

# CHEM-111 Elements of General Chemistry

Summer 2018 – Section 502 – CRN 54457

**Instructor:** Dr. Jerry Godbout

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**Office Hours:**

Monday 1:00 pm – 3:00 pm,

Wednesday 2:00 pm – 4:00 pm

Thursday 9:00 am – 10:00 am, and anytime by appointment

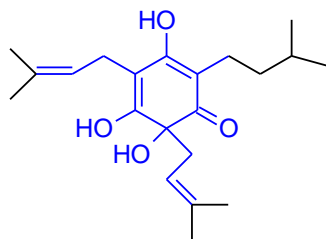
**Meeting Times:**

Lecture: Tuesday & Thursday 12:00 – 1:15 pm, VAAS 127

Lab/Recitation: Tuesday 1:30 – 3:30 pm, VAAS 128

**COURSE DESCRIPTION 1:** The study of stuff, and what it does

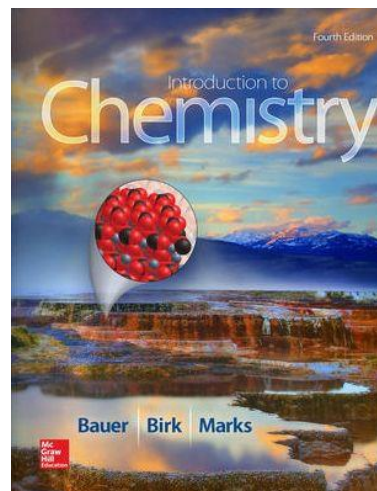
**COURSE DESCRIPTION 2:** One-semester course in general chemistry, especially for non-science majors in the health sciences except pre-medicine and medical technology. (Credit not allowed for both CHEM 111 and CHEM 121L.) Meets New Mexico Lower Division General Education Common Core Curriculum Area 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

1																	18
1	2											13	14	15	16	17	18
H Hydrogen 1.008	He Helium 4.003											B Boron 10.811	C Carbon 12.011	N Nitrogen 14.007	O Oxygen 15.999	F Fluorine 18.998	Ne Neon 20.180
3	4											13	14	15	16	17	18
Li Lithium 6.941	Be Beryllium 9.012											Al Aluminum 26.982	Si Silicon 28.086	P Phosphorus 30.974	S Sulfur 32.064	Cl Chlorine 35.453	Ar Argon 39.948
11	12											13	14	15	16	17	18
Na Sodium 22.990	Mg Magnesium 24.305											Al Aluminum 26.982	Si Silicon 28.086	P Phosphorus 30.974	S Sulfur 32.064	Cl Chlorine 35.453	Ar Argon 39.948
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
K Potassium 39.098	Ca Calcium 40.078	Sc Scandium 44.956	Ti Titanium 47.867	V Vanadium 50.942	Cr Chromium 51.996	Mn Manganese 54.938	Fe Iron 55.845	Co Cobalt 58.933	Ni Nickel 58.693	Cu Copper 63.546	Zn Zinc 65.38	Ga Gallium 69.723	Ge Germanium 72.631	As Arsenic 74.922	Se Selenium 78.971	Br Bromine 79.904	Kr Krypton 83.798
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Rb Rubidium 85.468	Sr Strontium 87.62	Y Yttrium 88.906	Zr Zirconium 91.224	Nb Niobium 92.906	Mo Molybdenum 95.94	Tc Technetium 98.906	Ru Ruthenium 101.07	Rh Rhodium 106.905	Pd Palladium 106.42	Ag Silver 107.868	Cd Cadmium 112.414	In Indium 114.818	Sn Tin 118.710	Sb Antimony 121.757	Te Tellurium 127.6	I Iodine 126.905	Xe Xenon 131.29
55	56	57-71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
Cs Cesium 132.905	Ba Barium 137.327	Lanthanide 57-71	Hf Hafnium 178.49	Ta Tantalum 180.948	W Tungsten 183.84	Re Rhenium 186.207	Os Osmium 190.23	Ir Iridium 192.222	Pt Platinum 195.084	Au Gold 196.967	Hg Mercury 200.59	Tl Thallium 204.383	Pb Lead 207.2	Bi Bismuth 208.980	Po Polonium (209)	At Astatine 210	Rn Radon 222
87	88	89-103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
Fr Francium 223	Ra Radium 226	Actinide 89-103	Rf Rutherfordium 261	Db Dubnium 262	Sg Seaborgium 266	Bh Bohrium 264	Hs Hassium 265	Mt Meitnerium 268	Ds Darmstadtium 285	Rg Roentgenium 289	Cn Copernicium 285	Uut Ununtrium 288	Fl Flerovium 289	Uup Ununpentium 288	Lv Livermorium 293	Uus Ununseptium 289	Uuo Ununoctium 289
57	58	59	60	61	62	63	64	65	66	67	68	69	70	71			71
La Lanthanum 138.905	Ce Cerium 140.116	Pr Praseodymium 140.908	Nd Neodymium 144.242	Pm Promethium 144.913	Sm Samarium 150.36	Eu Europium 151.964	Gd Gadolinium 157.25	Tb Terbium 158.925	Dy Dysprosium 162.500	Ho Holmium 164.930	Er Erbium 167.259	Tm Thulium 168.934	Yb Ytterbium 173.055	Lu Lutetium 174.967			71
89	90	91	92	93	94	95	96	97	98	99	100	101	102	103			103
Ac Actinium 227	Th Thorium 232.038	Pa Protactinium 231.036	U Uranium 238.029	Np Neptunium 237.048	Pu Plutonium 244.064	Am Americium 243.061	Cm Curium 247.070	Bk Berkelium 247.070	Cf Californium 251.080	Es Einsteinium 252.083	Fm Fermium 257.095	Md Mendelevium 258.10	No Nobelium 259.101	Lr Lawrencium 262			103



