

Chemistry 3A, Fall 2019 Course Syllabus

Reedley College, SCCC

Course Info:

Course #: 52287 – Lecture M/W 5-6:15am in PHY 76; Lab W 6:30-9:20am in PHY-82

Instructor and Contact Information:

Instructor: Kurtis Thiesen
Office: ANX 5 (Faculty Annex)
Office Hours: Mon/Wed 11-11:50am (LRC 111), Tues/Thurs 10-10:50am (LRC 111), Fri 8-8:50am (virtual)
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Required Course Materials:

Textbook: Introductory Chemistry by Nivaldo J. Tro, 6th ed. is the official textbook for the course, but please note that other editions of this Introductory Chemistry textbook (3-5, by Tro) will suffice for CHEM 3A as course content is very similar from version-to-version, and as HW problems are assigned/viewed through an online program called Mastering Chemistry.

Homework Access: Homework will be administered using an online program called Mastering Chemistry; the cost of Mastering Chemistry for our course is approximately \$65 and it will be purchased online. Registering for MC (i.e. “how to register”) will be discussed on the first day of class.

Calculator: Any scientific calculator that has exponent and logarithmic functions will suffice for our course (e.g. TI-30xa), but graphing/programmable calculators are not allowed during exams.

Lab Supplies: Approved safety goggles/glasses + lab coat; lab policy and safety will be discussed by your during your first lab session

Lab Text: Laboratory experiments will be uploaded to Canvas in pdf format; these experiments are available to you at no cost (except the cost of printing), but you must print them out and bring them with you to class.

Scantron Form #882-E: You’ll need one of these for each exam

Web Access: This course makes use of downloadable PowerPoint files, video, and other electronic documents. As such, access to a computer and web connection is required; if you don’t own a computer, the library has student computer labs as well as laptops available for check-out.

Prerequisites: MATH 103 or 3A or 5A or equivalent. CHEM 10 or high school chemistry and ENGL 1A are strongly recommended.

Important Note: Chemistry 3A is a challenging course...in a typical semester we might expect that 55-60% of students enrolled in this course during week 3 will complete the course with a C or better. Many students attempt to take CHEM3A without any prior chemistry; while it is possible to succeed in CHEM 3A without prior chemistry experience, it takes **a lot of hard work**. College level algebra skills are vital to your success in many of the quantitative aspects of this course. Fortunately, there are many wonderful resources available to you here at Reedley College (see Additional Resources section below).

Additional Resources: Please don’t feel weird about getting the help that you need in order to succeed (needing help is the rule rather than the exception in this course). We have many great tutors in our tutorial center who know what it takes to be successful in this course, and who are willing to help you do the same. Our tutorial center is located in the library (Room LRC 111). The link to the RC Tutorial Center is as follows:

<http://www.reedleycollege.edu/index.aspx?page=128>. Finally, I would be glad to have you join me during office hours to discuss just about anything you’d like to discuss (office hours schedule is noted above)...don’t hesitate to stop by if I can help out in any way.

Course Description:

This is a survey course in the principles of inorganic chemistry covering the composition of matter, physical and chemical changes, atomic and molecular structure, inorganic nomenclature, chemical formula and reaction calculations, gas laws, bonding, solutions, net-ionic equations, acid-base theories, pH, oxidation-reduction reactions, thermodynamics, nuclear chemistry and equilibrium. Both qualitative and quantitative theory and techniques will be covered. It is intended for applied science and non-science majors or for students preparing to take Chemistry 1A.

Important Dates:

Friday (8/30) - Last day to drop in order to avoid a "W"

Friday (10/11) - Last day to drop with a "W" (a letter grade will be assigned after this date)

Additional policies related to adding this course: If a student hopes to add this course, he/she must attend all lecture and lab periods, otherwise he/she will lose their spot on the list of students who are hoping to add the course. Also, if a student is issued an add code, the code must be used within 48 hours; if the code is not used promptly, an alternative add code will be given to the next student on the waiting list, and the original code will cease to be valid (i.e. if the original student adds the course after 48 hours have passed, they will immediately be dropped).

