



# CAMPBELLSVILLE UNIVERSITY

## COURSE SYLLABUS

PLEASE TYPE.

DATE 20 December 2016

ACADEMIC UNIT Natural Science Division FACULTY Elizabeth K. Sutton

Discipline	Course # Section	Title of Course	Credit Hours	Cross Reference (if applicable)
CHE	355-01	Environmental Chemistry	4.0	ENV 355-01

TEXTBOOK       Required                       Not Required

Author Baird, Colin and Cann, Michael Title Environmental Chemistry, 5<sup>th</sup>ed.

Publisher W.H. Freeman Date of Publication 2012

WORKBOOK       Required                       Not Required

Author \_\_\_\_\_ Title \_\_\_\_\_

Publisher \_\_\_\_\_ Date of Publication \_\_\_\_\_

PLEASE ANSWER THE FOLLOWING QUESTIONS ON A SEPARATE SHEET OF PAPER AND ATTACH TO THIS FORM

1. DESCRIPTION OF COURSE: Develop a brief description of the course as it will appear in the Catalog.
2. COURSE OBJECTIVES: List the objectives of the course, **both** general and specific. Please relate these objectives to the mission and goals of the University and the Academic Unit.
3. COURSE OUTLINE: Outline the topics/units that are to be taught.
4. EVALUATION: How do you plan to determine the grade in the course. Please include grading scale.
5. REQUIREMENTS
  - a. Examinations: State when tests are to be administered, including unit, mid-term, and final examinations.
  - b. Reports: How many, length required, and what type (oral, term and/or research, book critiques).
  - c. Supplemental reading assignments or outside work required.
  - d. Supplemental instruction aids: Audio visual aids, **field** trips, guest speakers, etc.
6. BOOKLIST

DEAN

Date Copy Received \_\_\_\_\_

VICE PRESIDENT FOR ACADEMIC AFFAIRS

Date Copy Received \_\_\_\_\_



**Section 1: Course Title: CHE 355 Environmental Chemistry, four credit hours**

**Section 2: Course Description**

The course will provide the student with an introduction to the chemical principles of environmental systems. Topics will include chemical equilibrium, acid-base chemistry, environmental organic chemistry, heavy metal chemistry and treatment applications. Three lecture hours and one three-hour laboratory per week. **Prerequisite:** CHE 321 with grade of C or better or consent of instructor.

**Section 3: Course Objectives**

- A. **General Education Curriculum Objectives (GECO):** (numbered to correspond to the objectives listed in the University catalog.)
2. Critical Thinking: Students will demonstrate the ability to reflect on theories and issues in a systematic fashion.
  4. Ethics: Students will demonstrate an understanding of Christian values and ethical standards in order to make mature and informed decisions concerning moral issues.
  5. Oral and Written Communication: Students will demonstrate the ability to express ideas, beliefs, and information in an organized, precise, and persuasive manner.
  6. Quantitative Literacy: Students will demonstrate the ability to understand and utilize mathematical and/or logical relationships to analyze data, to construct and assess arguments, and to make sound judgments in quantitative situations that arise in daily life.
  7. Social Responsibility and Citizenship: Students will demonstrate an understanding of personal and social responsibility in a changing global environment so that students can make contributions to their respective discipline and to society as a whole.
- B. **Student Learning Outcomes (SLO):** Students will demonstrate their laboratory skills and problem solving ability in this course. (Numbered to correspond to the pertinent General Education Curriculum Objective [GECO]).
1. Students will understand and be able to explain the basic principles of environmental chemistry. (GECO 2,6; Evidence: homework, quizzes, exams)
  2. Students will execute calculations related to quantitative aspects in environmental chemistry. (GECO 2,6; Evidence: homework, quizzes, exams)
  3. The student will recognize how chemistry provides solutions to contemporary, historical, technological, and societal issues. (GECO 2,4,6,7; Evidence: exams, term project)
  4. Students will develop an awareness of how a basic understanding of chemistry, the proper application of that knowledge, and the interaction between chemistry and other fields of study and careers is important to personal and social issues. (GECO 4,6,7; Evidence: exams, term project)
  5. Students should be able to read, understand, and apply scientific information through thinking more critically, discussing more meaningfully, arguing more persuasively, and writing more effectively. (GECO 2,5; Evidence: exams, term project)
- C. **Program Learning Outcomes (PLO):** (numbered to correspond to the listing in the program assessment document)
1. The student will be able to demonstrate a solid understanding of the core principles in the traditional subdivisions of chemistry: Analytical, Inorganic, Organic, and Physical.
  4. The student will be able to articulate chemical information/data/ideas clearly and effectively in speech and in writing in an acceptable presentation format.

