CHEM 1225: General Chemistry II for STEM Majors

Fall 2020– Section 501 – CRN 64774

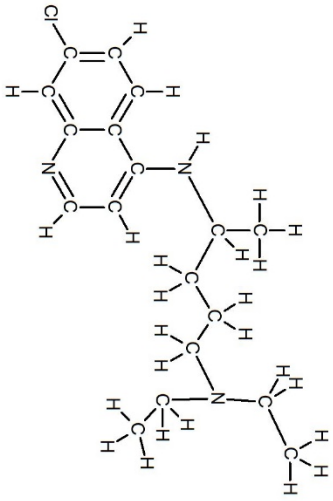
Instructor: Dr. Jerry Godbout

Office: VAAS 120-A
Email: jgodbout@unm.edu
Phone: 505-925-8611

Office Hours: Monday 10:30 am – 11:45 am, *via* Zoom. Other times will be determined based on class convenience, and anytime by appointment

Meeting Times: Monday 9:00 – 10:15 am *via* Zoom

Course Description(s): The Study of stuff, and what it does (2nd of a 2-course sequence)

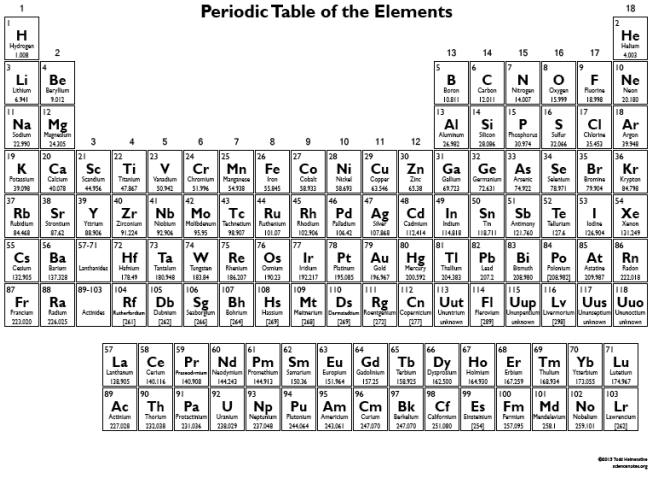


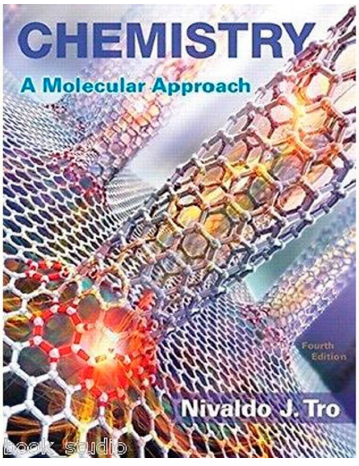
What is this molecule? Message me for some extra credit!

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.

(3) Continuation of CHEM 1215 (121). Lecture: 3 hours. Co-requisite: CHEM 1225L. Prerequisite: CHEM 1215 (121) and CHEM 1215L (123L) or CHEM 131 with a grade of C or higher; ACT =>25 or SAT =>590 or MATH 1220 (121) or MATH 1230 (123) or MATH 1240 (150) or MATH 1250 (153) or MATH 1430 (180) or MATH 1440 (181) or MATH 1512 (162) or MATH 1522 (163) or MATH 2530 (264).Meets UNMCC – Area 3: Physical and Natural Sciences; meets NMCC– Area III: Laboratory Science.

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





COURSE/INSTRUCTOR COMMUNICATIONS

- Please use the messaging function in UNM Learn for course communications. UNM email (Lobo Mail) should be used only when there are issues with Learn messaging.
- When requesting an "office hour" appointment, please propose three (3) times that work for you in your initial request. This makes scheduling much more efficient
- This semester I will likely be on campus on Wednesdays, so Learn Messsaging will be much more efficient than calling my office phone.
- It is the responsibility of the student to keep up with course announcements. ***Check UNM Learn Messaging daily!***

WHAT YOU'LL NEED (Required Resources)

