

CHEM 1215: General Chemistry I for STEM Majors

Spring 2021 – Section 501 – CRN 50420

Instructor: Dr. Jerry Godbout

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Office (student meeting) Hours

Monday 10:45 a.m. – 11:45 a.m.

Tuesday 9:00 a.m. – 10:00 a.m.

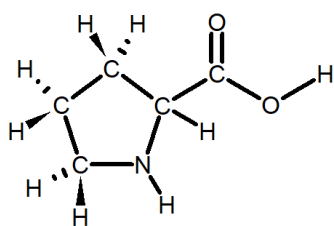
and mutually agreeable times by appointment *via* Zoom

Class Meeting Times:

Monday & Wednesday 9:00 – 10:15 am, *via* Zoom

Course Description:

The Study of stuff, and what it does (1st of a 2-course sequence)



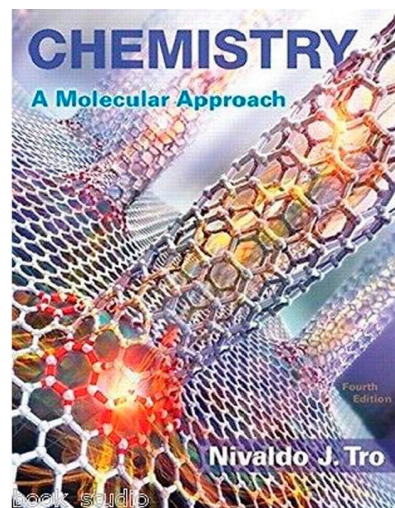
What is this molecule? Tell me (email) for 5 quiz points!

Course Description: Introduction to the chemical and physical behavior of matter. Credit for both this course and CHEM 1120C may not be applied toward a degree program. Meets New Mexico Lower-Division General Education Common Core Curriculum Area III: Science. Prerequisite: MATH 1220 or MATH 1230 or MATH 1240 or MATH 1250 or MATH 1430 or MATH 1440 or MATH 1512 or MATH 1522 or MATH 2530 or ACT Math =>25 or SAT Math Section =>590. Pre- or corequisite: 1215L.

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 H Hydrogen 1.008																	2 He Helium 4.003
3 Li Lithium 6.941	4 Be Beryllium 9.012											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180
11 Na Sodium 22.990	12 Mg Magnesium 24.305											13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.064	17 Cl Chlorine 35.453	18 Ar Argon 39.948
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.887	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.631	33 As Arsenic 74.922	34 Se Selenium 78.971	35 Br Bromine 79.904	36 Kr Krypton 83.798
37 Rb Rubidium 84.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.939	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.905	54 Xe Xenon 131.29
55 Cs Cesium 132.905	56 Ba Barium 137.327	57-71 Lanthanides	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.222	78 Pt Platinum 195.084	79 Au Gold 196.967	80 Hg Mercury 200.592	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [209]	85 At Astatine [210]	86 Rn Radon [222]
87 Fr Francium [223]	88 Ra Radium [226]	89-103 Actinides	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [265]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [271]	111 Rg Roentgenium [272]	112 Cn Copernicium [285]	113 Nh Nihonium [284]	114 Fl Flerovium [289]	115 Uup Ununpentium [288]	116 Lv Livermorium [293]	117 Uus Ununseptium [294]	118 Uuo Ununoctium [294]
57 La Lanthanum 138.905	58 Ce Cerium 140.116	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.242	61 Pm Promethium [145]	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.500	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.934	70 Yb Ytterbium 173.054	71 Lu Lutetium 174.967			
89 Ac Actinium [227]	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium [243]	96 Cm Curium [247]	97 Bk Berkelium [247]	98 Cf Californium [251]	99 Es Einsteinium [252]	100 Fm Fermium [257]	101 Md Mendelevium [258]	102 No Nobelium [259]	103 Lr Lawrencium [262]			



Course-Level Learning Objectives

1. Use dimensional analysis, the SI system of units and appropriate significant figures to solve quantitative calculations in science.
2. Explain the structure of atoms, isotopes and ions in terms of subatomic particles.
3. Understand the differences between physical and chemical changes to matter, and utilize the IUPAC system of nomenclature and knowledge of reaction types to describe chemical changes, predict products and represent the process as a balanced equation.
4. Apply the mole concept to amounts on a macroscopic and a microscopic level and use this to perform stoichiometric calculations including for reactions in solution, gases and thermochemistry.
5. Apply the gas laws and kinetic molecular theory to relate atomic level behavior to macroscopic properties.
6. Describe the energy conversions that occur in chemical reactions and state changes, relating heat of reaction to thermodynamic properties such as enthalpy and internal energy, and apply these principles to measure and calculate energy changes in reaction.
7. Use different bonding models to describe formation of compounds (ionic and covalent) and apply knowledge of electronic structure to determine molecular spatial arrangement and polarity.
8. Analyze how periodic properties (e.g. electronegativity, atomic and ionic radii, ionization energy, electron affinity, metallic character) and reactivity of elements results from electron configurations of atoms.