6. The student will demonstrate critical thinking skills in chemistry: interpretation, evaluation, explanation, and scientific inquiry; how to ask appropriate questions, gather relevant information effectively and creatively, and reason logically from this information to make reliable conclusions.
- D. **Course Specific Objectives (CSO):** The student is expected to recognize and apply the fundamental and practical aspects of the following concepts and apply the concepts to problem solving. Upon completion of the course, the student:
1. will be able to state the 12 principles of green chemistry.
  2. will be able to demonstrate an understanding of the chemistry of the stratospheric ozone layer and of the important ozone depletion processes.
  3. will be able to demonstrate an understanding of the chemistry of important tropospheric processes, including photochemical smog and acid precipitation.
  4. will demonstrate an understanding of environmental and health consequences of indoor and outdoor pollution, including acid rain, smog, particulates, and indoor air pollution.
  5. will demonstrate an understanding of the basic physics of the greenhouse effect and of the sources and sinks of the family of greenhouse gases.
  6. An understanding of the nature, reactivity, and environmental fates of toxic organic chemicals.
  7. An understanding of societal implications of some environmental problems.
  8. will understand energy reserves and usage, the role of fossil fuels, and global warming
  9. will be able to discuss quantitatively the chemistry of natural waters, including redox chemistry, acid-base chemistry (the carbonate system) and ion concentrations in natural waters
  10. will be able to discuss the pollution and purification of water, including disinfection, wastewater and air purification techniques
  11. will be able to discuss the chemistry of the toxic metals Hg, Pb, Cd, As and Cr.
  12. will be able to describe water, soils and sediments, including domestic and commercial garbage, recycling, the superfund program and hazardous wastes.

#### **Section 4: Course Outline**

- A. Introduction
- B. Atmospheric Chemistry and Air Pollution
- C. Energy and Global Climate
- D. Toxic Organic Compounds
- E. Water Chemistry and Water Pollution
- F. Metals, Soils, Sediments and Waste Disposal

#### **Section 5: Evaluation**

The evaluation for the course will be distributed as follows:

Homework/Quizzes (amount to vary)	10%	91-100%	A
Hourly Exams (three)	35%	81-90%	B
Final(comprehensive)	20%	71-80%	C
Lab Analyses	20%	61-70%	D
Term Project	15%	Below 60	F
If, for any reason, you cannot continue to attend this class, be certain you DROP IT OFFICIALLY. Otherwise you will automatically receive a failing grade.			

### Dates to Remember:

M.L. King, Jr Day	Jan 16	First Bi-term ends	Mar 11
Evening classes begin	Jan 17	Spring Break-No Classes	Mar 13-17
Day classes begin	Jan 18	Second Bi-term begins	Mar 20
Last day add/register for Spring term	Jan 20	Easter Holiday-No Classes	Apr 14-17
Last day to drop 1 <sup>st</sup> Bi-term class with W	Feb 24	Last day to drop a semester class with W	Apr 13
Midterm Week	Mar 6-10	Finals Week	May 8-12
In the event of class cancellation for any reason (weather, instructor illness, etc.) exams or other scheduled activities will be administered in the next active class period.			

