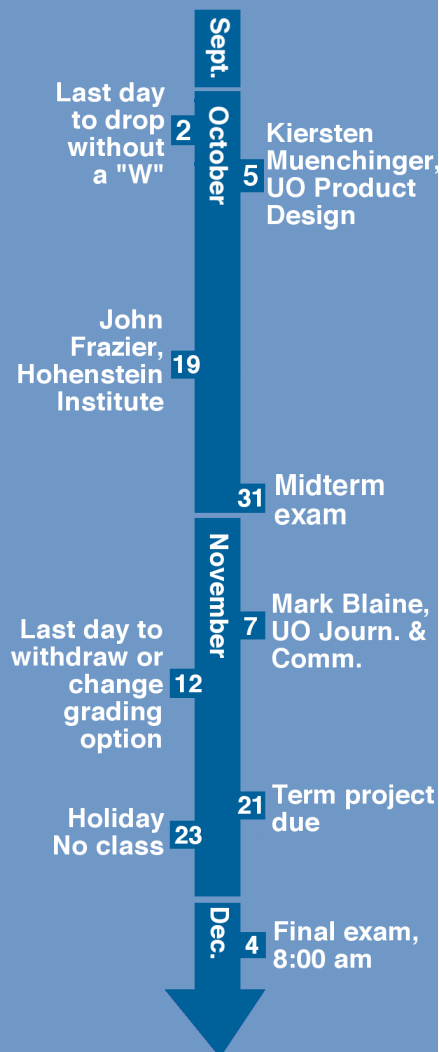


## Course Timeline



# CH 114: Green Product Design

Integrating green chemistry and life cycle thinking with design, communications, and sustainable business practices to create and accelerate the adoption of greener consumer products.

**Class Location:** 117 Kalapuya Ilihi Hall  
**Class Time:** Tues./Thurs. 12:00-1:50 pm

**Required Textbook:** Chemistry Lab Notebook 50 Carbonless Duplicating Set (spiral bound), Author Barbakam, ISBN 978 0978534400

### Instructor:

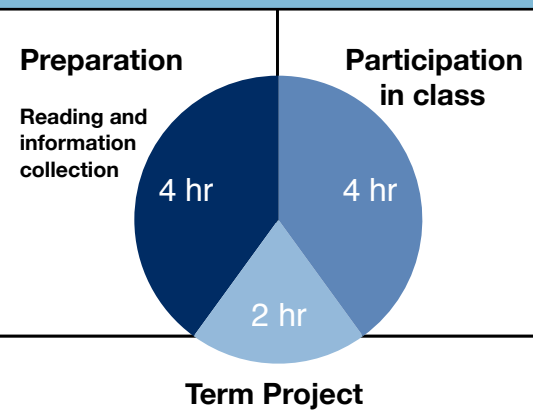
Dr. Julie Haack  
 UO Dept Chem/Biochem  
 Email: jhaack@uoregon.edu  
 Phone: 541-346-4604  
 Office: Room 91 Klamath Hall

### Teaching Assistants:

Kenyon Plummer  
 UO Dept Chem/Biochem  
 Chemistry PhD '18  
 Email: kplummer@uoregon.edu

Jishnu Mukherjee,  
 UO Cntr Sus Bus Practices  
 MBA '18  
 Email: jishnum@uoregon.edu

### Work load expectation: 10 hours/week



### Grading breakdown

#### Term Project

Work in interdisciplinary teams using green chemistry and life cycle thinking to design and advocate for a greener consumer product. Grades will be based on your ability to craft a data-driven strategy for design & market adoption.

#### Midterm Exam Topics

Molecular Design (composition, structure, function, impacts on human health and the environment)

Green Chemistry/Life cycle thinking

Materials  
 Polymers  
 Nanoscale Materials  
 Wearable Devices

#### In class activities & assignments

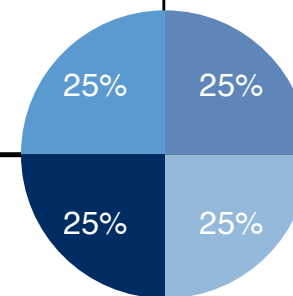
Homework and hands on chemistry demonstrations

Data Analysis  
 Design Challenges  
 Interdisciplinary brain storming  
 Collaborative problem solving

#### Final Take-Home Exam

Develop a comprehensive strategy for how a company could connect design and innovation to

the science of sustainability to accelerate the creation and market adoption of greener consumer products.



