# CHEM-1120C Introduction to Chemistry for Non-Majors

Fall 2019 – Section 501 – CRN 66852

**Instructor:** Dr. Jerry Godbout

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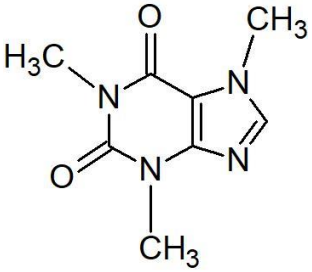
**Office Hours:** Monday 1:00 pm – 4:00 pm, Tuesday, 3:30 – 4:30 pm
Wednesday 3:00 pm – 4:00 pm, Thursday 9:00 am – 10:00 am,
and anytime by appointment

**Meeting Times:** Lecture: Tuesday & Thursday 12:00 – 1:15 pm, VAHS 101
Lab/Recitation: Tuesday 1:30 – 3:30 pm, VAAS 128

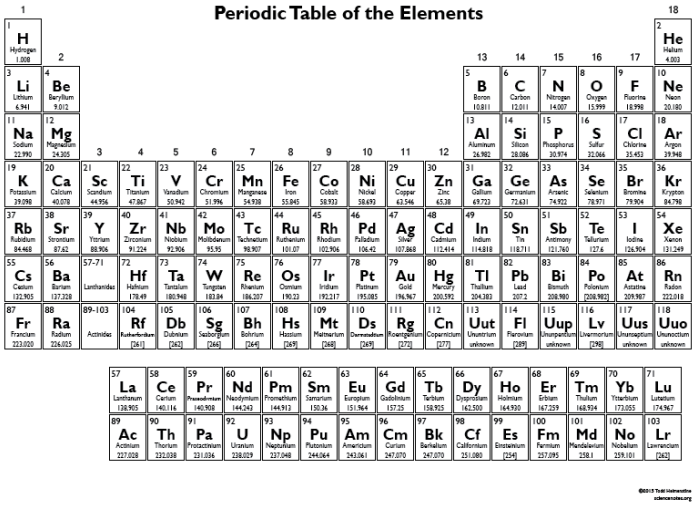
**COURSE DESCRIPTION:** The study of stuff, and what it does

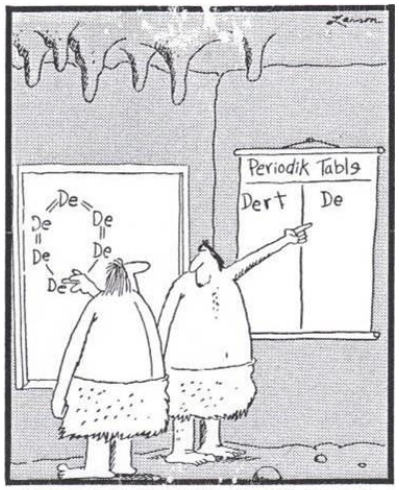
**COURSE DESCRIPTION:** One-semester course in general chemistry, especially for non-science majors in the health sciences except premedicine and medical technology. Three lectures, 3 hours demo lab/recitation. Credit for both this course and CHEM 1215 may not be applied toward a degree program. Credit for both this course and CHEM 131 may not be applied toward a degree program. Meets New Mexico Lower Division General Education Common Core Curriculum Area III: Science (NMCCN 1114). Prerequisite: MATH 1215Z or MATH 1220 or MATH 1240 or MATH 1430 or MATH 1440 or MATH 1512 or MATH 1522 or MATH 2530 or ACT Math =>22 or SAT Math Section =>540.



What is this molecule? Tell me (email) for some extra credit!

Guess which one is the instructor's, and guess which one is has gone through various committees and perhaps a lawyer or two?




Early chemists describe the first dirt molecule

# WHAT YOU'LL LEARN

COURSE TEACHING & LEARNING OUTCOMES

Relevant sections are given in [brackets] after each SLO

By the end of this course, a successful student will be able to:

1. Use dimensional analysis, the SI system of units and appropriate significant figures to express quantities, convert units and perform quantitative calculations in science. [Appendix B, 1.4 – 1.6]
2. Diagram the structure of the atom in terms of its subatomic particles; and justify the existence and nature of the subatomic particles and the scale of the nucleus using appropriate experiments from scientific history. [2.2 – 2.3]
3. Use the IUPAC system of nomenclature and knowledge of reaction types to describe chemical changes, predict products and represent the process as a balanced equation. [3.7, 4.3]
4. Apply the mole concept to amounts on a macroscopic and microscopic level and use this to perform stoichiometric calculations including for reactions in solution and gases. [2.4, 6.1 – 6.4, 7.3, 8.3]
5. Apply the gas laws and kinetic molecular theory to relate atomic level behavior to macroscopic properties. [8.1 – 8.5]
6. Describe the ways in which atoms combine to form molecules (ionic and covalent). Apply knowledge of electronic structure to determine molecular structure, geometry and hybridization. [4.1 – 4.6, 5.1 – 5.3]
7. Analyze how periodic properties (valence, electronegativity, etc.) and reactivity of elements result from electron configurations of atoms. [3.5 – 3.7]
8. Explain the intermolecular attractive forces that determine physical properties; apply this knowledge to qualitatively evaluate these forces; and predict the physical properties that result. [10.1 – 10.2]
9. Calculate solution concentrations in various units and explain the effects of temperature, pressure and structure on solubility. [11.1 – 11.4]
10. Explain rates and rate laws; determine the rate, rate law and rate constant of a reaction; and calculate concentration as a function of time and vice versa. [17.1 – 17.5]
11. Explain the collision model of reaction dynamics, including activation energy, catalysts and temperature; derive a rate law from a reaction mechanism; and evaluate the consistency of a mechanism with a given rate law. [17.6]
12. Recognize oxidation-reduction reactions; and identify oxidizing and reducing agents. [16.1 – 16.2]
13. Describe the dynamic nature of chemical equilibrium and its relation to reaction rates; and apply Le Chatelier's Principle to predict the effect of concentration, pressure and temperature changes on equilibrium mixtures. [13.1 – 13.3]
14. Describe the equilibrium constant and use it to determine whether equilibrium has been established; and calculate equilibrium constants from equilibrium concentrations and vice versa. [13.4]
15. Describe the different models of acids and base behavior and recognize common acids and bases. [14.1 – 14.4]
16. Apply equilibrium principles to aqueous solutions, including acid-base and solubility reactions; calculate pH and species concentrations in buffered and unbuffered solutions. [14.5 – 14.7]
17. Recognize the basic radioactive decay modes, compare the penetrating and ionizing power of various types of radiation, fill in a missing species in a balanced nuclear equation and perform half-life calculations for radioactive isotopes. Time permitting [20.1 – 20.3]

**If none of these make any sense to you at the beginning of the semester – Fret Not!**
**We're literally here so you can learn this stuff!**

**COURSE/INSTRUCTOR COMMUNICATIONS**

- Email is the most effective. Electronic communication for this course **MUST** be through your UNM email or UNM Learn Messaging.
- When requesting an appointment (which I am always happy to schedule), please propose three (3) times that work for you in your initial request. This will simplify and quicken the process
- It is the responsibility of the student to keep up with course announcements. ***Check your UNM email and Blackboard Learn daily!***

## WHAT YOU'LL NEED

(COURSE MATERIALS)

- **Text** Atoms First from OpenStax, Print ISBN 1-947172-64-6, Digital ISBN 1-947172-63-8,

Course Text

https://openstax.org/details/books/chemistry-atoms-first-2e Go to the fol lowing web address or scan the QR code on the left. This textbook is available for free online! If you prefer, you can also get a print version at a very low cost. The text is available in web view and PDF for free. You can also choose to purchase on iBooks or get a print version via from OpenStax on Amazon.com. You can use whichever formats you want. Web view is recommended -- the responsive design works seamlessly on any device. If you buy on Amazon, make sure you use the link on your book page on open-stax.org so you get the official OpenStax print version.

**Access to UNM Valencia networks, UNM Learn and UNM email:** Network access is necessary for some lab activities. Course materials will be posted on UNM Learn and important class announcements will be made to your UNM email address. Please check your email regularly. Valencia campus provides internet and computer access at the library, Learning Resource Center, and STEM center.

- **Safety glasses/goggles for lab:** please purchase those in the bookstore to avoid any question of their safety rating
- **A NON-PROGRAMMABLE scientific calculator** with log/antilog and exponential functions: TI-30Xa TI-30X IIS TI-30XS Casio or Sharp equivalents (**cell phones and graphing calculators are not acceptable**). Visit http://www.vrcworks.net/blog/how-to-identify-calculator-is-programmable-or-nonprogrammable-calculator/ will help you tell the difference, or ask your instructor.
- **A notebook (or space in a binder) to**
    - write down, space out the problems/questions, and to show your work before you submit answers electronically; (3) have it readily available when working with fellow classmate(s), tutor(s) and/or instructor; (4) use as review/study material.