- Chemistry: A Molecular Approach (3rd or 4th ed)
- Mastering Chemistry Access Code (link on UNM Learn, course ID **godbout12988**)
- Calculator (non-graphing) with log/antilog and exponential functions
- Internet Access: *Blackboard Learn* and *UNM email address* ***must be checked daily!***

WHAT YOU'LL FIND USEFUL (Recommended Resources)

- Binder for lecture notes, handouts, group activities
- Mastering Chemistry notebook: keep track of problem solving, identify patterns, record areas of difficulty
- Periodic table. Download your favorite from the internet! Having a paper copy available while you are working will be very useful

WHAT IF YOU NEED HELP? (UNM-Valencia Resources)

- **Instructor**: Class, office hours
- **STEM Center**: Tutors*, molecular modelling kits, Laptops, textbooks (see UNM Learn for remote tutoring instructions)

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

HOW IS YOUR 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 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

What Will My Weekly Routine Be Like?

- **Before Class**: complete any prepatory assignment (quiz, reading, video, etc.)
- **During Class:** on Mondays, work with your group in a breakout room to master concepts. The more you put in, the more you'll get out. There will also be some recorded lectures to fill out the content for the rest of the week.
- **After Class:** work on homework assignment relevant to that day's topic (review notes, **WORK ON PROBLEMS**, think of questions for office hour visits, **WORK ON PROBLEMS,** etc.
- **Repeat 15-ish times!**

What Will Each "Class" Be Like?

- **Quiz**: (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

Class Policies, Strategies for Success, and Important Dates

- **Be There** Attendance in the Monday meeting is expected. Treat this the same way you would treat an in-person class meeting.
  - I will exercise my discretion to without notice to drop any student who:
    - misses the first two Monday meetings or has not registered any activity in UNM Learn and/or Mastering Chemistry by the end of the 2nd week;
- **Be on time.** Class meetings will begin promptly, I hope. Please try to join in promptly as well.
- **When class ends, the work is just beginning:** Expect to dedicate at least 9 out-of-class hours per week for this class. Electronic quizzes (UNM Learn) and homework (Mastering Chemistry) will be assigned regularly Late homework will be accepted, but with a modest penalty.
- **Make a schedule:** At least half of the work in the class will be "on your own." Make a plan, stick to it, and don't fall behind!
- **All of this is flexible:** These continue to be challenging times, and I realize that everyone has many additional stresses in their lives. I don't want to add to it more than necessary. Please don't hesitate to ask about deadlines and the like.

Important Dates & Holidays

(for the most current information, check http://valencia.unm.edu/academics/calendar/fall.html)

Mon, 17 Aug 2020	Instruction begins
Fri, 28 Aug 2020	Last day to register, ADD sections, and change credit hours on LoboWeb Last Day to CHANGE grade option without permission Enrollment cancellation for non-payment
Fri, 04 Sep 2020	Last Day to DROP without "W" grade and 100% tuition refund on LoboWEB, Last Day to CHANGE grade option with permission
Mon, 07 Sep 2020	University Holiday – Labor Day
Wed, 07 Oct 2020	University Holiday – Fall Break
Tue, 03 Nov 2020	University Holiday – Election Day!
Fri, 06 Nov 2020	Last Day to withdraw **WITHOUT** Dean's Permission
Wed, 25 Nov 2020	Last day of in-person classes
Thu, 26 Nov 2020	University Holiday – Thanksgiving (extends through Fri, 27 Nov 2020)
Mon, 30 Nov 2020	Remote instruction week (for **all** classes, extends through Fri, 04 Dec 2020)
Fri, 04 Dec 2020	Last day to withdraw **WITH** dean's permission Last day to change grading options **WITH** dean's permission
Sat, 05 Dec 2020	Last day of instruction
Mon, 07 Dec 2020	Remote final exam week (through Sat) Date time for use TBA.

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.
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.

WHEN WE LEARN THIS STUFF?

