SYLLABUS

Name of instructor: Dr. Yves Coeckelenbergh
Course title: Environmental Chemistry
Course number: 4443.001/101
Office phone number: 825-2987
E-mail address: yves.coeckelenbergh@tamucc.edu
Office: 211 Center for Science
Office hours: TR 14H00 to 16H00

Course Description:

This course examines the fate and transport of chemicals in water, air and soil and their impact on the physical and biological world. Environmental chemistry is an applied field of chemistry. Emphasis will be placed on chemical processes in the environment, chemical cycles, and global issues of environmental concern. Emerging issues of chemistry in the environment, literature searches and seminar presentations are included in the course.

The laboratory portion of the course will contain problem solving exercises, dry labs, some traditional laboratory experiments and the completion of a specific environmental study leading to a report and a class presentation.

Student Learning Outcomes (SLO’s):

Identify the components of the spheres constituting the environment
Describe the relationships between the different spheres
Describe the elemental cycles of matter
Describe Green Chemistry with examples

Describe the hydrological cycle and identify species of water (major, minor, trace)
Perform calculation relating to the carbonate-bicarbonate-CO$_2$ buffering equilibria
Perform alkalinity calculations
Perform calculations involving pH, pE and pEo
Describe chelating agents, sediments, colloids and solubility
Perform solubility calculations
Describe chemical calculations involving microorganisms
Identify water pollutants and discuss their effects
Describe water treatment processes

Describe the components and physical characteristics of the atmosphere
Describe meteorological and photochemical processes
Identify sources, reactions and fate of O₂, N₂, CO, SO₂, NO₂, NH₃ and sulfides
Identify and describe fate of biogenic organic compounds
Identify and describe the source of atmospheric pollutants
Identify hazardous pollutants
Describe the formation and effects of photochemical smog
Describe particle formation and control
Describe acid rain and ozone depletion
Explain the concept of climate change and global warming

Describe the components and physical characteristics of the geosphere
Describe the physical and chemical processes in geochemistry
Describe the interactions between the geosphere and the other spheres
Describe and perform calculations pertinent to soil and nutrients
Identify and describe pollutants of the geosphere
Identify and describe sources of energy

Describe the transport, fate, treatment and minimization of hazardous waste
Describe toxicity, scales, effect, sensitivity and phases
Identify toxic substance, their exposure routes and their effects
Describe health risk assessment, analysis and detection.

**Graded activities:**

Final grade will be calculated as follows:

- Midterm exam: 100 points
- Final exam: 200 points
- Laboratory and quizzes: 100 points

Final letter grading for the course will be as follows:
A> 90%, B>80%, C>70%, D>60 %, F < 60%.

The final exam is comprehensive.

Missed exams without a valid excuse will be graded zero. Most of the questions will consist in problems similar to those seen in class or homework assignments. There will be a few conceptual questions.
Students must be seated no later than 5 min before the start of the exam. There should be as much distance between each student as the classroom configuration allows and the desk must be empty with the exception of a pencil or pen and an optional calculator.

Students are not allowed in the classroom after the start of the exam without the permission of the instructor. In any case no student will be admitted after the first exam-taker has left. Student leaving the room will not be allowed to return unless authorized by the instructor. All material including intermediate calculations will be given to the instructor at the end of the exam. A picture ID is required.

There are no make-up exams. All excuses must be requested in advance with the obvious exception of emergencies. Students with a university approved scheduled absence (athletics, military duty, etc.) should contact the instructor well in advance of the scheduled absence to request an exception. Exams may be taken early in those specific cases. Students who do not arrange to take exams ahead of time will not be eligible for this special consideration. A written excuse from the university department involved or the Office of the Dean of Students may be requested.

Homework and Quizzes:

Homework assignments will be posted on Blackboard. There might be additional reading assignments such as literature search.

There will be graded quizzes.

Without a valid excuse homework and quizzes that are not turned in will be graded zero.

Textbook required


Non-classroom communication:

Access to Blackboard in mandatory. Students can stop by the instructor’s office during scheduled hours or request an appointment (yves.coeckelenbergh@tamucc.edu).

Policies and guidelines:

This is a classroom course. Textbooks are useful complement but cannot replace attendance to the lecture. **Attendance is therefore mandatory.**

The course is built in a coherent manner and missing lectures will create knowledge gaps making further learning extremely difficult. If a class is missed, it is the responsibility of
the student to obtain all needed information from a classmate. Missed information includes not only lecture notes and handouts, but also any possible information regarding homework, syllabus changes, exam dates, etc.

Students must be seated in the classroom before the start of the lecture. There will be neither eating nor chatting. Use of communication devices such as cell-phones and computers is not allowed.

**Academic Advising:**

The College of Science and Technology requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. The College's Academic Advising Center is located in Faculty Center 178, and can be reached at 825-6094.

**Anxiety and Stress:**

The University Counseling Center (Driftwood: 825-2703) provides help for test anxiety, stress and study skills.

**Conflicting schedules:**

All students with conflicting schedules, including athletes, should ask an appointment with the Professor in order to evaluate the possibility to complete the course.

**Academic Integrity/Plagiarism**

University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in punishment.

**Dropping a Class**

Dropping a class is not good and should be considered as a last option. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with you Professor before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class.
Classroom/professional behavior

Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

Grade Appeals

As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at http://www.tamucc.edu/provost/university_rules/index.html, and the College of Science and Engineering Grade Appeals webpage (http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

Disabilities Accommodations

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Corpus Christi Hall 116.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.
Statement of Academic Continuity

In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

Provisional course outline:

The weekly schedule below is a preliminary outline of the lectures susceptible to be modified. It is the student’s responsibility to keep up with changes to this schedule. Some exams might be given during laboratory hours.

Week 01  Lesson 1- Syllabus, Quiz, Introduction (28AUG)

Week 02  Lesson 2- Chemistry of the anthrosphere, Cycles, Green Chemistry (02/04SEP)

Week 03  Lesson 3- Water chemistry, Acidity, Alkalinity, Solubility (09/11SEP)

Week 04  Lesson 4- Water, Oxidation-Reduction, Phase interaction (16/18SEP)

Week 05  Lesson 5 Water chemistry, Microbial biochemistry (23/25SEP)

Week 06  Lesson 6- Water chemistry, Pollution, Treatment (30SEP/02OCT)

Week 07  Review (07OCT) and Midterm Exam (09OCT)

Week 08  Lesson 7- Atmospheric chemistry, Atmosphere, Climate (14/16OCT)

Week 09  Lesson 8- Atmosphere, Particles, Inorganic air pollutants (21/23OCT)

Week 10  Lesson 9- Atmospheric chemistry, Organic air pollutants, Smog (28/30OCT)

Week 11  Lesson 10- Atmospheric chemistry, Climate (04/06NOV)

Week 12  Lesson 11- Geosphere, Geochemistry, Agriculture, Green chem. (11/13NOV)

Week 13  Lesson 12- Waste, waste minimization, Toxicological chemistry (18/20DEC)

Week 14 - Take Home Group Work: Research project final report (25NOV)

Week 15  Review (02DEC)

Final Exam 09-DEC
Instructions for the lab

The laboratory component of the course consists in the completion of a research project on an environmental topic where chemistry is required for the understanding.

Emphasis will be put on the use of a portable laboratory (WISI) purchased for the course. Students will have the option to borrow the equipment for data collection after training.

A mandatory safety presentation will be done in class.