

## ***CHEM 158 – the chemistry of everyday things- the good, the bad and ...***

Instructor- Harold Goldwhite

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office hours.: MW 2-3:30 pm and by appointment

Lecture times: Tuesday and Thursday, 11:40 – 13:20

Meeting Place: PS 158

Texts: “The Chemistry of Everything”, Kimberley Waldron, Pearson/Prentice Hall Publishing – ISBN 0-13-008522-7; “The Cartoon Guide to Chemistry”, Larry Gonick and Craig Criddle, Harper Resource, ISBN 0-06-093677-0

Other supplies: Z87 rated lab goggles or glasses required, lab coat or apron optional if taking CHEM 159

### ***Course learning objectives.***

- Understanding and being able to apply the scientific method
- Understanding the particulate nature of matter and its implications and ramifications
- Understanding the fundamentals of atomic structure, in particular, “atomic identity” and isotopes.
- Being able to work with the metric system including its prefixes; and with numbers that are common in chemical systems (scientific notation).
- Developing a basic model for bonding within chemical substances.
- Using the particulate nature of matter and the conservation of matter in balancing chemical equations of reaction.
- Using chemical units of measurement to quantify the amounts of chemical substances in the gas, liquid and solid phases.
- Developing an appreciation for the importance of structure of molecules and their reactivity.
- Learning about some molecules present in everyday life and how their production has impacts on society. The molecules include, but are not limited to, polymers, food, pollutants and bio/psychoactive agents.

### ***Grading Scheme.***

Your grade in this class will be determined largely by the number of points that you earn in the following categories:

Midterm Exam	100
Final Exam	200
Homework	100
<u>In Class Daily 25 Words</u>	<u>100</u>
Total	500

The midterm exam will test your knowledge of the first four weeks of class and will be comprehensive. Both midterm and final exams will contain questions that require quantitative reasoning (word problems), semi-quantitative reasoning (balancing equations and predicting trends) and essay questions.

**The final examination will be on Tuesday August 28 from 10:45 – 13:15**

Homework problems are listed in the syllabus and are due on the first class of the week due. These are considered a **minimum** effort to understand the work and trying further problems is highly suggested and encouraged. If you have problems solving homework questions, do not hesitate to see me at my office hours.

The “In Class Daily 25 Words” assignments are designed to have you learn about some molecules of contemporary interest or people significant in the history of chemistry. You are to write at least 25 **original** words (and no more than 35 words) about that substance or person in standard scientific prose and submit that sentence (or two or three) to me by email by 01100 of that class day. Bulleted lists are not acceptable. Late arrivals will receive no points. Your summary should describe important properties and uses and have a structure of the molecule/substance; or a comment on the significance of the person’s contributions to chemistry.

EXAMPLE: Nitrogen; Nitrogen,  $N_2$ , is an elemental gas that makes up about 80% of the earth’s atmosphere. It is relatively inert, but is essential to plant and animal life.

I will post the class’s work on a web site (anonymously, of course) for you all to peruse. I usually will have something to say about the substance or person for the day in class.

There are no specific reading references for “The Cartoon Guide” but I will be mentioning in class the sections relevant to the current topics. The planned schedule of topics and readings from “The Chemistry of Everything” class by class is shown below in the table. Each block in the table is laid out in the following format:

<i>Topic for Daily 25 words</i> Relevant text readings (section numbers) Homework problems (week # due) And/or <b>Events of note (exam, etc.)</b>

### *The Schedule of Topics and Assignments*

Week of	Tuesday	Thursday
June 18	<i>None</i> 1,1 – 1,3	<i>helium</i> 1.4 – 1.6 Ch.1: 8,12,16,18,20,28,38 (#2)
June 25	<i>Lavoisier</i> 2.1 -2.3	<i>silica (quartz)</i> 2.4 – 2.6 Ch.2: 9,16,20,24,34,40 (#3)
July 2	<i>Dalton</i> 3.1 – 3.3	<i>ozone (O<sub>3</sub>)</i> 3.3 – 3.7 Ch.3: 4,7,8,16,18, 30,32,34 (#4)
July 9	<i>ethylene (C<sub>2</sub>H<sub>4</sub>)</i> 3.7 – 3.9	<i>platinum (Pt)</i> 4.1 – 4.7 Ch.4: 6,10,12, 18, 22,26,34 (#5)
July 16	<b>Midterm exam</b>	<i>sulfuric acid</i> 5.1 – 5.7 Ch.5: 4, 6, 8, 12, 18, 24 34 (#6)
July 23	<i>plutonium</i> 6.1 – 6.4	<i>Marie Curie</i> 6.4 – 6.6 Ch.6: 4, 6, 14, 18, 22, 26 (#7)
July 30	<i>ammonia</i> 7.1 – 7.3	<i>ethanol</i> 7.4 – 7.7 Ch.7: 6, 8, 12, 18, 24, 28 (#8)
August 6	<i>nitrogen</i> 8.1 – 8.4	<i>carbon dioxide</i> 8.5 – 8.7 Ch.8: 8, 12, 16, 20, 26 (#9)
August 13	<i>sarin</i> 10.1-10.6	<i>glycine</i> 11.1 – 11.5 Ch.10: 12, 20, 22, 36 Ch: 11: 12, 20, 26 Not to be handed in; solutions will be posted
August 20	<i>adenine</i> 12.4 – 12.6	Review session