At the end of this course you will be able to use green chemistry and life cycle thinking to

1. Design a greener consumer product.
2. Advocate for greener than what, greener how and greener why.
3. Develop a strategy to accelerate the adoption of your greener product into the market.
4. Describe the opportunities and challenges of using polymers and nanoscale materials in greener consumer products.

## RETAINING COPIES OF ALL COURSEWORK:

Please retain copies of all work submitted and the original copy of all work returned to you during the term until the final course grade has been posted. In the event of any question concerning whether grades have been accurately recorded, it is your responsibility to provide these copies as documentation.

### ACCESSIBLE EDUCATION:

Please let me know within the first two weeks of the term if you need assistance to fully participate in the course. Participation includes access to lectures, web-based information, in-class activities, and exams.

The Accessible Education Center (<http://aec.uoregon.edu/>) is part of the Office of Academic Advising. Students can request an instructor notification letter that outlines possible accommodations and adjustments to class design that will enable better access. For additional assistance with access or disability-related questions or concerns, contact the Accessible Education Center at 346-1155.

### ADDITIONAL ASSISTANCE:

If you need help and are not sure where to go, check out the Office of the Dean of Students. The Office of the Dean of Students (formerly Student Life) is dedicated to enhancing the lives and learning of all students at the University of Oregon. Staff members are available to help you find solutions and resources for most issues and concerns. They are located in room 164 Oregon Hall. Phone: 346-3216.

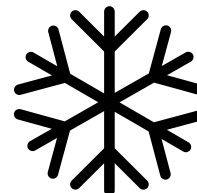
### ACADEMIC INTEGRITY:

Academic dishonesty in any guise, including plagiarism, fabrication, and cheating, will not be tolerated. All work submitted in this course must be your own and produced exclusively for this course. The use of sources (ideas, quotations, paraphrases) must be properly acknowledged and documented. Consequences of academic dishonesty range from receipt of a failing grade on the assignment to an F in the course. All violations will be taken seriously and are noted on student disciplinary records. Please contact me with any questions you have about academic conduct.

**DIVERSITY:** The University of Oregon is dedicated to the principles of equal opportunity and freedom from unfair discrimination for all members of the university community and an acceptance of true diversity as an affirmation of individual identity within a welcoming community. This course is committed to upholding these principles by encouraging the exploration, engagement, and expression of distinct perspectives and diverse identities. We will value each class member's experiences and contributions and communicate disagreements respectfully.

Please notify me if you feel aspects of the course undermine these principles in any way. You may also notify the Department of Chemistry and Biochemistry at (541) 346-4601.

**INCLEMENT WEATHER:** In the event of inclement weather, the UO home webpage ([www.uoregon.edu](http://www.uoregon.edu)) will include a banner at the top of the page displaying information about delay or closure decisions for the Eugene campus. Local television, radio, and print media will be notified as well. Unless the university closes, faculty members not able to travel to campus to convene their classes have the responsibility of attempting to notify students in a timely way that they will not be holding class. In the event of a class cancellation, for any reason, I will notify you by email, using Canvas, and post the cancellation on the course website.



# Fine Print

**GRADING:** This course is interactive and your ability to excel will depend your in-class participation.

Grades will be awarded based on the following scale and you must complete all assigned work and exams to pass the course.

90 to 100% of the total points = A  
80 to 89% of the total points = B  
65 to 79% of the total points = C  
50 to 64% of the total points = D  
<50% of the total points = F

If you have chosen the P/N option, a total score of at least 65% is required to receive a P (pass) grade. A course grade of incomplete (I) will be considered on a case-by-case basis.

Final grades are based on the total amount of points obtained for all elements of the course. Please note that you must complete all assignments (including in-class activities) in order to pass the class. Late assignments must be turned in via email to [jhaack@uoregon.edu](mailto:jhaack@uoregon.edu).

**EXAMS:** Make-up exams or early exams are not provided. If you have to miss an exam for any reason, please notify Julie Haack ASAP to request an accommodation. The in-class exam is closed book. All cell phones and other wireless communication devices must be turned OFF and placed under your seat with your backpack and other belongings. Headphones and unauthorized earpieces must be removed during exams. Due to the sophisticated nature of the material covered in this course, I do not allow dictionaries or translation devices to be used during exams.