### Section 6: Requirements

- A. *Attendance:* The University Undergraduate Student Attendance Policy will be strictly followed for this course. Arrival at class ten minutes or later after the class has begun or sleeping in class will be counted as an absence.
- B. **Numbers to Remember:**
  - a. **Campus Security Cell Phone: 270-403-3611**
  - b. **Campus Security Office Phone: 270-789-5556**
  - c. **Natural Science Division Office Phone: 270-789-5065**
- C. *Examinations:* Three or four hourly exams (100 points each) will be given throughout the semester, with exam dates being announced in class approximately a week in advance. A COMPREHENSIVE final valued at 100-400 points will be given at the end of the semester according to the exam schedule furnished by the Academic Dean's office. **NO MAKE-UP EXAMS WILL BE GIVEN.** If an exam is missed throughout the semester, the value of the final exam will increase in proportion to the number of exams missed. The maximum number of hourly exams which may be missed is two. (The final exam may not be missed.) Cases of prolonged absence, severe illness, or death in the immediate family will be handled on an individual basis.
- D. *Homework and Quizzes:* In order to succeed in any course, it is necessary to be able to apply the theory learned. One means of doing this is by working problems that deal with the topics discussed. Throughout the semester, homework assignments will be assigned, turned in and graded. **LATE PAPERS ARE NOT ACCEPTED** unless you have a very valid reason for a **PROLONGED ABSENCE**. In addition, quizzes (10 to 25 points each) will be given periodically to test your knowledge of various topics. **MAKE-UP QUIZZES WILL NOT BE GIVEN.** They are generally unannounced and you must be present in class to take them.
- E. *Laboratory Analyses:* During the semester, various laboratory experiments/projects illustrating topics discussed in lecture will be performed by the student. Students will keep a lab notebook and submit write-ups of the lab experiments performed. The laboratory experiments are taken from Laboratory Experiments in Environmental Chemistry by D. Neal Boehnke; Prentice-Hall (2000), as well as other sources.
- F. *Term Project:* This project will involve the analysis of a real life environmental chemistry problem. The project will involve writing a research paper describing the project. More details on the project will be given in lecture.
- G. *Classroom Behavior:*
  - a. Guests are only allowed in class at the discretion of and with prior approval from the instructor.
  - b. Electronic recording devices of any kind are not permitted except in special circumstances and with the specific permission of the instructor.
  - c. While you are expected to attend, and participate in this class, your cell phone, computer, and MP3 players are **not**. Pagers, cell phones, and similar items are disruptive to the entire class and **must be turned off** during class. **The owner of any such device that activates**

**during class will be immediately excused from class and counted as absent for the entire period.**

- d. Use of cell phones, computers, and MP3 players during examinations and quizzes will be considered academic dishonesty, which will result in a zero being awarded for the quiz or examination (No exceptions!).
- e. Hats and caps are to be removed prior to entering the classroom.
- f. Take care of any physiological needs *before* coming into the classroom.
- g. Unacceptable student behaviors:
  - i. Sleeping during class
  - ii. Chronic tardiness. Be here ready to learn when class begins.
  - iii. Reading, studying or working on materials for other classes.
  - iv. Chatting with your classmates when the instructor or other classmates are speaking.
  - v. Prematurely packing up your books and bags before class has been dismissed.
- H. *Academic Misconduct*: Students in this course will be working toward mastery of the material to satisfy the course objectives. ***This class is held to an honor system, meaning that cheating, allowing someone to cheat, or failing to report known cases of cheating are all considered academic misconduct.*** *The Division of Natural Science Academic Integrity Policy will be followed in this class.* Be aware that aggressive methods are used to protect the majority of you who are honest. For information about plagiarism and how to avoid it, consult the following website: <https://www.indiana.edu/~academy/firstPrinciples>. Students will be asked to sign an integrity statement on each examination and quiz. The following statement reads as follows:

“I pledge on my honor that on this assignment/examination/quiz I have not received, given or seen any dishonest work.  
Signature \_\_\_\_\_ Date \_\_\_\_\_”
- I. *Teaching Methods*: The lecture method will be used as well as a hands-on laboratory experience in environmental methods. In addition to hands-on laboratory work, computer simulation programs will be used to provide the student with experience in generation and interpretation of several environmental methods.

**Section 7: Book List**

- A. *Environmental Chemistry*, 4<sup>th</sup> ed, Colin Baird and Michael Cann, W.H. Freeman, 2008. ISBN: 978-1-4292-0146-9
- B. *Environmental Laboratory Exercises for Instrumental Analysis and Environmental Chemistry*, Frank Dunnivant, John Wiley & Sons, 2004.
- C. Adams, V. Dean, Water and Wastewater Examination Manual, Lewis Publishers (1990)
- D. APHA-AWWA-WPCF, Standard Methods for the Examination of Water and Wastewater, 15<sup>th</sup> ed., American Public Health Association (1981).
- E. Manahan, S.E., Environmental Chemistry, 6<sup>th</sup> ed., Lewis Publishers (1994).
- F. Skoog, D.A. West, D.M. and Holler, F.J., Analytical Chemistry—An Introduction, 7<sup>th</sup> ed., Saunders College Publishers (2000).
- G. Snoeyink, Vernon L., Water Chemistry, John Wiley & Sons (1980).

