

CHEM-111 Elements of General Chemistry

Spring 2018 – Section 550 – CRN 38170

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Office Hours: Monday 10:30 am – 12:00 pm,
Tuesday 2:00 pm – 4:00 pm (STEM Center),
Thursday 9:30 am – 11:30, and anytime by appointment

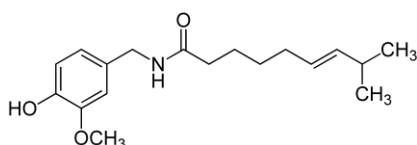
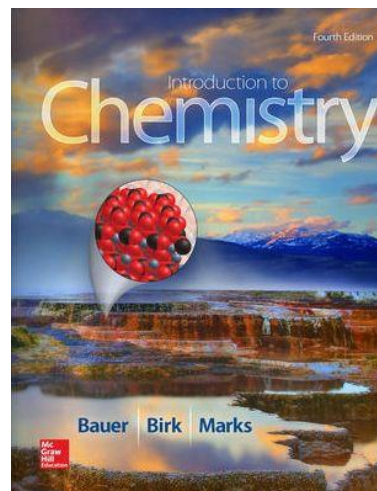
Meeting Times: Lecture: Tuesday & Thursday 12:00 – 1:15 pm, VHS 101
Lab/Recitation: Thursday 1:30 – 3:30 pm, VAAS 128

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 pre-medicine and medical technology. (Credit not allowed for both CHEM 111 and CHEM 121L.) Meets New Mexico Lower Division General Education Common Core Curriculum Area III: Science (NMCCN 1114). Prerequisite: ACT => 22 or SAT => 510 or MATH 103 or MATH 121 or MATH 150 or MATH 162 or MATH 163 or MATH 180 or MATH 181 or MATH 264.

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

Periodic Table of the Elements



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. [Math Toolboxes 1.1 – 1.3]
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. [3.1 – 3.5, 5.1 – 5.5]
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. [6.1 – 6.7, 9.5]
5. Apply the gas laws and kinetic molecular theory to relate atomic level behavior to macroscopic properties. [9.1 – 9.4]
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. [7.1 – 7.5, 8.1 – 8.3, 8.5]
7. Analyze how periodic properties (valence, electronegativity, etc.) and reactivity of elements result from electron configurations of atoms. [7.7]
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. [10.2 – 10.4]
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. [12.1]
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. [12.2 – 12.3]
12. Recognize oxidation-reduction reactions; and identify oxidizing and reducing agents. [14.1 – 14.5]
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. [12.4, 12.6]
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. [12.5]
15. Describe the different models of acids and base behavior and recognize common acids and bases. [13.1 – 13.3]
16. Apply equilibrium principles to aqueous solutions, including acid-base and solubility reactions; calculate pH and species concentrations in buffered and unbuffered solutions. [13.3 – 13.6]
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. [15.1 – 15.3]

If none of these make any sense to you at the beginning of the semester – No problem!

We're literally here so you can learn this stuff!

WHAT YOU'LL NEED (COURSE MATERIALS)

- **Online homework system** with e-book through McGraw-Hill Connect/LearnSmart (LS). The QR code on the left is a link to purchase the access code. You may find it cheaper somewhere else, but this is what you'll need. Once you have purchased the access code you will need to register with this class. Go to the following web address or scan the QR code on the right and click the "register now" button.



QR Code to **buy**
McGraw-Hill Connect



QR Code to **register**
McGraw-Hill Connect

<http://connect.mheducation.com/class/j-godbout-chem-111-550-dc>

- and click 'Register.' You will be asked for your email address and then given the option to purchase a bundle containing access to Connect/LearnSmart and the e-book. NOTE: There is also a trial period option. If you choose this, make sure you purchase the full access option before the trial period expires. Access to the class text: Introduction to Chemistry (4th ed), by Bauer, Birk, and Marks. (You automatically receive access to the e-book upon purchasing the homework system; if you would like a physical copy as well (not required), you may purchase a current or previous edition of the text from any source. The 4th version is the most recent one, but previous versions can be found online for considerably cheaper.
- **Access to UNM Learn and UNM email:** 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.
 - **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**
 - start every new chapter with new vocabulary by Matching Definitions with Key Terms (available as pdf documents on UNM Learn);
 - 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.
 - **Lecture and Lab/Recitation Binder(s)** to organize printed 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 | 6 | 90 | 540 |
| Homework | 30 | 8 | 240 |
| Quizzes | 15 | 10 | 150 |
| Attendance | 30 | 8 | 240 |
| Labs/Rec | 14 | 18 | 252 |
| Total | | | 1500* |

