

CHEM 483: GREEN CHEMISTRY
SPRING 2015
MWF / 9:10 – 10:00 AM / ROOM - 255

INSTRUCTOR: **Dr. Donald J. Darensbourg** 406 Chemistry Bldg. 845-5417 or -2983
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Chemistry 483 Homepage: <http://www.chem.tamu.edu/rgroup/djd/chem483>
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TEXTBOOK: “**Green Chemistry: An Introductory Text**,” 2nd Edition; Mike Lancaster; RSC Paperbacks, Cambridge, UK (2010)
ISBN-10: 1847558739 | ISBN-13: 978-1847558732

REFERENCE: “Green Chemistry and Catalysis,” Roger A. Sheldon, Isabel Arends, and Ulf Hanefeld; Wiley-VCH, Weinheim, Germany (2007).

GRADING:	Ten (10 min. quizzes) on Fridays (9:10-9:25 am)	100
	Midterm Exam – Fri., March 13	100
	Paper/presentation	50
	Final Exam – Friday, May 8, 2015; 8:00 - 10:00 AM	<u>150</u>
	Total	400 points

SCALE:
A ≥ 90%; 89 % ≥ B ≥ 80%; 79% ≥ C ≥ 70%; 69% ≥ D ≥ 60%; F < 60 %

EXAM SCHEDULE: **Midterm Exam:** Friday, March 13, 2015
 Final Exam: Friday, May 8, 2015; 8:00 - 10:00 AM

COURSE DESCRIPTION:

Green chemistry differs from previous approaches to many environmental issues. Rather than using regulatory restrictions, it unleashes the creativity and innovation of our scientists and engineers in designing and discovering the next generation of chemicals and materials so that they provide increased performance and increased value while meeting all goals to protect and enhance human health and the environment. (*ACS Green Chemistry Institute*®)

PREREQUISITES: JUNIOR OR SENIOR STANDING. CHEM228; CHEM 362 recommended.

CELL PHONES, TABLETS AND OTHER ELECTRONIC DEVICES: Use of cell phones and other electronic devices in class is strictly limited to course-related activities (e.g., taking notes). Students violating this policy will be required to leave immediately. If you have an emergency, please be courteous and step outside, so as not to disrupt the class.

ATTENDANCE/MAKE-UP POLICY

The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences and make up work are located on-line at <http://student-rules.tamu.edu/rule07>

AMERICANS WITH DISABILITIES ACT (ADA) POLICY STATEMENT

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit <http://disability.tamu.edu>.

AGGIE HONOR CODE

“AN AGGIE DOES NOT LIE, CHEAT, OR STEAL OR TOLERATE THOSE WHO DO.”

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System.

For additional information please visit: <http://www.tamu.edu/aggiehonor/>

TOPICS TO BE COVERED INCLUDE:

- *The Fundamentals of Green Chemistry*
 - Environmental Protection Agency (EPA) 1970
12 major environmental laws passed
 - Presidential Green Chemistry Challenge Awards (1996)
 - The Twelve Principles of Green Chemistry

- *Principles of Green Chemistry*
 - Atom economy
 - Life Cycle Assessment
 - Use of renewable resources

- *Catalysis for Green Chemistry*
 - Topics chosen from General, Inorganic, Organic and Polymer Chemistry
 - Alternative solvents and reaction media

- *Energy and the Environment*
 - Global warming
 - Renewable energy

RESEARCH PAPER AND PRESENTATION:

Paper (limit of 10 typed pages, including figures) involving case studies of issues in Green Chemistry. (This will be a project for three randomly grouped students.)

Due Dates:

Title and Abstract – March 25

Presentations: April 20 – 29 and May 1 (two per class period)

Papers – May 4

Graded with the following in mind:

1. Scientific content and clarity of presentation
2. Paper
 - well written and referenced (original literature, avoid internet references)
 - neat – no typographical errors or poorly drawn figures
 - clear, illustrative figures
3. Creativity/originality

An approximate schedule of lectures:

Week	Lecture	Assignment
1	The Fundamentals Of Green Chemistry	
2	Principles Of Green Chemistry, Atom Economy And E Factors	
3	Life Cycle Assessment And Environmental/Health/Safety Of Organic Solvent	
4	Basic Organometallic Chemistry For Catalysis	
5	Green Chemistry And Catalysis	
6	Green Chemistry And Catalysis, Homogeneous Catalysis	
7	Homogeneous Catalysis In Environmentally Benign Solvents	
8	Principles Of Polymer Chemistry	Exam
9	Green Improvements To Polyolefin Synthesis	
10	Polymers From Renewable Resources	
11	CO ₂ And Global Warming	
12	CO ₂ Utilization And Renewable Energy Sources	
13	Student Presentations On Green Chemistry Topics	
14	Student Presentations On Green Chemistry Topics	
15	Final Exam Friday, May 8, 2015; 8:00 - 10:00 AM	Final Exam