Class Meetings

Lecture: Monday & Wednesday 9:00 am – 10:15 am US MT, VAAS 140

Modality: 100% face-to-face.

Instructor Contact Information:

Office: VAAS 102A

Phone: 505.925.8611

Drop-in Hours (all times US MT)**:**
Mondays: 10:30 am – 12:30 pm
Thursdays: 10:00 am – 12:00 pm
And other times by appointment

Email: Canvas messaging for class-related questions, jgodbout@unm.edu for other inquiries

COURSE DESCRIPTION #1: The study of stuff, and what it does (2nd of a 2-course sequence)

COURSE DESCRIPTION #2: 3 Credits. This course is intended to serve as a continuation of general chemistry principles for students enrolled in science, engineering, and certain preprofessional programs. The course includes, but is not limited to a theoretical and quantitative coverage of solutions and their properties, kinetics, chemical equilibrium, acids and bases, entropy and free energy, electrochemistry, and nuclear chemistry. Additional topics may include (as time permits) organic, polymer, atmospheric, and biochemistry.

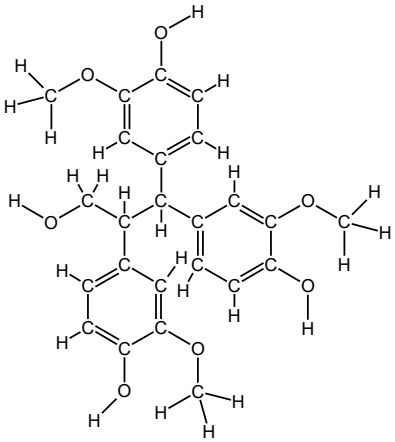
Credit for both this course and CHEM 1227 may not be applied toward a degree program.

Meets New Mexico General Education Curriculum Area 3: Physical and Natural Sciences.

Prerequisite: (CHEM 1215 or 1217) and 1215L) or ALEKS2 =>50%.

Pre- or corequisite: 1225L.

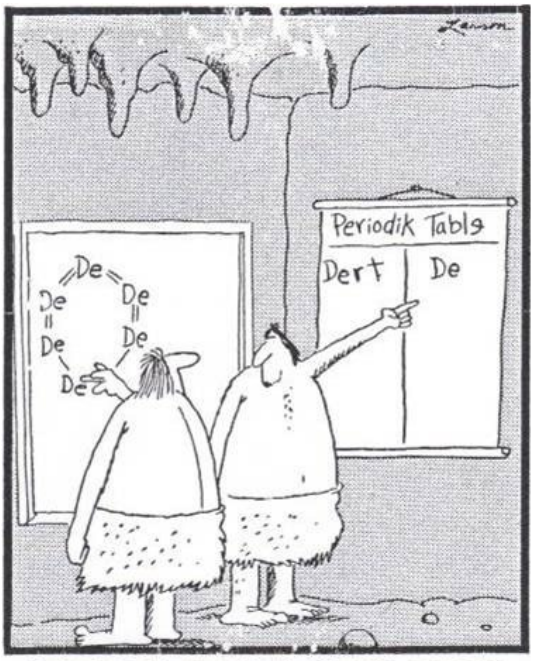
Now guess which one is the instructor's, and guess which one is has gone through various committees and perhaps a lawyer or two



WHAT YOU'LL LEARN

Course-Level Student Learning Outcomes

1. Explain the intermolecular attractive forces that determine physical properties and phase transitions, and apply this knowledge to qualitatively evaluate these forces from structure and to predict the physical properties that result.
2. Calculate solution concentrations in various units, explain the effects of temperature, pressure and structure on solubility, and describe the colligative properties of solutions, and determine solution concentrations using colligative property values and vice versa.
3. Explain rates of reaction, rate laws, and half-life, determine the rate, rate law and rate constant of a reaction and calculate concentration as a function of time and vice versa, as well as explain the collision model of reaction dynamics and derive a rate law from a reaction mechanism, evaluating the consistency of a mechanism of a given rate law.



Early chemists describe the first dirt molecule
Larson, Gary, *The Far Side*

4. 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 as well as describe the equilibrium constant and use it to determine whether equilibrium has been established, and calculate equilibrium constants from equilibrium concentrations and vice versa.
5. Describe the different models of acids and base behavior and the molecular basis for acid strength, as well as apply equilibrium principles to aqueous solutions, including acid base and solubility reactions, and calculate pH and species concentrations in buffered and unbuffered solutions.
6. Explain titration curves and speciation diagrams, as well as calculate concentrations of reactants from the former and determine dominant species as a function of pH from the latter.
7. Explain and calculate the thermodynamic functions, enthalpy, entropy and Gibbs free energy, for a chemical system, and relate these functions to equilibrium constants and reaction spontaneity; balance redox equations, express them as two half reactions and evaluate the potential, free energy and equilibrium *K* for the reaction, as well as predict the spontaneous direction.
8. Construct a model of a galvanic or electrolytic cell; or describe organic reactions.
9. Describe bonding theories, such as valence and molecular orbital theory.