Course Policies:

Lecture Attendance:

- Lecture attendance is mandatory; attendance will be recorded for lecture and lab. You are responsible for the material that you miss if you are absent from lecture or lab.
- Any student who is not present at the start of the first class period may be dropped and their spot given to another student.
- **Important Note: If a student misses more than 25% (combined) of lectures/labs they will be dropped.**

Lab Attendance:

- In order to be counted as present for a lab you must arrive on time, participate in the experiment or activity, and, unless otherwise instructed, stay the entire lab period. In other words, if you arrive late, leave early, or do not participate in lab activities, you may be counted absent and given a zero on your lab exercise. Note: Showing up late for lab is a safety risk for you and others, as specific safety concerns are generally addressed at the beginning of lab.
- **Important Note: If a student misses more than 3 lab sessions they will be dropped from the course (if these absences occur before the final "drop" deadline), or receive a failing grade in the course (if their 4th absence occurs after the final "drop" deadline etc.).**

Canvas:

- Canvas will be used extensively in this course, and students will be expected to check Canvas regularly for updates; lecture PowerPoints and other important documents (for both lecture and lab) will be uploaded to Canvas regularly.

Reading:

- Listed on the course schedule is the associated reading for each chapter. The course expectation is that you will have completed the readings before coming to class on the days those topics are discussed etc.

Missed exams, quizzes and labs:

- Make-up exams and quizzes are generally not given. Since your lowest exam is dropped, if you miss an exam, that score of "0" will count as your dropped score.
- Official RC Policy concerning absences - "There are no institutionally approved excused absences for any reason. Only your instructor may excuse an absence. Absences caused by personal engagements, transportation delays and business affairs will not be excused, nor will absences from class to complete registration or add/drop activities...Makeup work must be completed to the satisfaction of the instructor of the course. Being excused from class does not relieve the student from the responsibility for completing all assignments."

Cheating:

- Cheating is the act or attempted act of taking an examination or performing an assigned, evaluated task in a fraudulent or deceptive manner, such as having improper access to answers in an attempt to gain an unearned academic advantage. Cheating may include, but is not limited to, copying from another's work, supplying one's work to another, giving or receiving copies of examinations without an instructor's permission, using or displaying notes or devices inappropriate to the conditions of an examination, allowing someone other than the officially enrolled student to represent the student, or failing to disclose research results completely.
- You are encouraged to work together on labs. However, ***your individual work must be evident***. Do not copy work or allow others to copy from your work. Instances of confirmed cheating will generally result in failure and be referred to the Dean for further action.

- Electronic devices such as cell phones, tablets, etc. are not allowed during exams and must be put away in a backpack or purse; confirmed use of these devices constitutes cheating.
- As an alternative to automatic failure in the course, at the instructor's discretion, you may instead be assigned negative credit for the amount of points possible on the assignment. In this instance, the score would not be allowed to be dropped as your lowest score.
- RC Academic Dishonesty Statement: *"Because cheating, plagiarism, and collusion in dishonest activities erode the integrity of the college, each student is expected to exert an entirely honest effort in all academic endeavors. Academic dishonesty in any form is a very serious offense and will incur serious consequences."*

Plagiarism:

- Plagiarism is a specific form of cheating: the use of another's words or ideas without identifying them as such or giving credit to the source. One of the most common forms of this is copying information from a website and pasting it into your document. Instances of plagiarism will be treated like any other form of cheating.

Laboratory Safety:

- On the first day of lab we will cover various safety rules. If you do not follow these rules you will be asked to leave, and you may be dropped from the course. For example, if you refuse to wear safety glasses, you would be immediately and permanently removed from the course for your own protection and those around you.

Disabled Students:

- It is our policy not to discriminate against any student. If you suspect that you have any type of physical disability or learning disability that is relevant to your performance in the course, I'll encourage you to come talk to me about it right away (though you're not required to) so that I can support you to the best of my ability. Additionally, it may be helpful for you to stop by the disabled student services office and talk with staff members there to determine what kinds of services and support are available to you to help you succeed in this and other courses. SCCCD policy: *If you have a verified need for an academic accommodation or materials in alternate media (i.e., Braille, large print, electronic text, etc.) per the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, please contact the Disabled Student Services as soon as possible.*

Electronic Devices:

- Use of electronic devices (laptop, tablet, etc.) in the classroom is acceptable as long as it is not a distraction to the instructor or to other students. In lab, they must also be used in such a way as to not cause a safety risk (e.g. do not handle chemicals and then use your computer without removing your gloves and/or washing your hands). Electronic devices of any kind are NEVER permitted during exams.

Classroom Visitors:

- In accordance with Reedley College policy, only students currently enrolled in the course will be allowed in the classroom during lab and lecture.

Grading: Your course grade will be calculated as follows:

Lab Reports	15%
Lab Quizzes	10%
*Exams	48% (4 unit exams worth 12% each)
Final exam	14%
Homework	13%

*I will replace your lowest unit exam score with your final exam score if your final exam score exceeds it (see "exams" section for a more detailed explanation).