*If you do the math, you will notice that this adds up to 1572 points. The scale however, is based in 1500 points, so there 72 points of extra credit. In addition, the 90-point in-class exams will actually have 100 points. This means that there are actually a total of 132 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 6 scheduled in-class exams (on Thursdays), 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 (3 rd Week) |
| Exam 2 | 4 – 6 | 22 Feb (6 th Week) |
| Exam 3* | 7 – 8 | 8 Mar (8 th Week) |
| Exam 4 | 9 – 10 | 29 Mar (11 th Week) |
| Exam 5 | 11 – 12 | 12 Apr (13 th Week) |
| Exam 6 | 13 – 15 | 3 May (16 th Week) |
| Final** | | 10 May (12:00 – 2:00 p.m.) |

*This will be a take home exam. There may be others

**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 preparatory 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 28 times!:**

WHEN WE LEARN THIS STUFF?

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

| Meeting | Date | Topics |
|-----------|-------------------|--|
| 1 | Tue 16 Jan | |
| 2 | Thu 18 Jan | Matter and Energy: 1.1 – 1.4(7 Math Toolboxes 1.1 – 1.3) |
| 3 | Tue 23 Jan | Atoms, Ions, Periodic Table: 2.1 – 2.5 |
| 4 | Thu 25 Jan | Chemical Compounds: 3.1 – 3.7 |
| 5 | Tue 30 Jan | |
| 6 | Thu 1 Feb | Exam 1 |
| 7 | Tue 6 Feb | |
| 8 | Thu 8 Feb | Chemical Composition: (4.2 – 4.4) |
| 9 | Tue 13 Feb | Chemical Reactions & Equations (5.1 – 5.5) |
| 10 | Thu 15 Feb | Quantities in Chemical Reactions (6.1 – 6.7) |
| 11 | Tue 20 Feb | |
| 12 | Thu 22 Feb | Exam 2 |
| 13 | Tue 27 Feb | |
| 14 | Thu 1 Mar | Electron Structure of the Atom (7.1 – 7.7) |
| 15 | Tue 6 Mar | Chemical Bonding (8.1 – 8.5) |
| 16 | Thu 8 Mar | |
| | Tue 13 Mar | Spring Break (no meeting) Exam 3 (take-home) |
| | Thu 15 Mar | Spring Break (no meeting) |
| 17 | Tue 20 Mar | |
| 18 | Thu 22 Mar | The Gaseous State (9.1 – 9.5) |
| 19 | Tue 27 Mar | The Liquid and Solid States (10.1 – 10.4) |
| 20 | Thu 29 Mar | Exam 4 |
| 21 | Tue 3 Apr | |
| 22 | Thu 5 Apr | Solutions (11.1 – 11.6) |
| 23 | Tue 10 Apr | Reactions Rates & Chemical Equilibrium (12.1 – 12.6) |
| 24 | Thu 12 Apr | Exam 5 |
| 25 | Tue 17 Apr | |
| 26 | Thu 19 Apr | Acid and Bases (13.1 – 13.6) |
| 27 | Tue 24 Apr | Oxidation-Reduction Reactions (14.1 – 14.5) |
| 28 | Thu 26 Apr | Nuclear Chemistry (15.1 – 15.3) |
| 29 | Tue 1 May | |
| 30 | Thu 3 May | Exam 6 |
| | Thu 10 May | Final Exam (12:00 – 2:00 p.m.) |

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

| | |
|-------------------|--|
| 26 Jan 2018: | Last day to register (although if you're reading this you already are registered), ADD sections, and change credit hours |
| 2 Feb 2018 | Last Day to DROP without "W" grade and 100% tuition refund on LoboWEB, Last Day to CHANGE grade option |
| 11 - 18 Mar 2018: | Spring Break |
| 13 Apr 2018: | Last Day to DROP WITHOUT Student Services Permission |
| 4 May 2018: | Last Day to DROP WITH Student Services Permission |
| 9 Dec 2018: | Last day of instruction |
| 7 - 11 May 2018 | Final Exam Week |

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 work 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