## *How Do I Earn All Those Points?*

(Exams, Quizzes, Homework, and the Like)

| | How Many | Points Each | Points Total |
|---|---|---|---|
| Final Exam | 1 | 150 | 150 |
| In-class Exams | 4 | 130 | 520 |
| Homework | 16 | 14 | 224 |
| Quizzes | 24 | 7 | 168 |
| Attendance | 28 | 8 | 224 |
| Labs/Rec | 14 | 18 | 252 |
| Total | | | 1500* |

*If you do the math, you will notice that this adds up to 1538 points. The scale however, is based in 1500 points, so there 38 points of extra credit. In addition, the 130-point in-class exams will actually have 140 points. This means that there are actually a total of 58 points of extra credit possible.

## *How Many Points Do I Need For an A?*

(What's the grading scale?)

| Earn This Many Points | Get This Grade |
|---|---|
| 1425 | A+ |
| 1350 | A |
| 1320 | A- |
| 1275 | B+ |
| 1200 | B |
| 1170 | B- |
| 1125 | C+ |
| 1050 | C |
| 1020 | C- |
| 975 | D+ |
| 900 | D |
| 870 | D- |
| 825 | F+ |

## *Exams*

Think of these as opportunities for you to show just how much you have learned. The exam format consists of three types of questions: multiple-choice, short-answer, and multiple part. To help you figure out how well you understand the material, approximately a week in before each exam, a Practice Exam with the Answer Key will be published for students' use

There are 4 scheduled in-class exams tentatively on the dates below, although the instructor reserves the right to alter course schedule as the semester progresses. Students will be given advance notice of any change.

| | Chapters | Date* |
|---|---|---|
| Exam 1 | 1 – 3 | 1 Feb |
| Exam 2 | 4, 6 – 7 | 22 Feb |
| Exam 3 | 9 – 11 | 12 Apr |
| Exam 4 | 13 – 16 | 3 May |
| Final | 1 – 4, 6 – 11, 13 – 17 | 10 May (12:00 – 2:00 p.m.) |

**The final exam must be taken to pass the course, regardless of points accumulated to that point

### What Will Each Class Be Like?

- **Quiz**: covering material recently covered and any assigned preparation (reading, video, etc)
- **Course Business**
- **Group Activity:** collaborative exercise to help you master that day's topic
- **Reflection:** an opportunity to put the day's lesson into larger perspective, and formulate/ask questions

### What Will My Routine Be Like?

- **Before Class**: complete any prepatory assignment (reading, video, etc)
- **During Class:** work with your group to master concepts. The more you put in, the more you'll get out
- **After Class:** work on homework assignment relevant to that day's topic (review notes, **WORK ON PROBLEMS**, think of questions for office hour visits, etc.
- **Repeat 29 times!:**

## WHEN WE LEARN THIS STUFF?

**(Schedule is approximate and subject to change by the instructor)**

| Mtg | Date | Lecture Topics |
|---|---|---|
| 1 | Tue 20 Aug | |
| 2 | Thu 22 Aug | Math you'll need to know(1.4 – 1.6, Appendix B) |
| 3 | Tue 27 Aug | Atoms, Molecules, and Ions (2.1 – 2.4) |
| 4 | Thu 29 Aug | Electronic Structure and Periodic Properties of Elements (3.1 – 3.7) |
| 5 | Tue 03 Sep | |
| 6 | Thu 05 Sep | |
| 7 | Tue 10 Sep | **Exam 1 (Chapters 1 – 3)** |
| 8 | Thu 12 Sep | |
| 9 | Tue 17 Sep | |
| 10 | Thu 19 Sep | Chemical Bonding and Molecular Geometry (4.1 – 4.6) |
| 11 | Tue 24 Sep | Composition of Substances and Solutions (6.1 – 6.4) |
| 12 | Thu 26 Sep | Stoichiometry of Chemical Reactions (7.1 – 7.4) |
| 13 | Tue 01 Oct | |
| 14 | Thu 03 Oct | |
| 15 | Tue 08 Oct | **Exam 2 (Chapters 4, 6, 7)** |
| 16 | Tue 15 Oct | |
| 17 | Thu 17 Oct | Gases (8.1 – 8.5) |
| 18 | Tue 22 Oct | Thermochemistry (9.1 – 9.4) |
| 19 | Thu 24 Oct | Liquids and Solids (10.1 – 10.6) |
| 20 | Tue 29 Oct | Solutions and Colloids (11.1 – 11.4) |
| 21 | Thu 31 Oct | |
| 22 | Tue 05 Nov | **Exam 3 (Chapters 9 – 11)** |
| 23 | Thu 07 Nov | |
| 24 | Tue 12 Nov | Kinetics (17.1 – 17.7) |
| 25 | Thu 14 Nov | Fundamental Equilibrium Concepts (13.1 – 13.4) |
| 26 | Tue 19 Nov | Acid-Base Equilibria (14.1 – 14.7) |
| 27 | Thu 21 Nov | Equilibria of Other Reactions Classes (15.1 – 15.2) |
| 28 | Tue 26 Nov | |
| 29 | Tue 03 Dec | **Exam 4 (Chapters 13 – 16)** |
| 30 | Thu 05 Dec | Electrochemistry (16.1 – 16.3) |
| | Tue 10 Dec | **Final Exam (12:00 – 2:00 pm)** |