What You'll Need (Required Resources)

- **Text:** Atoms First from OpenStax, Print ISBN 1-947172-64-6, Digital ISBN 1-947172-63-8, https://openstax.org/details/books/chemistry-atoms-first-2e or go to the following web address or scan the QR code on the below. This textbook is available for free online, as also 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 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 well 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. The print quality will be high and it supports the authors.

Course Text

- Calculator with scientific notation, log/antilog and exponential functions.
- Internet Access: *Canvas* and *UNM email address* ***must be checked regularly (daily)!***

What Will Your Routine Be Like?

- **Before Class**: Complete any preparatory assignment (quiz, 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 drop-in hour visits, **WORK ON PROBLEMS,** etc.
- **Repeat 29 times!**

What Will Each Class Be Like?

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

What You'll Find Useful (Recommended Resources)

- Binder for lecture notes, handouts, group activities
- Mastering Chemistry notebook (or place in binder to keep track of problem solving, identify patterns, record areas of difficulty
- Periodic table (on paper): Download your favorite from the internet! Having a paper copy available while you are working will be very useful
- Small markerboard to share your work with classmates

Course/Instructor Communications

- Please use the messaging feature in UNM Canvas for course correspondence. UNM email (Lobo Mail) should be used only when there are issues with Canvas messaging.
- When requesting meeting, please propose three (3) times that work for you in your initial request, and I'll choose from those if possible. This makes scheduling much more efficient
- It is the responsibility of the student to keep up with course announcements. ***Check Canvas and your UNM email and daily!***

How Is My Grade Determined?

(Exams, Quizzes, Homework, and the Like)

	How Many	Weight
Class Points	1	10 %
Quizzes	15*	10 %
Homework	10*	15 %
Exams	4**	50 %
Final Exam	1	15 %
Total		**100 %**

* Approximate values

** Each equally weighted, 12.5 % each

What If You Need Help? (UNM-Valencia Resources)

- **Instructor**: Drop-in hours, STEM Center Hours, email
- **Learning Commons/STEM Center**: Tutors*, molecular modelling kits, Laptops, textbooks

* Reminder: when using tutors, it is the **students'** responsibility to make sure they understand well enough to complete the problems on their own.

Attendance Policy

- **Be There** Students are expected to attend all meetings, barring illness and other extenuating circumstances. Extenuating circumstances should be discussed with the instructor beforehand whenever possible
  - I will exercise my discretion without notice to drop any student who: misses the first two meetings; or has not completed any assignments in Canvas by the end of the 2nd week of the semester
- **Be on time.** Class will begin promptly. If you must arrive late, please do so in the least disruptive manner possible
- **Your job begins when class ends:** Electronic homework will be assigned regularly. Your answers are to be submitted and scored on Canvas.

What Do I Need For an A?

(What's the grading scale?)

Earn This %	Get This Grade
98	A+
92	A
90	A-
88	B+
83	B
80	B-
78	C+
73	C
69	C-
67	D+
62	D
60	D-
55	F+
0	F

Extra Credit

So that molecule on the front page – send me a message with its name for 5 quiz points. Offer expires after exam 1 is distributed. Hint – This molecule is thought to be an anti-oxidant, an anti-inflammatory, and possibly useful in diabetes management. The last one is particular ironic, given the source of the molecule.

Selected Dates, Deadlines & Holidays[1]	
Fri, 01 Sep 2023	Last day to register, ADD sections and change credit hours on LoboWEB Enrollment cancellation for non-payment on LoboWEB
Mon, 04 Sep 2023	University Holiday – Labor Day
Fri, 08 Sep 2023	Last Day to DROP without "W" grade and 100% tuition refund on LoboWEB
Thu, 12 Oct 2023	University Holiday – Fall Break (through Fri, 13 Oct, 2023)
Fri, 10 Nov 2023	Last Day to DROP **WITHOUT** Dean's Permission on LoboWEB
Thu, 23 Nov 2023	University Holiday – Thanksgiving (through Sun, 26 Nov 2023)
Fri, 07 Dec 2023	Last day to withdraw **WITH** Dean's Permission and change grading options

WHEN WILL WE LEARN THIS STUFF?
(Schedule is approximate and subject to change by the instructor)