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 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
- This semester I will likely be on campus on Wednesdays, so Learn Messaging 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 (any edition 2nd through 5th)
- Mastering Chemistry Access Code (link on UNM Learn, course ID **godbout36906**)
- Calculator (non-graphing) with log/antilog and exponential functions
- Internet Access: *BB Learn* and *UNM email address must be checked regularly (daily)*

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	24*	10 %
Homework	10	15 %
Exams	4	50 %
Final Exam	1	15 %
Total		100 %

* Approximate values

** Each equally weighted, 12.5 % each

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
- Small markerboard to share your work with classmates
- Download your favorite from the internet! Having a paper copy available while you are working will be very useful

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 ROUTINE BE LIKE?

- **Before Class:** complete any preparatory assignment (reading, video, etc.)
- **During Class:** Work in groups in breakout rooms 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 and show some more examples.
- **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-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 Zoom meetings 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 Zoom 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.
 - **Make a schedule.** Most of your overall 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/spring.html>)

Mon, 18 Jan 2021	Instruction Begins University Holiday – Martin Luther King Day (campus closed)
Fri, 29 Jan 2021	Last day to register, ADD sections, and change credit hours Enrollment cancellation for non-payment
Fri, 05 Feb 2021	Last Day to DROP without "W" grade and 100% tuition refund
Fri, 12 Feb 2021	Last Day to CHANGE grade option
Sun, 14 Mar 2021	University Holiday – Spring Break (through Sat, 20 Mar 2021)
Fri, 16 Apr 2021	Last Day to withdraw WITHOUT Student Services Permission
Fri, 07 May 2021	Last Day to withdraw WITH Student Services Permission
Wed 12 May 2021	Final Exam (for this section)

WHEN WE LEARN THIS STUFF?

(Schedule is aspirational, approximate and subject to change by the instructor, public health orders, and other circumstances beyond our control)

Class	Date	Topics/Events
1	Mon 18 Jan	Martin Luther King Day - No meeting
2	Wed 20 Jan	Nuclear Atom GA (2.5 - 2.6)
3	Mon 25 Jan	Dimensional Analysis GA (1.6 - 1.8)
4	Wed 27 Jan	Dalton's Atomic Theory (2.1 - 2.5)
5	Mon 01 Feb	Periodic Table, Average Atomic Mass GA (2.7 - 2.8)
6	Wed 03 Feb	Molar Mass (Counting by Weighing GA) (2.8)
7	Mon 08 Feb	Chemical Bonding, Formulas and Naming (3.1 - 3.7)
8	Wed 10 Feb	Exam 1 (Chapters 1 & 2)
9	Mon 15 Feb	Molar Mass, Balanced Chemical Equations (3.8 - 3.12)
10	Wed 17 Feb	Stoichiometry, L.R., % Yield, (4.1 - 4.2)
11	Mon 22 Feb	Solution Stoichiometry. Aqueous Solutions, Molarity (4.3 - 4.6)
12	Wed 24 Feb	Aqueous Reactions, Net Ionic Equations (4.7 - 4.9)
13	Mon 01 Mar	Ideal Gas Equation (5.1 - 5.4)
14	Wed 03 Mar	Exam 2 (Chapters 3 - 4)
15	Mon 08 Mar	Gas Mixtures, Gas Stoichiometry (5.6 - 5.7)
16	Wed 10 Mar	Kinetic Molecular Theory, Real Gases, Thermodynamics Intro (5.8, 5.10, 6.1 - 6.3)
	Mon 15 Mar	Spring Break (no meeting)
	Wed 17 Mar	Spring Break (no meeting)
17	Mon 22 Mar	Thermochemistry and Calorimetry (6.3 - 6.7)
18	Wed 24 Mar	Hess' Law and Reaction Enthalpies (6.8 - 6.9)
19	Mon 29 Mar	Atomic Orbitals and Shapes (7.5 - 7.6)
20	Wed 31 Mar	Electronic Configurations and Periodic Table (8.1 - 8.5)
21	Mon 05 Apr	Exam 3 (Chapters 5 - 7)
22	Wed 07 Apr	Periodic Trends (8.6 - 8.9)
23	Mon 12 Apr	Lewis Dot Structures (9.1 - 9.5)
24	Wed 14 Apr	Bond Polarity, Dipoles, Bond Characteristics (9.6 - 9.11)
25	Mon 19 Apr	VSEPR Theory (10.1 - 10.5)
26	Wed 21 Apr	Hybridization (10.6 - 10.7)
27	Mon 26 Apr	Bonding Review
28	Wed 28 Apr	Exam 4 (Chapters 8 - 10)
29	Mon 03 May	Molecular Orbital Theory (10.8)
30	Wed 05 May	Molecular Orbital Theory (10.8)
	Wed 12 May	Final Exam (9:00 - 11:00 a.m.)

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:



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.

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 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 above:



Title IX Policy

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.

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