

# Syllabus

## I. General Information

Instructor:	Dr. Piotr Filipczak
Email:	<a href="mailto:pfilipczak@unm.edu">pfilipczak@unm.edu</a>
Phone Number:	505-925-8876
Office Number:	VAAS 132A
Office Hours (on-campus):	Monday and Wednesday, 10:30 am to 11:30 am Tuesday and Thursday, 1:00 pm to 2:00 pm
Office Hours (online):	Tuesday and Thursday, 4:00 pm to 4:30 pm <a href="https://unm.zoom.us/j/97696043404">https://unm.zoom.us/j/97696043404</a> Meeting ID: 976 9604 3404
Course Section:	501
Meeting Room:	VAAS 131
Meeting Time:	Monday and Wednesday, 9:00 am to 10:15 am

## II. Course Description

Prerequisite: CHEM 1215 and CHEM 1215L; ACT =>25 or SAT =>570 or MATH 1220 or MATH 1230 or MATH 1240 or MATH 1430 or MATH 1440 or MATH 1510 or MATH 1520 or MATH 2530.

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.

## III. Resources

- "Chemistry, Atoms First" 2e from OpenStax (*textbook*).
- Canvas (*learning management system for communication, grades entry, resources navigation and selected assignments*).

#### IV. 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.

## V. Course Requirements

This is a 16-week, face-to-face course with the following requirements:

**Attendance:** In-person participation is required in this course. Student who missed 15% of a class time (which stands for 5 meetings) may be dropped by the instructor with a W, F or D (depending on the stage of the course). Exceptions may be made for documented medical reasons including COVID-19.

### Technology & Computer Requirements:

- Dependable computer
- Reliable internet connection
- Computer speakers
- Reliable web browser
- Microsoft Suite (PowerPoint and Word)
- Adobe Flash Player

## VI. Students Evaluation Criteria

Type of Assignment:	Points per Assignment:	Total Points in this Category:	Contribution to the Final Grade:
Homework (8x)	20 pts	160 pts	20.0%
Quizzes (8x)	20 pts	160 pts	20.0%
Discussion (4x)	5 pts	20 pts	2.5%
Partial Exams (3x)	100 pts	300 pts	37.5%
Final Exam (1x)	160 pts	160 pts	20.0%
<b>Total</b>	<b>NA</b>	<b>800 pts</b>	<b>100.00%</b>

- **Homework:** Open-book assignments to be completed at home. One lowest score will be dropped from the final grade.
- **Quizzes:** Closed-book assignment to be completed in class. One lowest score will be dropped from the final grade.
- **Discussions:** Administrated once per month via Canvas. All four discussions count.
- **Partial Exams:** To be completed in class on days indicated in the course schedule. All three exams count.
- **Final Exam:** To be completed in class during the final week of the course.
- **Extra Credit:** Practice final exam, which will be administrated online via Canvas in the second last week of the course, is the only extra credit opportunity that will contribute up to 5% of student's final grade.

**Grading scale:**

- 100 or higher: A+
- 94-99.99: A
- 90-93.99: A-
- 87-89.99: B+
- 83-86.99: B
- 80-82.99: B-
- 77-79.99: C+
- 73-76.99: C
- 70-72.99: C-
- 60-69.99: D
- below 60: F

**VII. Course Policies**

**Academic Integrity:** All homework, quizzes and exams in this course must be completed by students as their original and individual work. No group work is allowed when it comes to completing these assignments. While taking quizzes and exams, only resources listed by the instructor (such as non-graphing calculator, scratch paper, periodic table etc.) are allowed. Use of any other resources such as but not limited to textbooks, unauthorized internet websites, personal notes are forbidden. Plagiarism or cheating is not tolerated. Any instance of this will result in a grade of zero for that assignment. For more details on academic integrity violation examples, please see the UNM Academic Dishonesty Policy: <https://policy.unm.edu/regents-policies/section-4/4-8.html>.

**Compliance and Safety:** Students must read, understand and obey safety rules while present in chemical laboratory. That will be documented by signing safety contract during the first on-campus meeting. Student who does not obey the safety rules and brings the risk on himself/herself and/or on colleague students, may be suspended from the class by the instructor at any time of the course with the consequent non-passing grade.

**Disruptive Behavior:** Disruptive behavior will not be tolerated and can lead to being dropped from the course at the instructor's discretion. No "guests" will be allowed unless they are explicitly invited to attend the class by the instructor.

**Responsible Learning and Academic Honesty:** Cheating and plagiarism (academic dishonesty) are often driven by lack of time, desperation, or lack of knowledge about how to identify a source. Communicate with me and ask for help, even at the last minute, rather than risking your academic career by committing academic dishonesty. Academic dishonesty involves presenting material as your own that has been

generated on a website, in a publication, by an artificial intelligence algorithm (AI), by another person, or by otherwise breaking the rules of an assignment or exam. Academic dishonesty is a violation of the Student Code of Conduct that can lead to a disciplinary procedure. When you use a resource in work submitted for this class, document how you used it and distinguish clearly between your original work and the material taken from the resource. For information specifically about AI usage—see <https://airesources.unm.edu/instructors/index.html>. Having academic integrity is paramount to your success in any class. Plagiarism or cheating is not tolerated. For more information, please consult the UNM Academic Integrity Policy. The policy states in part: 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.

**Wellness:** If you do need to stay home due to illness or are experiencing a wellness challenge, please take advantage of the resources below. You can communicate with me via Canvas messaging or [jgodbout@unm.edu](mailto:jgodbout@unm.edu), and I will work with you to provide alternatives for course participation and completion. Let me, an advisor, or another UNM staff member know that you need support so that we can connect you to the right resources. UNM is a mask friendly, but not a mask required, community. If you are experiencing COVID-19 or any other infectious symptoms, please do not come to class.