***Grading Scale:**

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

*The instructor reserves the right to alter grade ranges to accommodate borderline grades.

Lab Reports: Expectations about lab reports will be discussed by your lab instructor during the introduction to lab policy and safety on the first day of lab.

Lab Quizzes: There will be 3 lab quizzes during the term that are meant to examine whether you've gained a thorough understanding of relevant lab theory, techniques associated with lab experimentation, and, where appropriate, how these lab experiments are related to lecture topics.

Exams: There will be 4 unit exams that are weighted equally and a final exam which is weighted more heavily; these exams may be multiple choice, essay, short answer, or a mixture of these. Make-up exams will NOT be given for unit exams or for the final exam; however, the score on your lowest unit exam may be replaced by your final exam score if your final exam score exceeds it (and if you miss an exam, this will automatically count as your lowest unit exam score). Though each unit exam will be written primarily to examine topics in the current unit/recent chapters, topics in chemistry build upon one another and so all exams should be considered comprehensive.

Homework: Homework will be administered online using Mastering Chemistry. A code for online access to Mastering Chemistry may be purchased online during the registration process (I have posted details about this process on Canvas, and we'll discuss this further on the first day of class).

Student Learning Outcomes for CHEM 3A:

(Specify the learning skills the student demonstrates through completing the course and link critical thinking skills to specific course content and objectives.)

Upon completion of this course, students will be able to:

1. Construct and balance a chemical reaction and use the reaction to predict stoichiometric quantities.
2. Describe acid-base reactions and how to calculate pH.
3. Explain concepts from the periodic table and use the periodic table to solve chemical problems.
4. Name and draw Lewis diagrams of inorganic and molecular compounds from the formula and vice versa.
5. Safely conduct laboratory experiments implementing concepts and principles learned in lecture.
6. Use dimensional analysis to solve for an unknown parameter of density, volume, mass, pressure, temperature, molar mass, concentration, or an empirical formula.

Course Objectives for CHEM 3A:

(Specify major objectives in terms of the observable knowledge and/or skills to be attained.)

In the process of completing this course, students will:

1. Apply solution properties and stoichiometry to calculate quantities (e.g. moles, volume, grams) of reactants and products in a reaction.
2. Develop techniques to write Lewis electron-dot formulas and identify the shape using the VSEPR theory.
3. Identify the nature and applications for electron exchange reactions.
4. Prepare and solve simple mathematical problems involving formula calculations related to gas laws.
5. Calculate molarity, mass percentage concentration and density of solutions and apply the molarity in dilution calculations.
6. Identify types of matter, recognize physical properties and chemical properties, and apply the Law of Conservation of Mass and the Law of Conservation of Energy.
7. Describe the impact of chemistry on modern society and the relationship between chemistry and other disciplines including agriculture, the medical field, and industry.
8. Distinguish and identify metals, non-metals, metalloids, alkali metals, alkaline earth metals, halogens, noble gases, transition metals, and of the lanthanide and actinide series.
9. Identify the principles of equilibrium in reversible reactions, saturated solutions, solutions of weak electrolytes and solutions of gases in solving related problems.
10. Use the periodic table to identify physical and chemical properties of elements and calculate molar masses of compounds and molecules.
11. Explain, write and balance chemical equations, and use these equations along with stoichiometry and the mole concept to convert quantities (e.g. grams or moles) of a given substance into quantities of an unknown substance.
13. Identify different types of intramolecular and intermolecular forces of attraction present in various substances based on chemical formulas and structures.
14. Define and identify acids and bases and perform math calculations involving pH measurements.
15. Explain colligative properties of solutions (e.g. boiling point elevation, freezing point depression, and osmotic pressure).
16. Calculate empirical formulas, and mass percentage composition given the appropriate data.

17. Explain state and energy changes accompanying heating and cooling curves.
18. Recognize the electromagnetic spectrum and explain the basic principles of the quantum mechanical model of the atom.
19. Diagram heating and cooling curves.
20. Perform unit conversions using the correct significant figures; between the English and metric systems, temperatures in different units, density, energy, and with SI units.
21. Understand the structure of the atomic nucleus.
22. Explain the fundamental types of nuclear radiation and the effects they have on biological systems
23. Predict the physical behavior of gases to pressure, temperature, and volume changes.
24. Apply gas laws and stoichiometry to calculate quantities (e.g. moles, volume, grams) of gas produced or consumed during a reaction.
25. Perform calculations involving a limiting reactant and determine the percent yield.
26. Name inorganic compounds given their formulas, and write formulas given names.
27. Complete, identify type and balance chemical equations of reactions.
28. Demonstrate laboratory skills which include operating an analytical balance; calibrating and/or using fundamental lab equipment such as a thermometer, barometer, buret, pipette; recognizing use and limitations of laboratory glassware.

