

Course Overview

This course satisfies the Pure and Applied Sciences Pillar (UC Credit) Level 1. This course is an introductory course in chemistry designed specifically for non-science majors. The course is intended to develop critical thinking to help students understand how chemistry is relevant to their daily lives. The course reflects a variety of current societal and technological issues and the chemical principles embedded in them. Air pollution, global warming, acid rain, energy (fossil fuels, nuclear, alternatives), and properties/purity of water are examples of such issues.

Instructor Biography

Professor Lattman has been teaching at SMU for more than 30 years. In addition to teaching students majoring in chemistry, he has taught non-science majors since he first arrived at SMU. His experience includes teaching Chem 1301 during the summer for more than 10 years, as well as in May Term 2013 through 2017. Professor Lattman was recognized by SMU students as a HOPE (Honoring our Professors' Excellence) honoree in 2002, 2003, 2007, 2008, and 2015. He also received the Distinguished HOPE Faculty Award in 2012 and has been honored as a Camille and Henry Dreyfus Scholar. In 2014, Professor Lattman received the Altshuler Distinguished Teaching Professor Award. Professor Lattman conducts research in the areas of inorganic chemistry and catalysis.

Benefits of taking this course during May Term

- Students will be able to focus exclusively on this course.
- Numerous breaks will be scheduled for problem sessions and review.
- Small class size allows for individualized faculty-student interactions.
- Students will be free from taking Chem 1301 during the fall and spring or summer, making it possible to substitute other courses to fulfill requirements and interests.

UC/GEC "tags" and Student Learning Outcomes (SLO's)

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General Education Learning Outcomes:

- Students will be able to use both qualitative and quantitative methods to understand chemistry.
- Students will be able to describe how the concepts and findings in chemistry are relevant to our daily lives and shape our world.

Student Learning Outcomes:

- Students will be able to apply chemical principles with their application to the real world.
- Students will be able to acquaint themselves with scientific methods and scientific understanding, so that they will be able to read about science and technology with some degree of critical judgment.
- Students will be able to use chemical knowledge and critical thinking ability to better assess the risks and benefits in choices that they, as informed citizens, will be making.
- In the laboratory, experiments are designed to illustrate the chemical principles presented in lecture with broader societal implications. Hands-on experience with experimentation and data collection will help students describe the scientific method and the role that science plays in addressing societal issues. All experiments include a set of questions that will allow students to summarize and consolidate what they have learned and/or to extend the results to new situations.

Class Meeting 9:00 am to 1:00 pm **Fondren Science** **Room TBD** **Room 25 (lab)**
Instructor: M. Lattman, Room 310 Fondren Science (FS) (Tel. 214-768-2467, mlattman@smu.edu)
Office Hours: M W 1:00 - 2:00 pm (or by appointment)

Text: *Chemistry in Context: Applying Chemistry to Society*, 9th ed., McGraw-Hill, 2018. ISBN 978-1-259-92015-8.

Calculator: An inexpensive calculator will be needed. One that does logarithms ("logs") is helpful.

Date	Topic	Lab	Exams
May 16	Introduction – Portable Electronics: The Periodic Table in the Palm of Your Hand The Air We Breathe	Pre-lab assignment must be handed in before lab starts.	
May 17	Radiation From the Sun	What's in a Breath? O ₂ and CO ₂ .	
May 20	Climate Change		Exam 1
May 21	Energy from Combustion	Molecular Shapes	
May 22	Water and Acid Rain		
May 23	Energy From Alternate Sources	Chemical Moles	
May 24	Energy Storage		Exam 2
May 27	No class		
May 28	Health and Medicine	Acids and Bases	
May 29	The World of Polymers and Plastics		
May 30	Nutrition		
May 31	—	Fats in Foods	Final Exam

Lectures meet for 4 hours (with breaks/problem sessions) unless a lab or lecture exam is scheduled on the same day.

When a lab is scheduled, lecture and lab meet for 2 hours each.

Exams 1 and 2 are 1-hour long; lecture meets for 3 hours on these days.

The final exam is scheduled for 2 hours and the final lab is 2 hours.

Last day to drop class: Tuesday, May 28

Students CANNOT drop their MayTerm course through my.SMU or by telling the instructor. Once classes start, they MUST complete an Enrollment Discrepancy petition. Contact the MayTerm office (408 Blanton) to officially withdraw.

Grading	Two one-hour lecture exams (Exams 1 and 2)	40%
	Final Exam (2 hours, comprehensive)	40%
	Lab	20%
	Total	100%

Missed Exams

If you miss an exam for a **WRITTEN, EXCUSED** reason, a make-up will be given.

The make-up may be written or oral, or a combination of the two.

If you miss the exam for an **UNexcused** reason, a zero will be entered.

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- In the laboratory, experiments are designed to illustrate the chemical principles presented in lecture with broader societal implications. Hands-on experience with experimentation and data collection will help students describe the scientific method and the role that science plays in addressing societal issues. All experiments include a set of questions that will allow students summarize and consolidate what they have learned and/or to extend the results to new situations.