**Support:** PASOS Resource Center (505) 925-8546, <mailto:pasos@unm.edu>. The Resource Center is an on-campus center that serves as a “one-stop” for all non-academic needs of UNM-Valencia students. Student Health and Counseling (SHAC) at (505) 277-3136. TimelyCare: Free 24/7 virtual care services (medical, emotional support, health coaching, self-care, basic needs support). 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 The UNM-Valencia Equal Access Services (Sarah Clawson, Coordinator), at (505) 925-8840 or by email at [msjclawson@unm.edu](mailto:msjclawson@unm.edu). Or the UNM-Albuquerque Accessibility Resource Center at [arcsrvs@unm.edu](mailto:arcsrvs@unm.edu) or by phone at 505-277-3506. Support (Accommodations) Contact me via email ([jgodbout@unm.edu](mailto: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](mailto: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 2024 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 If you are making an email appointment with the Writing Center, email your draft to [tutor@unm.edu](mailto: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](mailto: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:** The University of New Mexico and its faculty are committed to supporting our students and providing an environment that is free of bias, discrimination, and harassment. The University's programs and activities, including the classroom, should always provide a space of mutual respect, kindness, and support without fear of harassment, violence, or discrimination. Discrimination on the basis of sex includes discrimination on the basis of assigned sex at birth, sex characteristics, pregnancy and pregnancy related conditions, sexual orientation and gender identity. If you have encountered any form of discrimination on the basis of sex, including sexual harassment, sexual assault, stalking, domestic or dating violence, we encourage you to report this to the University. You can access the confidential resources available on campus at the LoboRESPECT Advocacy Center (<https://loborespect.unm.edu>), the Women's Resource Center (<https://women.unm.edu>), and the LGBTQ Resource Center (<https://lgbtqrc.unm.edu>). If you speak with an instructor (including a TA or a GA) regarding an incident connected to discrimination on the basis of sex, they must notify UNM's Title IX Coordinator that you

shared an experience relating to Title IX, even if you ask the instructor not to disclose it. The Title IX Coordinator is available to assist you in understanding your options and in connecting you with all possible resources on and off campus. For more information on the campus policy regarding sexual misconduct and reporting, please see <https://policy.unm.edu/university-policies/2000/2740.html> and CEEO's website. If you are pregnant or experiencing a pregnancy-related condition, you may contact UNM's Office of Compliance, Ethics, and Equal Opportunity at [ceo@unm.edu](mailto:ceo@unm.edu). The CEEO staff will provide you with access to available resources and supportive measures and assist you in understanding your rights. Pregnancy and Parenting Support information is available here. Support: Confidential services for students are available at 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. The Women's Resource Center supports all students, including those who are pregnant or are parents. rights. UNM Pregnancy and Parenting Support information is available. UNM-Valencia has lactation stations located in LRC 112 (Tomé campus) and in the Workforce Training Center. 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. 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/>. Respectful Conduct Expectations: I am committed to building with you a positive classroom environment in which everyone can learn. I reserve the right to intervene and enforce standards of respectful behavior when classroom conduct is inconsistent with University expectations [and/or classroom community agreements]. Interventions and enforcement may include but are not limited to required meetings to discuss classroom expectations, written notification of expectations, and/or removal from a class meeting. Removal from a class meeting will result in an unexcused absence. [Insert number] or more unexcused absences may result in permanent removal and a drop from the course (see attendance policy). The University of New Mexico ensures freedom of academic inquiry, free expression and open debate, and a respectful campus through adherence to the following policies: D75: Classroom Conduct, Student Code of Conduct, University Policy 2240 – Respectful Campus, University Policy 2210 – Campus Violence. 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, and financial capability support. Your advisor, staff at the resource centers and Academic Affairs Office, and I can help you find the right opportunities for you.

### VIII. Course Schedule

Week	Date	Topic	Assignments
1	1/20, 1/22	Liquids, Solids, and Intermolecular Forces	
2	1/27, 1/29	Liquids, Solids, and Intermolecular Forces, continue	H#1, Q#1
3	2/3, 2/5	Solutions	H#2, Q#2
4	2/10, 2/12	Solutions, continue	<b>Exam #1</b>
5	2/17, 2/19	Chemical Kinetics	
6	2/24, 2/26	Chemical Kinetics, continue	H#3, Q#3
7	3/3, 3/5	Chemical Equilibrium	H#4, Q#4
8	3/10, 3/12	Chemical Equilibrium, continue	<b>Exam #2</b>
9	3/17, 3,19	<b>Spring Break</b>	
10	3/24, 3/26	Acids and Bases	H#5, Q#5
11	3/31, 4/2	Acids and Bases, continue	H#6, Q#6
12	4/7, 4/9	Aqueous Ionic Equilibrium	H#7, Q#7
13	4/14, 4/16	Free Energy and Thermodynamics	<b>Exam #3</b>
14	4/21, 4/23	Electrochemistry	
15	4/28, 4/30	Radioactivity and Nuclear Chemistry	H#8, Q#8
16	5/5, 5/7	Course Review	H#9, Q#9, PFE
<b>FINAL WEEK</b>	<b>5/12 9:00-11:00 am</b>	<b>In-Class Final Exam</b>	

Wk – Week of the Course, H – Homework, Q – Quiz, PFE – Practice Final Exam

Red – No Meeting