

## **SCED589: Introduction to Green Chemistry for High School Teachers**

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COURSE CREDIT:	3 graduate credits/48 hrs instruction
DATES & TIMES:	Summer 2025 June 9 – August 4, 2025

### **COURSE DESCRIPTION:**

Green Chemistry is being widely used in industry and the need for future scientists who understand how to use the 12 principles to drive green innovation is acute. Green Chemistry education must be integrated into the way we teach scientists from the earliest ages. This course will provide an introduction to Green Chemistry and give teachers the skills and knowledge to practice green chemistry pedagogy and procedures in their classrooms. A broad overview of green chemistry will be given including ways that green chemistry is being used in industry. Lesson plans for teachers to use will be introduced which include all of these concepts as well as laboratory activities that can replace those that are currently used by teachers but are dangerous to human health and the environment. These new learnings are intended to be integrated into the content and standards that teachers are already required to teach and a portion of the work for this class will be developing implementation plans for each teacher. A survey of the available resources to teachers will be explored and those that are available for free download will be emphasized.

### **STUDENT LEARNING OUTCOMES:**

Upon completion of the course, the learner will be able to:

1. Explain the 12 principles of green chemistry
2. Give examples of how these 12 principles are being used in industry to make the world more sustainable.
3. Collect materials they can use to bring an understanding of green chemistry to their students.
4. Evaluate all of the educational and support materials available to High School teachers in the area of green chemistry.
5. Identify those lab activities that are of concern to the health and safety of the environment and human health.
6. Develop a course plan that weaves green chemistry lesson plans and lab activities through their existing curriculum.

## **COURSE REQUIREMENTS:**

Each learner will complete the following:

1. **Zoom Sessions/Discussion Forums:** The synchronous zoom sessions and the asynchronous forums constitute the online class discussion and are a substantial portion (40%) of your grade.
  - a. Synchronous Zoom Sessions: There will be 3 synchronous zoom sessions that will provide opportunities for valuable student-student interaction and provide a space to share ideas, ask questions, and learn more from each other. If you are not able to attend the zoom sessions, there will be a recording provided and you will need to complete alternate assignments.
  - b. In the asynchronous discussion forums, I expect you to participate by posting substantive comments when assigned. Please post your original thread earlier in the week so you and your classmates are able to respond throughout the week. The questions are designed to be based upon the readings and assignments for the week but you are also encouraged to post comments related to general teaching and pedagogy and just general teacher sharing. In addition to posting your own thoughts and ideas, please respond to at least two people's postings on two separate days for each lesson.
2. **Module 1 (Intro to Green Chemistry Lesson Plan) 20% of grade**
  - a. Develop a lesson plan that you would use to introduce the 12 principles of green chemistry and/or the sustainable development goals to your students. Include a hands-on component and relevant chemistry content (local/state science standards) in your lesson.
3. **Module 2 (Green Chemistry in Industry Lesson Plan) 20% of grade**
  - a. Develop a lesson plan that you would use to introduce a green chemistry example or innovation to your students. Your lesson plan should connect to the chemistry content that you already teach, and provide real world green chemistry or industry connections to students.
4. **Module 3 (Lab Safety and Replacement Labs Analysis)**
  - a. Identify what you consider to be your 3 most hazardous labs - what is the objective of the lab, what are the hazards and risks involved? Create a list of at least 3 labs from the Beyond Benign website that you would like to try in place of those labs..
5. **Module 4 (Final Implementation Plan) 20% of grade**
  - a. Develop a plan for implementing green chemistry in your classroom throughout the next school year. Be sure to include your implementation goals, additions, and modifications to your current curriculum. Doing everything in one year may not be possible, so you may consider a plan that unfolds over multiple years.

## **GRADE DISTRIBUTION AND SCALE:**

### **Graded Assessments**

	<b>Weight</b>
Virtual Class Participation (Discussion Posts, Zoom Session, & Module 3 Replacement Lab Analysis)	40%
Module 1 (Intro to Green Chemistry Lesson Plan)	20%
Module 2 (Green Chemistry in Industry Lesson Plan)	20%
Module 4 (Final Curriculum Plan)	20%

Total: 100%

### **Grade Scale:**

90-100%	A
80-89%	B
70-79%	C
60-69%	D
59 and below	F