# Other Things That Aren't Chemistry, But Are Still Important
## (Class Policies and Important Dates)

- **Be There** Attendance in lecture and lab/recitation is mandatory. Students are expected to attend all meetings of the classes in which they are enrolled.
  - A student with excessive absences may be dropped from a course by the instructor with a grade of WP or WF or the student may receive a grade of F at the end of the semester.
  - I will exercise my discretion without notice to drop any student who:
    - misses the first two lectures and first lab/recitation;
    - has not completed any assignments in Connect by the end of the 2nd week;
    - after 2 consecutive unexcused absences;
    - after 4 total absences.
  - An excused absence must be communicated.
  - Students are limited to 2 excused absences BUT they may not be used for days of Exams
- **Be on time.** Lectures and labs/recitations will begin promptly. After 10 minutes, a student will be counted absent. Late arrival or early departure is unacceptable. Absences due to illness or any mitigating circumstance are unavoidable but must be documented or approved in advance. If you must miss a lecture or lab, email me ASAP in order to get your absence excused and discuss when you will turn in or make up any allowable assignments. Students are responsible for all assignments regardless of attendance.
- **Your job begins when class ends:** Electronic homework will be assigned regularly and will be available for a week and over a weekend. Your answers (worked out in your Homework Notebook) are to be submitted and scored on Connect. Late homework will not be accepted.

| **Important Dates & Holidays** | |
|---|---|
| Fri, 30 Aug 2019 | Last day to register, ADD sections, and change credit hours on LoboWeb<br>Enrollment cancellation for non-payment |
| Mon, 02 Sep 2019 | University Holiday – Labor Day |
| Fri, 06 Sep 2019 | Last Day to DROP without "W" grade and 100% tuition refund on LoboWEB,<br>Last Day to CHANGE grade option |
| Thu, 10 Oct 2019 | University Holiday – Fall Break |
| Fri, 08 Nov 2019 | Last Day to withdraw **WITHOUT** Dean's Permission |
| Thu, 28 Nov 2019 | University Holiday – Thanksgiving |
| Fri, 07 Dec 2019 | Last day to change grading options<br>Last Day to withdraw **WITH** Dean's Permission |
| Wed 12 Dec 2018 | Final Exam (for this section) |

# Other Things That Aren't Chemistry, But Are Still Important
## (University Policies)

### Equal Access Services

If you have a documented disability or psychological/medical condition that may affect your performance in this class, please register with Equal Access Services as soon as possible so I can provide your accommodations in a timely manner. EAS can provide a quiet place to take exams, additional time, and additional services if there is a documented need. For more information, please see their website at http://www.unm.edu/~vcadvise/equalaccess.htm, or scan the following QR code:

Equal Access Services

### Academic Honesty

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, including dismissal, against any student who is found responsible for academic dishonesty. Any student who has been judged to have engaged in academic dishonesty in coursework may receive a reduced or failing grade for the work in question and/or for the course. Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests or assignments; claiming credit for work not done or done by others; hindering the academic wok of other students; and misrepresenting academic or professional qualifications within or outside the University. Depending on the severity of the offense, students caught cheating may receive a zero on the assignment, be dropped from the course, or receive an 'F' in the course. Don't cheat.

### Sexual Misconduct and Gender Discrimination

In an effort to meet obligations under Title IX, UNM faculty, teaching assistants, and graduate assistants are considered responsible employees. This designation requires that any report made to a faculty member, TA, or GA regarding sexual misconduct or gender discrimination must be reported to the Office of Equal Opportunity and the Title IX Coordinator. For more information on this policy, https://policy.unm.edu/university-policies/2000/2740.html or scan the following QR Code:

Title IX Policy