CH-102 Chemistry for the Concerned World Citizen

Section: *-01* M W F 1030 – 1120 HHOA 101
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Office Hours: TBA

Course Requirements:

Scientific hand-held calculator with log function
Textbook or eBook: *Chemistry in Context: Applying Chemistry to Society*: A Project of the American Chemical Society, Seventh Edition, 2012. (McGraw Hill)
eCollege (chaminade.ecollege.com)
iClicker – available for sale in Wesselkamper Science Center, Room 115 (See Heidi).

Course Description:

This is a one-semester course during which a number of environmental issues, familiar to most college students, are explored from a chemical perspective providing the students a conceptual background necessary for a full understanding of environmental and socio-economical implications of these issues. Discussions of ozone layer depletion followed by climate change (global warming/ the greenhouse effect), will lead to a molecular approach to be adopted for the rest of the course. Students will be able to understand the molecular basis of all the processes. Environmental issues caused by acid rain will be a basis to investigate water at the molecular level as well as cellular and ecological levels as well as concepts related to the chemistry of solutions. We will explore different types of energy production including nuclear chemistry and evaluate the pros and cons of this technology.

We will be looking at key biochemical molecules important in health and nutrition and evaluate the current food industry model on our health. We will also look at synthetic polymers of small carbon compounds will shift the emphasis on plastics and their environmental and human health effects. A portion of the course will focus on other important organic synthesis of chemicals focusing on both synthetic and natural products medicines and drugs as well as drugs of abuse. Further study of biochemistry involving protein function and enzyme reactions and functions will be discussed in addition to basic molecular genetics.

Towards the end of the course, we will discuss a few Special Topics that will allow you to pull together all the science and chemistry knowledge you have gained from the course. These topics will include debating if genetically modified organisms are good or bad, the possible link between climate change and increased prevalence and spread of certain diseases, the importance of microbes in our environment and the real environmental cost to the foods we choose in America and the food we throw away.

By the end of the course, you should have a great understanding on how molecules, large and small, have such a profound impact on eco-systems. With the increased awareness gained from the course, it is hoped that the students, in the short and long term, will work towards reducing the unfavorable aspects of this impact.

Course Competencies:

- ✓ Learn the chemical basis of environmental changes such as global warming / the greenhouse effect and ozone layer depletion
- ✓ Learn to quantify chemical substances using different parameter such as mass units, number of particles, and moles
- ✓ Understand chemical and physical basis of the role of water in maintaining temperate living conditions
- ✓ Learn to express acidity using various parameters
- ✓ Be aware of the consequences of acid rain
- ✓ Learn to identify polymers in terms of their monomeric units
- ✓ Distinguish between biodegradable and non-biodegradable compounds and recognize any possible ecological impact from them
- ✓ Understand how enzymes and other catalysts work
- ✓ Understand the general principles of enzyme inhibition and recognize how this concept can be utilized to fight diseases
- ✓ Understand the principles of nuclear decay
- ✓ Have a full grasp of the origin and various uses of nuclear power

Class Policies and Reminders:

Attendance: In class quizzes/exams **cannot** be made up at a later time. If you miss a midterm exam, a written explanation is for your absence is required (doctor's note or other document may be needed to determine if the absence is excused). Unexcused absences will result in a score of zero for that exam. Any student who does not take the final exam will fail the course.

Student Conduct: Please refer to the Student Handbook for the CUH policies on Classroom Behavior and Academic Dishonesty.

Music Devices and Cellphones: As a courtesy to other students and the instructor, the use of music devices, cell phones, smart phones, PDAs (personal digital assistant), pagers or any other electronic device with the potential to make noise is prohibited during all Natural Science and Mathematics classes at Chaminade, unless specifically permitted by your instructor. These devices must be placed on silent (not vibrate) during the entire lecture time and placed on your desk facedown; using (even touching) your phone during lecture without instructor consent will result in loss of participation/attendance points and you may be asked to leave the classroom. During quizzes and exams, these devices need to be turned off and stored with the professor until completion of the exam/quiz. If during an exam, your electronic device makes noise (this includes vibrating), you may be asked to turn in your exam/quiz for a grade of zero and leave the room while the rest of the class finishes. The use of any other electronic device other than an approved scientific calculator during exams or quizzes will be considered a form of academic dishonesty and will result in a failing grade for that assignment. Students who cannot comply with this rule will be asked to leave class. Please refer any questions to the Dean of Natural Sciences and Mathematics.

