CHEM 3700 – Environmental Chemistry

Spring 2020 – 3 credits

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| **Class**: MW 5:00 – 6:15 PM, SC 212  **Office Location**: SC-339  **Office Hours**: By appointment | **Instructor**: Dr. Dan Ferreira  **Phone**: (470)578-5011  **Email**: dferreira@kennesaw.edu |

The environment is all around us. We depend on it to supply us with air to breathe, water to drink, and food to eat. Our civilization can create fundamental imbalances in the chemistry of many environmental processes. From the soil nutrients that our crops need to grow to the air and water pollution generated by our modern technology, environmental chemistry dominates our quest for a sustainable environmental future.

**Student Learning Outcomes – By the end of the semester, you should be able to:**

1. Explain the chemistry of the earth’s atmosphere.

2. Describe the causes and effects of ground-level air pollution.

3. Explain all types of energy, and their environmental consequences.

4. Outline climate change with respect to global warming and the greenhouse effect.

5. Explain water chemistry, resources, pollution, and treatment.

6. Identify toxic organic substances, their use and environmental concerns and the four generations of pesticides.

7. Describe how local sustainability efforts impact the globe.

8. Identify and describe key water resource issues throughout the world.

**Textbook**

Environmental Chemistry, Fifth Edition, by Colin Baird and Michael Cann, 2012

**Assessment Rubric (How I will grade exams and assignments)**

*Full credit* – The student has completely identified what the question is asking for and fully justified the answer he/she proposed. The justification is based in a solid understanding of the concepts covered in class.

*Partial credit* – The student has identified what the question is asking for and has proposed an answer. However, their answer is not fully backed up by the material learned in class, or the answer fails to take some important aspect of the question into account.

*No credit* – The student has not identified the specific issues presented in the question. The answer does not make sense or is not based in any way on the material learned in class.

**\*NOTE\***: If I cannot read your answer, you get **NO CREDIT**. Make sure your answers are legible.

**Course Norms:**

I want everyone to feel comfortable contributing their thoughts and ideas in lecture. In order to do that, we need to create an atmosphere of mutual respect between all members of the class. If you have questions about any of these policies or have special circumstances I should know about, please feel free to let me know.

*Absences*: At the beginning of every class we will have a brief 1-2 question quiz on the material covered in the previous class. The quizzes are designed to be extremely easy if you paid attention in class. If you do not show up to class you will get a zero on the quiz. If less than 20 minutes late, you will get 20 points on the quiz. If you are more than 15 minutes late, it counts as an absence. Doing well on these quizzes could bump you a letter grade, so it is in your best interest to show up to class every day on time and review your notes from the previous lecture before class.

**If you have more than 3 unexcused absences, 2.5 points will be deducted from your final grade for every absence past the second. So if you miss 7 classes during the semester, you will lose 10 points off your final grade. If, however, you have no unexcused absences I will add 2 points to your final grade.**

Students are solely responsible for managing their enrollment status in a class; nonattendance does not constitute a withdrawal.

*Makeup Assignments/Exams:* I will allow students to make up assignments/exams that they miss for legitimate reasons, BUT ONLY WITH APPROPRIATE DOCUMENTATION. If you do not have official documentation of your reason for missing class (a doctor’s note, a hospital discharge form, an official request to be excused from a coach, etc) you will receive a zero grade on any work you miss or do not hand in on time. Documentation must be submitted within a reasonable (as determined by me) time period after the absence in order for the absence to be excused.

*Extra Credit*: There is **NO EXTRA CREDIT** in this class. The grade you receive will be calculated based on the criteria described below. If you wait until the last week of the semester to start worrying about your grade, I guarantee you that you will be disappointed.

*Electronic Devices (cell phones, PDAs, music players, etc.)*: Cell phones should be set to silent mode upon entering class. All other electronic devices must be turned off to maintain a respectful class atmosphere. You will be asked to leave if you disregard this requirement. If you wish to use a laptop in class, do not use the laptop for any purpose not related to the class (i.e. surfing the internet, playing games, etc). Such activities are distracting to everyone around you and seriously impact the ability of other students to learn. Repeated violations of this policy will result in you being banned from bringing a laptop to class in the future.