Meeting	Date	Topics/Events
1	Mon 21 Aug	Syllabus, Review: Lewis Structures, VSEPR, Polarity (4.4 – 4.6)
2	Wed 23 Aug	Intermolecular Forces, Phase Changes, Relative BP (10.1 – 10.6)
3	Mon 28 Aug	Solutions and Solubility (11.1 – 11.3)
4	Wed 30 Aug	Colligative Properties (11.4)
5	Mon 04 Sep	Labor Day – No Meeting
6	**Wed 06 Sep**	**Exam 1: CHEM 1215 Review, Chapters 10, 11**
7	Mon 11 Sep	Kinetics: Introduction (17.1 – 17.3, 17.5)
8	Wed 13 Sep	Kinetics: Integrated Rate Laws (17.4)
9	Mon 18 Sep	Kinetics: Temp Dependence and Mechanisms (17.5 – 17.7)
10	Wed 20 Sep	Kinetics: Review
11	Mon 25 Sep	Equilibrium: Intro (13.1 – 13.2)
12	Wed 27 Sep	Equilibrium: ICE Tables (13.4)
13	Mon 02 Oct	Equilibrium: Q and LeChâtelier's Principle (13.3)
14	Wed 04 Oct	Equilibrium: Review
15	**Mon 09 Oct**	**Exam 2: Kinetics and Equilibrium (Chapters 17, 13)**
16	Wed 11 Oct	Acids/Bases: Definitions, K_a, K_w, pH scale (14.1 -14.3)
17	Mon 16 Oct	Acids/Bases: Weak acid/base equilibria (14.3)
18	Wed 18 Oct	Acids/Bases: Weak acid/base equilibria (cont) (14.3)
19	Mon 23 Oct	Acids/Bases: Salts, Polyprotic Acids, Lewis Definition (14.4 – 14.5, 15.2)
20	Wed 25 Oct	Equilibrium: Buffers (14.6)
21	Mon 30 Oct	Equilibrium: Weak A/B titrations (14.7)
22	Wed 01 Nov	Equilibrium: Solubility (15.1)
23	**Mon 06 Nov**	**Exam 3: A/B Equilibria, Solubility (Chapters 14, 15)**
24	Wed 08 Nov	Thermodynamics: Entropy (12.1 -12.3)
25	Mon 13 Nov	Thermodynamics: Gibbs Free Energy (12.4)
26	Wed 15 Nov	Thermodynamics: GFE and Equilibrium (13.4)
27	Mon 20 Nov	Electrochemistry: Intro and Balancing (16.1)
28	Wed 22 Nov	Electrochemistry: Galvanic and Electrolytic Cells (16.2 – 16.4, 16.7)
29	Mon 27 Nov	Electrochemistry: Batteries and Corrosion (16.5 – 16.6)
30	Wed 29 Nov	Thermodynamics and Electrochemistry Review/Catch Up
31	**Mon 04 Dec**	**Exam 4: Thermodynamics and E-Chem (Chapters 12, 16)**
32	Wed 06 Dec	Review of CHEM 1225 Topics and Learning Objectives
	Mon 11 Dec	**Final Exam (9:00 – 11:00 a.m.)**

[1] These are only selected deadlines! For a complete and up-to-date calendar, please see https://registrar.unm.edu/semester-deadline-dates/index.html

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:

Academic Integrity Policy

https://policy.unm.edu/regents-policies/section-4/4-8.html. or scan the QR code above:

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.

COVID-19 Health and Awareness

UNM is a mask friendly, but not a mask required, community. If you are experiencing COVID-19 symptoms, please do not come to classIf you do need to stay home, please communicate with me via email (jgodbout@unm.edu) or Canvas course messaging; I can work with you to provide alternatives for course participation and completion. Please let us know that you need support so that we can connect you to the right resources and please be aware that UNM will publish information on websites and email about any changes to our public health status and community response.

Support

Student Health and Counseling (SHAC) at (505) 277-3136. If you are having active respiratory symptoms (e.g., fever, cough, sore throat, etc.) AND need testing for COVID-19; OR If you recently tested positive and may need oral treatment, call SHAC.

LoboRESPECT Advocacy Center (505) 277-2911 can offer help with contacting faculty and managing challenges that impact your UNM experience.

Accommodations

UNM is committed to providing equitable access to learning opportunities for students with documented disabilities. As your instructor, it is my objective to facilitate an inclusive classroom setting, in which students have full access and opportunity to participate. To engage in a confidential conversation about the process for requesting reasonable accommodations for this class and/or program, please contact Accessibility Resource Center at arcsrvs@unm.edu or by phone at 505-277-3506. The UNM-Valencia Equal Access Services (Sarah Clawson, Coordinator), at (505) 925-8840 or by email at msjclawson@unm.edu.