Disability Accommodations: Students needing academic accommodations for a disability must first register with Disability Accommodations & Success Strategies (DASS). Students can call 214-768-1470 or visit <http://www.smu.edu/Provost/ALEC/DASS> to begin the process. Once registered, students should then schedule an appointment with the professor as early in the semester as possible, present a DASS Accommodation Letter, and make appropriate arrangements. Please note that accommodations are not retroactive and require advance notice to implement.

Religious Observance: Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence. (See University Policy No. 1.9.)

Excused Absences for University Extracurricular Activities: Students participating in an officially sanctioned, scheduled University extracurricular activity should be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up the work. (University Undergraduate Catalogue)

Homework

In addition to the assignments below, other problems and exercises may be assigned throughout the semester. The homework will not be collected or graded. However, doing the homework is necessary to do well in this course.

End of chapter questions.

Assignments will be handed out on the first day of class.

Your Turn questions.

Assignments will be handed out on the first day of class.

Specific Topics/Details

Day	Date	4-Hour Lecture	
Thu	May 16	Introduction – Portable Electronics: The Periodic Table in the Palm of Your Hand Periodic Table Survey What chemical elements are in your cell phone? Atoms, Molecules, and Formulas Classifying Matter: Pure Substances, Elements, and Compounds Our Responsibilities as Citizens and Chemists The Air We Breathe What's in a Breath? Air Pollutants and Risk Assessment Air Quality Names and Formulas: The Vocabulary of Chemistry Chemical Change: The Role of Oxygen in Burning Fire and Fuel: Air Quality and Burning Hydrocarbons Air Pollutants: Direct Sources Ozone: A Secondary Pollutant	
Fri	May 17	2-Hour Lecture Radiation From the Sun Ozone: What and Where Is It? Atomic Structure and Periodicity Molecules and Models Waves of Light Radiation and Matter The Oxygen-Ozone Screen Biological Effects of Ultraviolet Radiation Stratospheric Ozone Destruction Chlorofluorocarbons: Properties, Uses, and Interactions with Ozone The Antarctic Ozone Hole Responses to Global Concern Replacements for CFCs	2-Hour Lab (Lab 1. What's in a Breath? Properties of Oxygen and Carbon Dioxide)

Mon	May 20	3-Hour Lecture		Exam 1 (1-hour long)	
		Climate Change The Greenhouse Effect: Earth’s Energy Balance Gathering Evidence Molecular Shape Vibrating Molecules and the Greenhouse Effect The Carbon Cycle: Contributions from Nature and Humans Quantitative Concepts: Mass Quantitative Concepts: Molecules and Moles Methane and Other Greenhouse Gases How Warm Will the Planet Get? The Consequences of Climate Change What Can (or Should) We Do About Climate Change?			
Tue	May 21	2-Hour Lecture	2-Hour Lab	(Lab 2. Molecular Shapes)	
		Energy from Combustion Fossil Fuels and Electricity Efficiency of Energy Transformation The Chemistry of Coal Petroleum Measuring Energy Changes Energy Changes at the Molecular Level The Chemistry of Gasoline New Uses for an Old Fuel Biofuels I—Ethanol Biofuels II—Biodiesel, Garbage, and Biogas The Future			
Wed	May 22	4-Hour Lecture			
		Water and Acid Rain What is an Acid? What is a Base? Neutralization: Bases are Antacids Introducing pH Ocean Acidification The Challenges of Measuring the pH of Rain Sulfur Dioxide and the Combustion of Coal Nitrogen Oxides and the Combustion of Gasoline The Nitrogen Cycle SO ₂ and NO _x Acid Deposition and Its Effects on Materials Acid Deposition, Haze, and Human Health Damage to Lakes and Streams			
Thu	May 23	2-Hour Lecture	2-Hour Lab	(Lab 3. Chemical Moles)	
		Energy From Alternate Sources Nuclear Power Worldwide How Fission Produces Energy How Nuclear Reactors Produce Electricity What is Radioactivity? Radioactivity and You The Weapons Connection Nuclear Time: The Half-Life Nuclear Waste Issues Risks and Benefits of Nuclear Power Solar Power			
Fri	May 24	3-Hour Lecture		Exam 2 (1-hour long)	
		Energy Storage Batteries Fuel Cells Hydrogen Storage			

Tue	May 28	2-Hour Lecture	2-Hour Lab	(Lab 4. Acids and Bases)
		Health and Medicine A Classic Wonder Drug The Study of Carbon-Containing Molecules Functional Groups How Aspirin Works: Function Follows Form Modern Drug Design Steroids Prescription, Generic, and Over-the-Counter Medicines Herbal Medicine Drugs of Abuse		
Wed	May 29	4-Hour Lecture The World of Polymers and Plastics Polymers: Long, Long Chains Adding Up the Monomers Polyethylene: A Closer Look The “Big Six”: Theme and Variations Condensing the Monomers Polyamides: Natural and Nylon Recycling		
Thu	May 30	4-Hour Lecture Nutrition Food and the Planet Fats, Oils, and Your Diet Carbohydrates: Sweet and Starchy Sugars and Sugar Substitutes Proteins Vitamins and Minerals Energy from Food Feeding a Hungry World		
Fri	May 31	2-Hour Final Exam Final Exam	2-Hour Lab	(Lab 5. Fats in Foods)