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

Week	Topics/Events
1	Syllabus, Review: Lewis Structures, VSEPR, Polarity
	Intermolecular Forces, Phase Changes, Relative BP (11.4 – 11.8)
2	Solutions and Solubility (13.1 – 13.5)
	Colligative Properties (13.6 – 13.7)
3	Labor Day – No Meeting
	Exam 1: CHEM 121 Review, Chapters 11, 13
4	Kinetics: Introduction (14.1 – 14.3)
	Kinetics: Integrated Rate Laws (14.4)
5	Kinetics: Temp Dependence and Mechanisms (14.5 – 14.7)
	Kinetics: Review
6	Equilibrium: Intro (15.1 – 15.5)
	Equilibrium: ICE Tables (15.1 – 15.8)
7	Equilibrium: Q and LeChâtelier's Principle (15.7 – 15.9)
	Equilibrium: Review
8	**Exam 2: Kinetics and Equilibrium (Chapters 14, 15)**
	Acids/Bases: Definitions, K_a, K_w, pH scale (16.1 -16.5)
9	Acids/Bases: Weak acid/base equilibria (16.6 – 16.7)
	Acids/Bases: Weak acid/base equilibria (cont) (16.6 – 16.7)
10	Acids/Bases: Salts, Polyprotic Acids, Lewis Definition
	Equilibrium: Buffers (17.1 – 17.3)
11	Equilibrium: Weak A/B titrations (17.4)
	Equilibrium: Solubility
12	**Exam 3: AB Equilibria, Solubility (Chapters 16, 17)**
	Thermodynamics: Entropy (18.1 -18.5)
13	Thermodynamics: Gibbs Free Energy (18.6 – 18.9)
	Thermodynamics: GFE and Equilibrium and Review (18.10)
14	Electrochemistry: Intro and Balancing (19.1 – 19.2)
	Electrochemistry: Galvanic and Electrolytic Cells (19.3 – 19.6)
15	Electrochemistry: Batteries and Corrosion
	Thermodynamics and Electrochemistry Review/Catch Up
16	**Exam 4: Thermodynamics and E-Chem (Chapters 18, 19)**
	Review of CHEM 1225 Topics and Learning Objectives
Final Exam (release time TBA)	

Things That Aren't Chemistry, But Are Still Important
(Campus and University Policies)

Respect the UNM Community by Preserving Health

This may not apply to this class specifically, but will apply for any in-person class, or if you have in-person business/appointments, etc. on any UNM campus

You have the ability to prevent the spread of COVID-19 and to preserve the health of fellow students, your instructor, staff and the community by following UNM health protocols. The UNM Provost Administrative Directive on Mandatory Student Face Covering and Symptom Reporting of July 9, 2020 requires that **all students on UNM-Main and UNM branch campuses wear face masks in the face-to-face classroom and on campus unless they have a specific mask accommodation (confidentially documented with the Accessibility Resource Center).** UNM Provost Administrative Directive is consistent with Governor Lujan Grisham's Public Health Emergency Order as amended, and the Public Health Order of the New Mexico Health Secretary. It also requires daily participation in symptom screening through covidscreen, which will be sent via UNM e-mail.

Acceptable masks and mask wearing in class: A two-layer mask that covers the nose and mouth and that is cleaned regularly is acceptable. A face shield is not sufficient protection. It is vital that you wear your mask correctly, covering your nose and mouth. Removing your mask for an extended period to eat or drink in class violates the Provost Administrative Directive and endangers others.

Mask Wearing Accommodation*:* Individuals with a documented disability or diagnosis may seek accommodation with the UNM Accessibility Resource Center (ARC) (https://arc.unm.edu/). Individuals do not need to reveal private information to an instructor. ARC will require documentation of health requirements, which will be kept confidential. The instructor will be informed only of any need for accommodation.

Consequences of not wearing a mask properly: Unless you have an ARC-approved accommodation, if you don't wear a mask, or if you do not wear a mask properly by covering your nose and mouth, you will be asked to leave class. If you fail to wear a mask properly on more than one occasion, you can expect to be dropped from the class. If you insist on remaining in the classroom while not wearing a mask (without an ARC-determined accommodation), class will be dismissed for the day to protect others and you will be dropped from the class immediately.

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.

Equal Access Services (Valencia Campus)

If you have a documented condition that may affect your performance in this class, please register with Equal Access Services as soon as possible so accommodations can be arranged 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/equal-access-services.html, or scan the QR code at above:

Equal Access Services

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