

*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 and is intended to develop critical thinking to help students understand how chemistry is relevant to their daily lives. The topics covered reflect 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 Bio*

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 the more than 10 years and May Term 2013. Professor Lattman was recognized by SMU students as a HOPE (Honoring our Professors' Excellence) honoree in 2002, 2003, 2007, and 2008. He also received the Distinguished HOPE Faculty Award in 2012 and has been honored as a Camille and Henry Dreyfus Scholar. 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.

**Class Meeting** 9:00 am to 1:00 pm      **Fondren Science**      **Room: Check ACCESS**  
**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:** Middlecamp, Keller, Anderson, Bentley, Cann, Ellis *Chemistry in Context: Applying Chemistry to Society*, 7<sup>th</sup> ed., McGraw-Hill, 2012.

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

Date	Topic	Lab	Exams
May 15	Introduction - Chemistry for a Sustainable Future The Air We Breathe		
May 16	Protecting the Ozone Layer	What's in a Breath? O <sub>2</sub> and CO <sub>2</sub> .	
May 19	The Chemistry of Global Climate Change		Exam 1
May 20	Energy from Combustion	Molecular Shapes	
May 21	Water for Life		
May 22	Neutralizing the Threat of Acid Rain	Chemical Moles	
May 23	The Fires of Nuclear Fission		Exam 2
May 26	HOLIDAY		
May 27	The World of Polymers and Plastics	Acids and Bases	
May 28	Manipulating Molecules and Designing Drugs		
May 29	Nutrition		
May 30	—	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.

<b>Grading</b>	Two one-hour lecture exams (Exams 1 and 2)	40%
	Final Exam (2 hours, comprehensive)	40%
	<u>Lab</u>	<u>20%</u>
	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.

**Course Objectives:** This course is an introductory course in chemistry specifically designed 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, energy, acid rain, and properties/purity of water are examples of such issues.

### 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 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 contact Ms. Rebecca Marin, Coordinator, Services for Students with Disabilities (214-768-4557) to verify the disability and establish eligibility for accommodations. They should then schedule an appointment with the professor to make appropriate arrangements. (See University Policy No. 2.4.)

**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 will 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.

- 1: 1, 3, 4, 6, 7, 8, 9, 10, 13, 14, 15, 16, 17a, 18, 20, 21, 22, 25, 29, 30, 31, 37, 38, 45
- 2: 1, 7, 8, 9, 10, 1, 12, 13, 14 16, 17, 18(calculate the frequency associated with each wavelength; also calculate the energy of a photon associated with each wavelength), 19, 25, 26, 36, 40, 41, 42, 52
- 3: 3, 4, 8, 9, 12, 13, 14, 16, 17, 21, 23(note average value), 24, 25, 36, 38, 39, 54.

**Also do problems on handout: Extra homework on grams, moles, and atoms.**

- 4: 1, 4, 5, 6, 13, 14, 17, 18, 19, 24, 25, 27, 29, 32, 33, 35(also show specifically the effect of a catalyst on the energy of activation using the green line on Fig 4.20 as a reference), 37, 40(a, b, e), 45, 50
- 5: 4, 5, 6, 7, 8, 9, 10, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 27, 35, 36, 37, 38, 50, 52
- 6: 7, 9, 10, 12, 13(for a, calculate  $[H^+]$ ; for c and d, calculate pH), 14(for d-g, calculate pH), 15, 16, 18, 20, 21, 22, 28, 29, 36
- 7: 2, 3, 4, 12, 13, 14, 15, 17, 18, 21, 22, 43
- 9: 1, 2, 3, 9, 10, 11, 12, 33, 40
- 10: 10, 12, 23, 24, 31 (In the question 31 structures, each dash not connected to two carbons is a hydrogen atom)
- 11: 5, 6, 7, 9, 10, 11, 13, 15, 16, 17, 22, 27, 33, 34, 35, 40, 46

**Your Turn, Consider This, Skeptical Chemist questions.**

All are Your Turn questions except where otherwise indicated: Consider This (CT), Skeptical Chemist (SC)

- 1.5 (SC), 1.6, 1.7, 1.8, 1.10, 1.11, 1.13, 1.15, 1.18, 1.20, 1.25, 1.29
- 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10, 2.11(CT), 2.12, 2.13, 2.15(CT), 2.16, 2.23
- 3.4(CT), 3.6 (SC), 3.8, 3.9, 3.10, 3.11, 3.12, 3.14, 3.15, 3.16, 3.17
- 4.4, 4.8, 4.9, 4.13a, 4.16, 4.18, 4.20 (do problem on a per gram, not per gallon, basis)
- 5.12, 5.13, 5.3, 5.4(CT), 5.5, 5.6(CT), 5.14, 5.15, 5.16, 5.17, 5.18, 5.19(CT), 5.21
- 6.2, 6.3(CT), 6.4, 6.5, 6.6, 6.7, 6.13, 6.14
- 7.6, 7.12, 7.13, 7.18, 7.26
- 10.6, 10.7, 10.16. 10.17 (a, c only)