## 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 – No problem!  
We're literally here so you can learn this stuff!**

## WHAT YOU'LL NEED

(COURSE MATERIALS)

- **Text** Atoms First from OpenStax, Print ISBN 1938168151, Digital ISBN 1947172182, [www.openstax.org/details/chemistry-atoms-first](http://www.openstax.org/details/chemistry-atoms-first) Go to the following web address or scan the QR code on the right. 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 openstax.org so you get the official OpenStax print version. (Simple printouts sold by third parties on Amazon are not verifiable and not as high-quality.)  
**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
- **USB Flash drive:** to save data collected in lab. Any size is fine, and it does not need to be dedicated to this class
- **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.



Course Text

### 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 are 63 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 78 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, 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	Tue, 11 Sep
Exam 2	4, 6, 7	Tue, 09 Oct
Exam 3	9 - 11	Tue, 06 Nov
Exam 4	13, - 15, 16	Tue, 04 Dec
Final	1 - 4, 6 - 11, 13 - 17	Tue, 11 Dec

### WHAT WILL EACH CLASS BE LIKE?

- **Review Online 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, **MORE PROBLEMS**, etc.)
- **Repeat 30 times!**

## WHEN WE LEARN THIS STUFF?

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

Mtg	Date	Lecture Topics
1	Tue 21 Aug	
2	Thu 23 Aug	
3	Tue 28 Aug	Math you'll need to know(1.4 – 1.6, Appendix B)
4	Thu 30 Aug	Atoms, Molecules, and Ions (2.1 – 2.4)
5	Tue 04 Sep	Electronic Structure and Periodic Properties of Elements (3.1 – 3.7)
6	Thu 06 Sep	
7	Tue 11 Sep	<b>Exam 1 (Chapters 1 – 3, 1<sup>st</sup> half of class)</b>
8	Thu 13 Sep	
9	Tue 18 Sep	
10	Thu 20 Sep	Chemical Bonding and Molecular Geometry (4.1 – 4.6)
11	Tue 25 Sep	Composition of Substances and Solutions (6.1 – 6.4)
12	Thu 27 Sep	Stoichiometry of Chemical Reactions (7.1 – 7.4)
13	Tue 02 Oct	
14	Thu 04 Oct	
15	Tue 09 Oct	<b>Exam 2 (Chapters 4, 6, 7)</b>
16	Tue 16 Oct	
17	Thu 18 Oct	Gases (8.1 – 8.5)
18	Tue 23 Oct	Thermochemistry (9.1 – 9.4)
19	Thu 25 Oct	Liquids and Solids (10.1 – 10.6)
20	Tue 30 Oct	Solutions and Colloids (11.1 – 11.4)
21	Thu 01 Nov	
22	Tue 06 Nov	<b>Exam 3 (Chapters 9 – 11)</b>
23	Thu 08 Nov	
24	Tue 13 Nov	Kinetics (17.1 – 17.7)
25	Thu 15 Nov	Fundamental Equilibrium Concepts (13.1 – 13.4)
26	Tue 20 Nov	Acid-Base Equilibria (14.1 – 14.7)
27	Tue 27 Nov	Equilibria of Other Reactions Classes (15.1 – 15.2)
28	Thu 29 Nov	
29	Tue 04 Dec	<b>Exam 4 (Chapters 13 – 16)</b>
30	Thu 06 Dec	Electrochemistry (16.1 – 16.3)
	Tue 11 Dec	<b>Final Exam (12:00 – 2:00 pm)</b>

## 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 meetings;
    - 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.

<b>Important Dates &amp; Holidays</b>	
Fri 31 Aug 2018	Last day to register, ADD sections, and change credit hours Enrollment cancellation for non-payment
Mon 03 Sep 2018	University Holiday - Labor Day
Fri 07 Sep 2018	Last Day to DROP without "W" grade and 100% tuition refund on LoboWEB, Last Day to CHANGE grade option
Thu 11 Oct 2018	University Holiday - Fall Break
Fri 09 Nov 2018	Last Day to withdraw <b>WITHOUT</b> Dean's Permission
Thu 22 Nov 2018	University Holiday - Thanksgiving
Fri 07 Dec 2018	Last day to change grading options Last Day to withdraw <b>WITH</b> Dean's Permission
Tue 11 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 <https://valencia.unm.edu/students/advisement-and-counseling/equal-access-services.html>, or scan the QR code at right:



Equal Access Services

### Academic Integrity

Having academic integrity is paramount to your success in any class. Plagiarism or cheating is not tolerated. Any instance of this will result in a grade of zero for that assignment. Here is the link to the UNM Academic Dishonesty Policy:

<https://policy.unm.edu/regents-policies/section-4/4-8.html>. or scan the QR code at right:



Academic Integrity Policy

The policy states:

*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, up to and including dismissal, against any student who is found guilty of academic dishonesty or who otherwise fails to meet the expected*

*standards. Any student judged to have engaged in academic dishonesty in course work may receive a reduced or failing grade for the work in question and/or for the course.*

Academic Dishonesty is defined as:

"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; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

### 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." by the Department of Education (see page 15 - <http://www2.ed.gov/about/offices/list/ocr/docs/qa-201404-title-ix.pdf>).

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 QR Code at right:



Title IX Policy