*Academic Honesty*: Every KSU student is responsible for upholding the provisions of the Student code of Conduct, as published in the Undergraduate and Graduate catalogs. The Student Code of Conduct addresses the University’s policy on academic honesty, including provisions regarding plagiarism and cheating, unauthorized access to University materials, misrepresentation/falsification of University records or academic malicious/intentional misuses of computer facilities and/or services, and misuse of student identification cards. Incidents of alleged academic misconduct will be handled through the established procedures of the Student Conduct and Academic Integrity department, which includes either an “Informal” resolution by a faculty member, resulting in a grade adjustment, or a formal hearing procedure, which may subject a student to the Code of Conduct’s minimum one semester suspension requirement. I don’t want to have to impose these penalties on anyone, and I know you don’t want to have them imposed on you either, so please make things easier on both of us and just don’t cheat.

*Accommodations:* Any student with a documented disability or medical condition needing academic accommodations of class-related activities or schedules must contact the instructor immediately. Written verification from the KSU Student Disability Services (http://www.kennesaw.edu/stu\_dev/dsss/welcome.html) is required. No requirements exist that accommodations be made prior to completion of this approved University documentation. All discussions will remain confidential.Course requirements will not be waived, but accommodations will be made, when appropriate, to assist you to meet the requirements.

**Grading**

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| Quizzes - 5%  Chemical Presentation - 15%  Exams – 15% each (4 x 15% = 60% total)  Final Exam – 20% | A  B  C  D  F | = 90 - 100  = 80 - 89  = 70 - 79  = 60 - 69  = 59 and below |

**\*NOTE: There will generally not be any grade curving in this course**.

**Important Dates**

1/10 – End of drop/add

1/20 – Martin Luther King Day holiday

2/26 – Last day to withdraw

3/28 – 4/3 – Spring Break

4/17 – Group presentations due

4/28 – Last day of classes

4/29 6:00 – 8:00 PM – Final Exam

**Chemical Presentation**

Students will select their first, second, and third choice from a list of chemical compounds for this semester long project. Students will then be assigned into groups of three based on their chosen compounds and will spend the semester researching the uses, environmental impacts, and human health effects of their assigned chemical compound. Each student will submit a 3-4 page summary of the research they conducted for the group project and each group will give a 10 minute presentation for the class on the three aspects of their compound described above. The individual summary should include a reference page and in-line citations for the information presented. This project will account for 10% of each student’s overall grade, half of which will come from the individual summary and half of which will come from the group presentation. The individual summaries and group presentations must be uploaded to D2L by 10:00 PM on April 17 regardless of when the presentation is scheduled to be given. Failure to submit the group presentation by this deadline will result in a 30% penalty to the presentation portion of the grade. Failure to submit the individual summary by this deadline will result in a grade of 0% for the individual summary.

**Course Outline (This schedule is subject to change as the semester progresses)**

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| **Week of** | **Topic** | **Reading** |
| 1/6 | Introduction, Formation of the Universe and Planet | N/A |
| 1/13 | The Atmosphere, Chemistry of the Stratosphere | Ch.1 |
| 1/20\* | The Ozone Hole | Ch.2 |
| 1/27 | **Exam 1**, Air Pollution | Ch.3,Ch.4 |
| 2/3 | Chemistry of the Troposphere, Climate Change | Ch.17,Ch.5 |
| 2/10 | History of Fossil Fuels, **Exam 2** | Ch.6 |
| 2/17 | Extraction & Use of Oil, Extraction and Use of Natural Gas, & Coal | Ch.6 |
| 2/24 | Alternative Energy | Ch.7,Ch.8 |
| 3/2 | Nuclear Power | Ch.9 |
| 3/9 | **Exam 3,** Water Resources | N/A |
| 3/16 | Aqueous Chemistry, Water Pollution | Ch.10 |
| 3/23 | Wastewater Treatment, Chemical Analysis of Water Pollutants, **Exam 4** | Ch.11 |
| 3/30\* | SPRING BREAK – NO CLASS |  |
| 4/6 | Heavy Metal Pollution, Pesticides | Ch.12,Ch.13 |
| 4/13 | Organic Pollutants, Sustainability & Green Technology | Ch.14,Ch.15 |
| 4/20 | Toxicology, Hazardous Waste Disposal, Student Presentations | Ch.16 |
| 4/27 | Student Presentations cont’d. |  |

\* indicates a week where one or more classes will not take place due to a holiday.