Equal Access Services

Support

Contact me via email (jgodbout@unm.edu) or Canvas messaging or in office/drop-in hours.

The UNM-Valencia Equal Access Services (Sarah Clawson, Coordinator), at (505) 925-8840 or by email at sjclawson@unm.edu., Or Accessibility Resource Center (https://arc.unm.edu/) at mailto:arcsrvs@unm.edu (505) 277-3506.

Credit-hour Statement

This is a three credit-hour course. Class meets for two 75-minute sessions of direct instruction per week for sixteen weeks during the Fall 2023 semester. Please plan for a minimum of six hours of out-of-class work (or homework, study, assignment completion, and class preparation) each week.

Support

UNM Valencia Learning Commons (tutoring). Tutoring is available to you in math, science, writing, and other subjects through the Learning Commons: Learning and STEM Centers and Writing Center. In

person tutoring is in these centers in the LRC (the building that also has the library). Tutoring in Zoom and, for writing, through email, is also available.

Making use of tutoring is a fantastic way to use your resources and set yourself up to learn deeply and well in your courses. To schedule an appointment, please go to: Learning Commons Bookings

Learning Commons Booking

If you are making an email appointment with the Writing Center, email your draft to tutor@unm.edu after you fill out the form above.

If you have difficulty with the scheduling link above, would like an appointment in a subject not listed at that link, or have a question, email tutor@unm.edu. You'll get answers during business hours Monday through Friday.

The webpage, with more details about available hours, is here: Learning Commons: Tutoring Services webpage.

Center for Academic Program Support (CAPS). Many students have found that time management workshops can help them meet their goals (consult (CAPS) website under "services").

Title IX

Our classroom and our university should always be spaces of mutual respect, kindness, and support, without fear of discrimination, harassment, or violence. Should you ever need assistance or have concerns about incidents that violate this principle, please access the resources available to you on campus. Please note that, because UNM faculty, TAs, and Gas are considered "responsible employees" by the Department of Education, any disclosure of gender discrimination (including sexual harassment, sexual misconduct, and sexual violence) made to a faculty member, TA, or GA must be reported by that faculty member, TA, or GA to the university's Title IX coordinator. For more information on the campus policy regarding sexual misconduct, please see: https://policy.unm.edu/university-policies/2000/2740.html.

Title IX Policy

Support

LoboRESPECT Advocacy Center and the support services listed on its website, the Women's Resource Center and the LGBTQ Resource Center all offer confidential services and reporting.

Land Acknowledgement

Founded in 1889, the University of New Mexico sits on the traditional homelands of the Pueblo of Sandia. The original peoples of New Mexico Pueblo, Navajo, and Apache since time immemorial, have deep connections to the land and have made significant contributions to the broader community statewide. We honor the land itself and those who remain stewards of this land throughout the generations and also acknowledge our committed relationship to Indigenous peoples. We gratefully recognize our history.

Resource: Division for Equity and Inclusion.

Citizenship and/or Immigration Status

All students are welcome in this class regardless of citizenship, residency, or immigration status. Your professor will respect your privacy if you choose to disclose your status. As for all students in the class, family emergency-related absences are normally excused with reasonable notice to the professor, as noted in the attendance guidelines above. UNM as an institution has made a core commitment to the success of all our students, including members of our undocumented community. The Administration's welcome is found on our website:: http://undocumented.unm.edu/.

Citizenship/Immigration status

Respectful and Responsible Learning

We all have shared responsibility for ensuring that learning occurs safely and equitably. UNM has important policies to preserve and protect the academic community, especially policies on student grievances (Faculty Handbook D175 and D176), academic dishonesty (FH D100), and respectful campus (FH CO9). These are in the *Student Pathfinder* (https://pathfinder.unm.edu) and the *Faculty Handbook* (https://handbook.unm.edu). Please ask for help in understanding and avoiding plagiarism or academic dishonesty, which can both have very serious consequences.

Support

Many students have found that time management workshops or work with peer tutors can help them meet their goals. These and are other resources are available through PASOS (Pathways to Articulation and Sustainable Opportunities for Students), TRIO Student Support Services, and Student Learning Support at the Center for Teaching and Learning.

Center for Academic Program Support (CAPS). Many students have found that time management workshops can help them meet their goals (consult (CAPS) website under "services").

Connecting to Campus and Finding Support:
UNM-Valencia has many resources and centers to help you thrive, including opportunities to get involved, mental health resources, academic support including tutoring, resource centers, free food at Valencia Campus Food Pantry, and jobs on campus. Your advisor, staff at the resource centers and I can help you find the right opportunities for you.