Tentative Schedule:

Week	Date	Lecture topics	Text section	Lab experiment (Wednesday)
1	8/12	Course Intro/Policies, Chapter 1 The Chemical World	1.2-1.3	Introduction to Lab Policy + Lab Safety
1	8/14	Chapter 2 Measurement and Problem Solving	2.2-2.10	
2	8/19	Chapter 3 Matter and Energy	3.2-3.12	Exp 3 – Density of liquids and solids
2	8/21	Chapter 4 Atoms and Elements	4.2-4.5	
3	8/26	Chapter 4 Cont'd	4.6-4.9	Worksheet – Significant figures and dimensional analysis
3	8/28	Chapter 5 Molecules and Compounds	5.2-5.5	
4	9/2	Labor Day Holiday		Exp 1 – Properties and changes of matter
4	9/4	Exam #1 (Chapters 1-4)		
5	9/9	Chapter 5 Cont'd	5.6-5.9	Worksheet – Nomenclature
5	9/11	Chapter 6 Chemical Composition	6.2-6.4	
6	9/16	Chapter 6 Cont'd	6.5-6.9	Exp 5 – Empirical formula of a compound
6	9/18	Chapter 7 Chemical Reactions	7.2-7.4	
7	9/23	Chapter 7 Cont'd	7.5-7.10	Lab Quiz #1 (Expts 3, 1, Sig figs/dimensional analysis worksheet, Nomenclature worksheet)
7	9/25	Chapter 8 Quantities in Chemical Reactions	8.2-8.3	
8	9/30	Chapter 8 Cont'd	8.4-8.7	Exp 13 – Percent water in hydrates
8	10/2	Chapter 9 Electrons in Atoms and The Periodic Table	9.1-9.4	
9	10/7	Chapter 9 Cont'd	9.5-9.9	Exp 8 – Alum production from scrap aluminum
9	10/9	Exam #2 (Chapters 5-8)		
10	10/14	Chapter 10 Chemical Bonding	10.1-10.3	Exp 7 – Reaction Types: Copper Chemistry
10	10/16	Chapter 10 Cont'd	10.4-10.8	
11	10/21	Chapter 11 Gases	11.2-11.4	Worksheet – Lewis diagrams and molecular models
11	10/23	Chapter 11 Cont'd	11.5-11.10	
12	10/28	Chapter 13 Solutions	13.2-13.5	Exp 14 – MM of a volatile liquid + Lab Quiz #2 (Expts 5, 13, 8, 7)
12	10/30	Chapter 13 Cont'd (lecture posted on Canvas)	13.6-13.10	
13	11/4	Chapter 14 Acids and Bases	14.2-14.6	Exp 11 – Acid-base titration lab (practice for upcoming lab practical)
13	11/6	Exam #3 (Chapters 9-11, 13)		
14	11/11	Veteran's Day Holiday		Exp 9 – Production of hydrogen gas
14	11/13	Chapter 14 Cont'd	14.7-14.10	
15	11/18	Chapter 12 Liquids, Solids, and IMFs	12.2-12.5	Lab practical – Acid-base titration (½ of the class will take the lab practical)
15	11/20	Chapter 12 Cont'd (lecture posted on Canvas)	12.6-12.8	
16	11/25	Chapter 15 Chemical Equilibrium	15.2-15.7, 15.12	Lab practical – Acid-base titration (other ½ of the class will take the lab practical)
16	11/27	Chapter 17 Radioactivity and Nuclear Chemistry	17.2-17.5	
17	12/2	Catch up on topics		Lab Quiz 3 (Expts 14, 9, Lewis diagrams/molecular models worksheet) + check out
17	12/4	Exam #4 (Chapters 14, 12, 15, 17)		
18	12/9	Final Exam (5pm)		No Lab during finals week

THIS SYLLABUS AND SCHEDULE ARE SUBJECT TO CHANGE...IF YOU ARE ABSENT FROM CLASS, IT IS YOUR RESPONSIBILITY TO DETERMINE WHAT YOU MISSED (INCLUDING ANNOUNCEMENTS MADE RELATING TO SCHEDULE CHANGES ETC.)