**Section 8: Disabilities**

Campbellsville University is committed to reasonable accommodations for students who have documented physical and learning disabilities, as well as medical and emotional conditions. If you have a documented disability or condition of this nature, you may be eligible for disability services. Documentation must be from a licensed professional and current in terms of assessment. Please contact the Coordinator of Disability Services at 270-789-5192 to inquire about services.

### **Section 9: Academic Support**

The Academic Support area, located in the Badgett Academic Support Center (BASC), exists to help students. At certain times, most students need some help with studying, choosing a career, major/minor, or assistance in a difficult course. The following services are available Career Services, Disability Services, tutoring, and the Citizens Bank & Trust Writing Center. *These services are provided at no extra cost to the student.* Space is also available for individual and group study, and laptop computers are available for students to check-out and use within the building. Information is also available by calling the Office of Academic Support at (270) 789-5064.

### **Section 10: Title IX**

Campbellsville University and its faculty are committed to assuring a safe and productive environment for all students. In order to meet this commitment and to comply with Title IX of the Education Amendments of 1972 and guidance from the Office of Civil Rights, the University requires all responsible employees, which includes faculty members, to report incidents of sexual misconduct shared by students to the University's Title IX Coordinator.

*Title IX Coordinator:*

Terry VanMeter

1 University Drive

UPO Box 944

Campbellsville, KY 42718

Administration Office 8A

Phone: 270-789-5016

Email: [twvanmeter@campbellsville.edu](mailto:twvanmeter@campbellsville.edu)

Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is set forth at: [www.campbellsville.edu/titleIX](http://www.campbellsville.edu/titleIX)

<b>Tentative Course Schedule (Spring 2017)</b>			
<b>Lecture Date</b>	<b>Topic</b>	<b>Chapters</b>	
	Course syllabus		
19 Jan	Review of General Chemistry topics		
24 Jan	Introduction: Chemistry and the Environment	Introduction	
26 Jan	<b>The Atmosphere</b>	Chapters 1,2,3,4,17	
31 Jan	Stratospheric chemistry		
2 Feb	Ozone Holes		
7 Feb	Aerosols, Smog, Particulates; Tropospheric Chemistry		
9 Feb	Urban & Indoor Atmospheres		
	<b>Exam 1 (Feb 9, in lab)</b>		
14 Feb	Global Climate	Chapters 5-6	
16 Feb			
21 Feb			
23 Feb			
28 Feb	<b>The Hydrosphere</b>	Chapters 10,11,12,13	
2 Mar	Aquatic systems		
7 Mar	Gases in water	Chapters 10,11,12,13	
	Organic matter		
9 Mar	<b>Exam 2 (Mar 9, in lab)</b>		
<b>March 13-17</b>	<b>Spring Break</b>		
21 Mar	Chemistry of Natural Waters	Chapters 10,11,12,13	
23 Mar	Water Cycle, Carbon cycle, etc		
28 Mar	Water-Redox Chemistry		
30 Mar	Pesticides		
4 Apr	Toxic Heavy Metals and Waste		
6 Apr	Pollution and Water Purification		
11 Apr	<b>The Lithosphere (Soil chemistry)</b>	Chapters 14,15,16	
13 Apr			<b>Exam 3 (Apr 6, in lab)</b>
18 Apr			Soil properties
20 Apr			Toxic organic compounds
25 Apr			Decontamination of Water, Hazardous wastes
27 Apr			
2 May	Emerging Environmental Issues; Review	Chapters 7,8	
4 May			
<b>May 9</b>	<b>FINAL EXAM, 8:00 am</b>		
<b>In the event of class cancellation for any reason (weather, instructor illness, etc.) exams or other scheduled activities will be administered in the next active class period.</b>			



COURSE #: \_\_\_\_\_ SEMESTER: \_\_\_\_\_

COURSE TITLE: \_\_\_\_\_

### Student's Acceptance of Course Policies

Please fill out and sign the following form and **return it no later than**  
\_\_\_\_\_ to the instructor. **Use a blue or black pen (no pencil).**

I, \_\_\_\_\_, have read the entire syllabus describing the  
course

(Print your name neatly)

policies for this course, taught by Ms. E. Kay Sutton. I fully understand these policies and I  
agree to comply with them during the entire \_\_\_\_\_ term.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_