

## **CHEM 510: Green Chemistry for Secondary Educators Summer 2007 (3 credit hours)**

Instructor: Ann Ratcliffe

Time: Laboratory: 6/22 - 24; Online 6/25 - 7/20, 2007

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### **Prerequisite**

A year of college chemistry or equivalent teaching experience in chemistry.

### **Course Description**

The course is designed to help middle and high school teachers apply the 12 principles of Green Chemistry in their laboratories by starting with a series of at least 18 Green Chemistry experiments and demonstrations. The on-campus laboratory is followed by 4 weeks online. Upon completion of the course, participants will be able to

- write age-appropriate Green Chemistry experiments for students in which the students minimize, destroy, or reuse unwanted products;
- download a Toxics Release Inventory (TRI) from EPA for their local area, interpret it, and design age-appropriate activities around the TRI;
- "Green-up" existing experiments;
- analyze an experiment and give it a Green Chemistry rating;
- write an environmental impact statement for each experiment;
- discuss risk and hazard and analyze chemicals and reactions in terms of toxicity, potency, severity of an effect, reversibility, etc.
- analyze a traditional drug synthesis and its "green" replacement, and describe it in terms of atom economy and alternative reagents;
- "Green-up" their chemical stockrooms, eliminating chemicals that pose unnecessary hazard, are no longer used, or of which there is an excess;
- interpret the 12 principles of Green Chemistry to peers, parents, and administrators.

In the 4 weeks following the workshop, students will participate in multiple discussions using Blackboard. Assignments will be submitted on Blackboard and high school and middle school experiments/activities will be shared.

### **Grading**

**Letter graded** (A = 90 - 100; B = 80 - 89; C = 70 - 79; D = 60 - 69; F = <60)

1. Laboratory	30%
2. Written assignments	30%
3. Blackboard participation	30%
4. Final Exam, online	10%

### **Textbook**

The textbook is *Green Chemistry: Theory and Practice*, by Paul T. Anastas and John C. Warner. Oxford University Press, 1998.

Students will download appropriate resources from the Blackboard site. Some useful URLs are:

American Chemical Society, Green Chemistry Institute,  
<http://greenchemistryinstitute.org>  
"Green Innovations," *Chemical and Engineering News*,  
<http://pubs.acs.org/cen/coverstory/8228/8228greenchemistry.html>  
Green Chemistry at the University of Oregon,  
<http://www.uoregon.edu/~hutchlab/greenchem/>

Green Chemistry at the University of Scranton,  
<http://academic.scranton.edu/faculty/CANNM1/greenchemistry.html>  
Green Chemistry, US EPA, <http://www.epa.gov/greenchemistry/>

### ***Tentative Schedule***

This course starts with a 2.5 day intensive laboratory experience on the UNC campus, which is followed by 4 weeks of assignments, discussions, and an online final exam.

### **Honor Code**

All members of the University of Northern Colorado community are entrusted with the responsibility to uphold and promote five fundamental values: *Honesty, Trust, Respect, Fairness, and Responsibility*. These core elements foster an atmosphere, inside and outside of the classroom, which serves as a foundation and guides the UNC community's academic, professional, and personal growth. Endorsement of these core elements by students, faculty, staff, administration, and trustees strengthens the integrity and value of our academic climate.

### **Disability Support Services**

Students who believe that they may need accommodations in this class are encouraged to contact the UNC Disability Support Services, 970.351.2289, as soon as possible to ensure that accommodations are implemented in a timely fashion.

### **UNC's Policies**

UNC's policies and recommendations for academic misconduct will be followed.