Opportunities for Help: If you need assistance with the material for this course, come to my office for help! I have set office hours, but I am often available at other times. Feel free to drop by or send me an email angelique.showman@chaminade.edu (using your Chaminade account; do **NOT** email me through eCollege!) to make a specific appointment. In addition, there are Chemistry tutors available at the AAP. ***Do NOT wait until the last minute to get help!***

eCollege: I will be utilizing eCollege primarily as a document depository where I will be uploading slide handouts and other related material for the lectures. You can print these out (if you choose) to follow along and take notes on during the lecture. Submission for the Applied Chemistry Paper will also be through this platform. In addition, I urge you to use the discussion feature to discuss homework problems or other questions you may have regarding the material. I will be monitoring any discussions, so I can provide additional information and assistance if needed. Periodically, I will post current points and grades on eCollege (usually following grading of exams). However, do **NOT** email me through eCollege as it is an intranet system and will result in a delayed response from me. Please use my Chaminade email as listed in my information section at the beginning of the syllabus.

Grading, Homework and Exams

iClicker Quizzes: Clicker quizzes may be given at the beginning of every class and based on the previously lecture material and are often based on homework questions. Additional questions may be asked during lecture on the material currently being presented. Points for clicker quizzes are the basis of your attendance/participation points for this class. Not having your iClicker with you is the equivalent of being absent from class and participation points will not be given.

Worksheets and Homework: Worksheets and suggested problems from the text will be provided throughout the semester that will help prepare you for the exams. Worksheets will be posted on eCollege; if you do not understand how to solve a problem, come see me. Review session may be scheduled on a Saturday or evening before the exam; these are optional but I strongly encourage you to attend.

Exams: Exams include three midterms and one comprehensive final exam focusing on the latter material. Scientific hand-held calculator is allowed. No other electronic devices are permissible including cellular or smart phones as per the class policy listed above.

Final Exam: TBA

Do NOT schedule work, plane tickets home, etc during the Monday-Thursday exam week scheduled by the university as the final exam time can fall during any time this week. *This exam will be cumulative, covering all of the material presented in class over the semester. Any student who does not take the final exam will fail the course.*

Applied Chemistry Paper and Elevator Speech: We will watch the documentary *Food, Inc.* Robert Kenner, producer/director 2008. From this documentary, each student will select two chemicals mentioned in the film (chemical selection is first come, first serve with a link available through eCollege to sign up) and research the chemical to include the formula.

The Paper: You will be expected to briefly explain the application of the chemical, any health and environmental issues associated with the chemical (i.e. use, production, disposal or byproducts formed, etc.). You are required to include in your resources a Material Safety Data Sheet (MSDS/SDS) on each of the chemicals you choose. Additionally, provide a one to two paragraph review of the film expressing your opinion (do you agree, disagree, does this change the way you will eat, why or why not?). It is important that you carefully select the sources that you use to write this paper; non-credible sources will cost you points on this paper. You must cite any sources that you use (use APA formatting for inline citation and works cited page); failure to cite references is plagiarism and a form of academic dishonesty. This is no more than two to three-page paper, double-spaced, font size 12, 1-inch margins. The paper must be turned in as a .doc, .docx or .pages format only to eCollege on the due date listed below; .pdf and other formats are not acceptable and will result in your paper being deducted points for being late as I wait for the correct format to be submitted. Questions on the film will be included on the midterm and final exams.

The Elevator Speech: In no more than five minutes, you will share what you learned about at least one of the two chemicals you wrote about. Be sure to include the chemical formula, but you cannot just read off the paper you turned in. You are not required to use any visuals or PowerPoint but are welcome to bring examples that your chemical might be used or found in (if safe and applicable).

Course Grades: The course grades will be based on the following scale (650 total points). Any changes will be announced in class.

Participation (iClicker Quizzes) – 50 points
Written Quizzes – 75 points
Worksheets/Homework – 75 points
Applied Chemistry Paper – 75 points
Elevator Speech – 50 points
Midterm exams – 225 points (75 each)
Final exam 100 points

Letter grade (based on 650 points): A = > 85%
B = 75 – 84%
C = 65 - 74%
D = 50 - 64%
Fail = < 50%

Tentative Class Schedule and Important Dates:

Week	Dates	Description
1	1/11	Course Information and Introduction
	1/13	Chapter 0: Chemistry for a Sustainable Future and Your Ecological Footprint
	1/15	Chapter 1: The Air We Breathe (1.1, 1.2, 1.3, 1.4, 1.5)
2	1/20	***Add-Drop Last Day***
	1/18	Fr. Chaminade/Martin Luther King Day **(NO CLASS)**
	1/20	Chapter 1: Matter, Elements, Compounds, Reactions (1.6, 1.7, 1.8, 1.9, 1.10)
	1/22	Chapter 1: Pollutants and Air Quality, Conversions and Sig Figs (1.11, 1.12, 1.13, 1.14)
3	1/25	**Quiz 1: Chapter 1** Chapter 2: Atomic Structure, Periodic Table, Light and Radiation, (2.2, 2.3, 2.4, 2.5)
	1/27	Chapter 2: The Ozone Layer and CFCs (2.1, 2.6, 2.7, 2.8, 2.9)
	1/29	Chapter 2: The Ozone Hole and HCFCs (2.10, 2.11, 2.12) Chapter 3: Intro. to Climate Change, the Greenhouse Effect and the Carbon Cycle (3.1, 3.2, 3.5)
4	2/1	**Quiz 2: Chapter 2** Chapter 3: Lewis Structures, Molecules and The Greenhouse Effect, Mass, Moles (3.3, 3.4, 3.6, 3.7)
	2/3	Chapter 3: Greenhouse Gases and Consequences of Climate Change (3.8, 3.9, 3.10, 3.11) Chapter 4: Combustion and Energy Efficiency (4.1, 4.2)
	2/5	Chapter 4:, Hydrocarbons and Thermodynamics (4.3, 4.4, 4.5, 4.6, 4.7, 4.8)
5	2/8	**Midterm I: Ch 1, 2, 3, and 4.1-4.8**
	2/10	Chapter 4: Biofuels and Alternative Energies (4.9, 4.10, 4.11) Chapter 11: Food For Thought: Lipids, (11.2, 11.3, 11.4)
	2/12	Chapter 11: Food For Thought: Lipids, Carbohydrates and Proteins (11.5, 11.6, 11.7, 11.8, 11.9)

Week	Dates	Description
6	2/15	President's Day **(NO CLASS)**
	2/17	*Food, Inc.* Part I **Chemical Selection Open for Applied Chemistry Paper**
	2/19	*Food, Inc.* Part II
7	2/22	**Quiz 3: Chapter 11 and *Food, Inc.*** Chapter 5: Water Use and Issues, Ionic Compounds, The Oceans (5.3, 5.4, 5.7, 5.8)
	2/24	**Due: Chemical Selection for Applied Chemistry Paper** Chapter 5: Properties of Water and Solutions (5.1, 5.2, 5.5, 5.6, 5.9
	2/26	Chapter 5: Drinking Water (5.10, 5.11, 5.12)
8	2/29	**Quiz 4: Chapter 5** Chapter 9: Polymers and Plastics (9.1, 9.2, 9.3, 9.4, 9.5, 9.6)
	3/2	*Bag It!* Part I
	3/4	*Bag It!* Part II Bag Ban Law in Hawaii
9	3/7	**Midterm II: Ch 4.9-4.11, Ch 11, 5, 9 and *Food, Inc.*** **Midterm II: Ch 4.9-4.11, Ch 11, 5, 9 and *Food, Inc.***
	3/9	Chapter 6: Acids and Bases, pH, Ocean Acidification and Acid Rain (6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7)
	3/11	Chapter 6: Nox and Sox, The Nitrogen Cycle and Acid Deposition and Ecological Damage (6.8, 6.9, 6.10, 6.11, 6.12, 6.13)
10	3/14	**Quiz 5: Chapter 6** Chapter 7: Nuclear Chemistry, Energy and Half-Life (7.1, 7.2, 7.3, 7.4, 7.8)
	3/16	Chapter 7: Nuclear Chemistry: The Good, The Bad and The Ugly (7.5, 7.6, 7.7, 7.9, 7.10)
	3/18	Chapter 8: Electrochemistry and Electron Transfer (8.1, 8.2, 8.3, 8.4)
	3/21-25	Spring Break **(NO CLASSES)**

Week	Dates	Description
11	3/28	**Quiz 6: Chapter 7** Chapter 8: Fuel Cells (8.5, 8.6, 8.7, 8.8) **Due: Applied Chemistry Paper (by midnight on eCollege)**
	3/30	Chapter 10: Intro. to Organic Chemistry and Synthesis (10.1, 10.2, 10.3, 10.4, 10.5)
	4/1	Chapter 10: Stereochemistry and Medicines, Drugs and Abuse (10.6, 10.7, 10.8, 10.9, 10.10)
12	4/4	**Last Day to Withdraw** **Midterm III: Ch 6, 7, 8, 10 and *Bag It!***
	4/6	Chapter 12: Protein Structure and Function (12.5) Enzymes: Biological Catalysts
	4/8	Chapter 12: Introduction to Molecular Genetics and Intro. to Genetic Engineering (12.2, 12.3, 12.4, 12.4, 12.5)
13	4/11	ST-1: GMOs: Miracle or Monster of Science?
	4/13	ST-2: Climate Change and Spread of Disease
	4/15	ST-3: Importance of Microbes in Human Health and Environment
14	4/18	ST-4: The American Buffet: The Environmental Cost of Food
	4/20	TBA
	4/22	Earth Day: Giving Back to Mother Earth
15	4/25	**Presentations Day 1**
	4/27	**Presentations Day 2**
	4/29	Review for Final

Class schedule is subject to change and will be announced in class as needed.

