherwise. However, NCEES FE Handbook can be used during the Exams and Quizzes. 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/quizzes 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. *There will be a quiz on each topic on-line. The quiz deadline will be posted in D2L calendar.*

4. **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.
5. **Term Paper/Presentation:** No term paper/presentation for this course. However, group project(s) may be assigned, as necessary, for any design works.
6. **Class 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."
10. **Communications, Grading, and Response Timeframe:** The best way to communicate with me is by SPSU email, then by telephone. Grading of homeworks/ assignments may take up to a week. I will try to respond to any comments/questions within 24 hours. However, I may not be available during the weekend.
11. **Contacts to get Help:**
 - For D2L Technical Support, go to <http://spsu.edu/d2l>
 - For Wimba Technical Support, go to <http://www.wimba.com/services/support/>
 - SPSU Help Desk Phone Number: (678) 915-HELP (4357).

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.

<u>Class Work:</u>	<u>Total Grade:</u>
1. Homework - 10%	<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)
2. Quiz/Project - 25%	
3. Mid Term 1 - 20%	
5. Mid Term 2 - 20%	
5. Final Exam - 25%	
<hr/> TOTAL - 100%	

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: Two 75-minute classes or 3-50 minute classes or 1-150 minutes class per week

TENTATIVE LECTURE TOPIC/OUTLINE: The following lecture topic/outline is subject to change by the instructor. Changes will be announced in the class.

Class/Week	Tentative Lecture Topic/Outline	Chapter
Week 1	Topic 1: Introduction – definitions, introduction to environmental engineering issues, code of ethics, environmental systems overview, environmental legislation and regulations, and environmental ethics.	Chapter 1 + Handouts
Week 1	Topic 2: Material and Energy Balance – conservation of matter and energy, fundamental approach to problem solving.	Chapter 2 + Handouts

Class/Week	Tentative Lecture Topic/Outline	Chapter
Week 2 - 3	Topic 3: Water Supply - elements of water supply systems such as source of supply, collections system, treatment system, distribution system, and planning of water supply system.	Handouts
Week 4 – 6	Topic 4: Water Treatment – water chemistry, physical, chemical, and biological treatment of water such as sedimentation, filtration, chlorination, coagulation, flocculation, and water softening.	Chapter 4 + Handouts
Week 6	Mid Term Exam 1	---
Week 7 - 9	Topic 5: Water Quality Management – definition and uses of biochemical oxygen demand (BOD) and chemical oxygen demand (COD), determination of BOD rate constant (k), and development of dissolved oxygen (DO) sag curve using Streeter Phelps' equation for a stretch of stream/river.	Chapter 5 + Handouts
Week 10 – 11	Topic 6: Wastewater Treatment - wastewater microbiology, characteristics of wastewater, physical, chemical and biological treatment of wastewater such as unit operations of pretreatment, primary treatment, unit processes of secondary treatment, tertiary/advanced treatment, disinfection, various options for wastewater disposal and reuse.	Chapter 6 + Handouts
Week 11	Mid Term Exam 2	---
Week 12 – 13	Topic 7: Air Pollution – introduction to air pollution, air pollution perspective, air pollution standards, effects of air pollutants, origin and fate of air pollutants, and air pollution control of stationary sources.	Chapter 7 + Handouts
Week 14 - 15	Topic 8: Solid Waste Management - definition and types of solid waste from technical and regulatory points of view, characteristics of solid waste, generation rate of solid waste in different regions and climate, process for storage, collection, treatment, disposal procedures, and perspectives of solid waste, recycling and reuse of waste, and disposal of municipal solid waste (MSW) in landfills.	Chapter 9 + Handouts
Week 15 - 16	Topic 9: Hazardous Waste Management - definition of hazardous wastes from technical and regulatory points of view, introduction to resource conservation and recovery act (RCRA) and comprehensive environmental response, compensation, and liability act (CERCLA), identification of hazardous waste, hazardous waste exclusions and exemptions, types of hazardous waste: listed and characteristic hazardous wastes, mixture rule, hazardous waste recycling and universal wastes, hazardous waste generators and transporters.	Chapter 10 + Handouts
Week 17	Final Exam - Comprehensive	---

ABET CATEGORY: Engineering science: 2 credit hours (67%)
 Engineering design: 1 credit hour (33%)