The final exam is a take home exam and will be due via email by 10 am on Monday, December 4, 2017. The final exam should be typed and submitted as a PDF attached to the email. Additional details for completing the take home final exam will be provided during week 8 of the term. You may not discuss the exam with anyone until Friday, December 8, 2017.

# Assignments

Developing the ability to evaluate and design greener products requires a robust collection of integrated skills in research, communication, and problem solving. Class activities and assignments are designed to help you develop, practice and refine these skills throughout the term.

You will participate in a variety of in-class activities that enable you to practice working with general concepts presented in lecture. These in-class activities promote communication and collaborative problem solving during class. The daily Journal Assignment will be completed in your laboratory notebook and turned in at the end of each class period. It will include an introductory exercise, results from in class activities and a learning summary.

Reading and Information Collection. Due to the rapidly evolving nature of wearable devices, I will provide a limited number of additional reading and homework assignments during the term. We will be utilizing a variety of source materials for this course. Some of the reading materials will be available via Canvas and some information will be accessible via the Internet.

# CH 114

Green Product Design


# SCHEDULE OF CLASSES

FALL 2017

Class meets in Kalapuya Ilihi Hall 12:00 - 1:50 T/R  
CRN #16196 4 Credits

I'll do my best to keep this schedule, but shift happens sometimes.  
I will try to communicate clearly any schedule changes

Please submit all journal assignments at the  
end of class.

DATE/CLASS TOPIC	CLASS	READINGS (Read before class)	Assignments Due In Class
9/26 Welcome/Introductions Course Overview Chemistry/Materials/Impacts	1	Wearables - Form/Function and Performance None	Journal Assignment
9/28 Polymer Chemistry 3R Strategies Greener Water Bottle	2	Life Cycle Thinking General Chemistry - Introduction (Wiki Book) General Chemistry - Properties of Matter (Wiki Book)	Journal Assignment
10/3 Greener - Validation Alternatives Assessment Polymer life cycle	3	Wearables - Design <i>Green Chemistry Theory and Practice</i> . Anastas and Warner, pages 1-19 (1998) - CANVAS	Journal Assignment
10/5 Guest lecture Kiersten Muenchinger (PD)	4	<i>How to get people to believe your product is sustainable</i>	Journal Assignment
10/10 Polymer Feedstocks Endangered Elements Alternatives Assessment	5	Wearables - Life Cycle <i>Greenwashing</i> . Dahl (2010) - CANVAS	Journal Assignment + What is green chemistry and how can you use it to create a greener water bottle?
10/12 The Business Case Project Team Formation	6	<i>Green to Gold</i> . Esty and Winston, pages 1-30 (2009) - CANVAS	Journal Assignment + 10 project ideas (see CANVAS for details)
10/17 3M & Green Design Strategy Retroreflective sheeting	7		Journal Assignment + 3M video (see CANVAS for details)
10/19 Guest Lecture John Frazier, Hohenstein Institute	8	<i>Closing the Loop</i>	Prepare for midterm exam - practice problems (see CANVAS for details)
10/24 Introduction to nano-materials	9		Journal Assignment + recommended nano videos (see CANVAS for details)
10/26 Greener Nano Exam review	10	<i>Green Nanoscience</i> . McKenzie and Hutchison (2004) - CANVAS	Journal Assignment + one page emerging technology summary (see Canvas for details)
10/31 <b>Midterm Exam - In Class</b>	11		Final Project Teams Formed
11/2 Emerging Technologies - Wearables	12		Journal Assignment
11/7 Guest Lecture Mark Blaine (UO Journalism)	13	<i>Telling the green story</i>	Journal Assignment
11/9 Barriers to the implementation of green chemistry	14	<i>Barriers to the Implementation of Green Chemistry in the United States</i> . Matus et. al. (2012) - CANVAS	Journal Assignment
11/14 Peer review final project	15		Journal Assignment + project abstract due (see CANVAS for details)
11/16 Incentivizing Change Group Work	16		Journal Assignment
11/21 Final exam preparation Group Work - final presentation preparation	17		Term Project Due In-Class
11/23 THANKSGIVING HOLIDAY! NO CLASS!	18		
11/28 <b>Team Presentations - Group A</b>	19		Student presentations and evaluation.
11/30 <b>Team Presentations - Group B</b>	20		Student presentations and evaluation.
12/4 Take home final exam due at 10 am via email to <a href="mailto:jhaack@uoregon.edu">jhaack@uoregon.edu</a>		Subject: CH 114 FINAL	Take home final exam due via email at 10 am.