Additional Departmental and University Polices

1. Electronic Devices

Use of music devices and cell phones is prohibited during all Natural Science and Mathematics classes at Chaminade, unless specifically permitted by your instructor. Use of cellphones and music devices in laboratories is a safety issue. In addition, use of cellphones and music devices in any class is discourteous and may lead to suspicion of academic misconduct. Students who cannot comply with this rule will be asked to leave class and may be subject to laboratory safety violation fines. You will be asked to leave class and marked absent if you do not comply. This will negatively affect your grade. Please refer any questions to the Dean of Natural Sciences and Mathematics.

2. ADAA Statement

2.1 Pursuant to several federal and state laws, including the Americans with Disabilities Act of 1990, as amended by the ADA Amendments Act of 2008, and Section 504 of the Rehabilitation Act of 1973, all qualified students with disabilities are protected from discrimination on basis of disability and are eligible for reasonable accommodations or modifications in the academic environment to enable them to enjoy equal access to academic programs, services, or activities. If a student would like to determine if they meet the criteria for accommodations, they should contact the Counseling Center at 808-735-4845 for further information.

3. Attendance & Tardiness

3.1 Students are expected to attend regularly all courses for which they are registered. Students should notify their instructors when illness or other extenuating circumstances prevents them from attending class and make arrangements to complete missed assignments. Notification may be done by emailing the instructor's Chaminade email address, calling the instructor's campus extension or by leaving a message with the instructor's division office (Natural Science and Math 1 (808) 440-4204). It is the instructor's prerogative to modify deadlines of course requirements accordingly. Any student who stops attending a course without officially **withdrawing,** may receive a failing grade.

3.2 Unexcused absences equivalent to more than a week of classes may lead to a grade reduction for the course. Any unexcused absence of two consecutive weeks or more may result in being **withdrawn** from the course by the instructor, although the instructor is not required to **withdraw** students in that scenario. Repeated absences put students at risk of failing grades.

3.3. Tardiness – failure to be on time for class may result in loss of participation points and even quiz/exam points as additional time will not be given, nor will makeup quizzes be given for students who are tardy.

4. Policy on Make-Up Tests

See syllabus, under Attendance for Instructor's policy on make-up exams/quizzes.

5. Policy on Communication

5.1 The University provides a Chaminade email address for all students. Official Chaminade communications will be sent to the students' Chaminade email address and instructors will use only this email to communicate with students. It is the responsibility of the student to check their email frequently. Report email-related problems to the Helpdesk at 808-735-4855 or helpdesk@chaminade.edu.

6. Laboratory Safety Information

The following guidelines are established to provide instructions in maintaining safety for students, staff, and faculty while using any of the science laboratories at Chaminade University. The Division of Natural Sciences and Mathematics (NSM), along with the University Environmental Safety Office are responsible for enforcing the regulations set forth in the current Student Handbook. Queries should be addressed to: Dean of Natural Sciences and Mathematics (808) 440-4204; Environmental Safety Officer (808) 739-4811

7. Title IX Declaration

Chaminade University of Honolulu recognizes the inherent dignity of all individuals and promotes respect for all people. Sexual misconduct, physical and/or psychological abuse will NOT be tolerated at CUH. If you have been the victim of sexual misconduct, physical and/or psychological abuse, we encourage you to report this matter promptly. As a faculty member, I am interested in promoting a safe and healthy environment, and should I learn of any sexual misconduct, physical and/or psychological abuse, I must report the matter to the Title IX Coordinator. Should you want to speak to a confidential source you may contact the following:

- Chaminade Counseling Center| 808 735-4845.
- Any priest serving as a sacramental confessor or any ordained religious leader serving in the sacred confidence role. | 808-735-4774 |

http://www.chaminade.edu/student_life/sss/counseling_services.php

8. Academic Honesty

Students are expected to have read and to abide by the "Student Rules of Conduct" which are available in your copy of Chaminade University's Student Handbook. Cheating in the form of plagiarism, collusion, deception and will not be tolerated and will negatively affect your grade.