CHEM 3A: Introductory General Chemistry Spring 2020
Lectures MW (5-6:15pm) in PHY76
Lab Wed (6:30-9:20pm) in PHY 82

Instructor: V. Cornel
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Canvas Website: https://scccd.instructure.com
Office Hours: MW 9-11 and F 9-10 in PHY78
Tutoring: Free tutoring available in the Tutorial Center (by the library) or STEM tutorial center (FEM) Self enroll using this link: **https://scccd.instructure.com/enroll/AJ6NXM**

Course Objectives: Chemistry 3A is an elementary survey course in chemistry including lab work. It is designed to give the student a chemistry background for a wide variety of careers including forestry, nutrition, nursing, physical therapy, teaching and other biological and health related fields.

Course Prerequisite: Students will need to be familiar with algebra (Algebra II or equivalent) before taking this course as there is a **lot of math** involved. Almost half the course is math problems.

Course Advisories: ENGL 1A, CHEM10 or high school chemistry

Text and Materials:
1. This is a Zero-Cost Textbook class so you do not need to purchase a textbook. If you would like to read along using a textbook I would suggest Nivaldo J. Tro: "Introductory Chemistry" 3rd , 4th, 5th or 6th Edition. The 3rd edition can be purchased for $20. Links to some free online textbook chapters will be given to supplement the lectures.
2. Download fill-in notes, homework questions and the labs weekly off Canvas. If you do not have access to a printer you can print on campus, or write everything out by hand.

You will need safety glasses ($5 at hardware store), labcoat and a calculator with "exp" (or "EE") and "log" keys ($12 at Walmart for a TI-30XA or TI-30XII), but not a programmable calculator or the pink STATS calculator.

Lecture Notes: The ability to listen carefully and to take good lecture notes in an essential college skill. Students should print out the fill-in notes, homework and lab assignments off my Canvas website prior to coming to class. The more effort you put into your homework, the better you will do in exams.

Homework: Homework will be assigned every lecture. It is essential to your success in this class that you do all the assigned homework yourself and read the relevant sections on Canvas or in your Textbook. All homework will be collected at the beginning of the following lecture and selected problems graded. This is to ensure that you work consistently and can apply what you learn to problems. Do not just copy somebody else's homework or you will not be able to do the problems for yourself in the exams. There will be no make-up homework assignments, but I will drop the lowest four homework assignments. You can ask another student or tutor to help you with the problems, but then you need to go home and redo them yourself. Even if you get all the problems wrong, you will still get 70% for the assignment for attempting all the problems yourself and showing all your work. You will learn where you are going wrong when I go over the homework. The latest I will accept homework is just before I hand back the graded homework the next lecture. This is not ideal as you won't have your homework in front of you when I go over it and you will lose 10% for the homework being late. Absence is not an excuse for not doing your homework on time as you can send it in with another student, or count that

assignment as one you drop. I can't accept emailed homework. If you leave the class or are disruptive while I go over homework, I will also deduct points. Write out or print the homework questions as well as the answers so you can study your homework.

Drop dates:
To avoid a "W" you need to drop the class on or before Friday January 31, 2020
The final date to drop this class is Friday March 13, 2020. After that day a letter grade needs to be assigned and it will appear on your transcripts.

Late Adds: Add codes need to be used within 2 days or they will no longer work and you will go to the bottom of the waitlist. If you need to petition to add the class, you need to get the approval first and then ask for an add code (if there is still space in the class). The last day to add this class is Friday, Jan 31. Students will not be allowed to add the class unless they have been attending consistently from the first day.

Attendance: Attendance in lecture and lab is mandatory. The student will be dropped automatically if she/he misses the first day of class, without contacting the instructor. If a student misses more than 25% of the lectures/labs, or 3 classes in a week without contacting the instructor with a valid excuse, they will also be dropped. The homework will be on the Canvas notes so that you can do the homework even if you missed the lecture. Watch You-tube videos on that section before answering the homework. Do not just copy somebody else's homework or you will not do well in the exams. **There will be no make-up exams**. The **final exam grade** will count as an exam and will also be counted as a make-up exam for the missing exam. If you have not missed any exams, and do better in the final exam than one of the earlier exams, the final exam grade will **replace the earlier exam grade**. If you miss two exams you will receive a zero for the second missed exam. If a student is disruptive (including using cell-phones, interrupting the instructor continuously) they may be asked to leave the lecture/lab and recorded as "absent".

Cancelled Classes: If for some reason a class is cancelled, an official yellow cancellation form will be posted on the door of the classroom. We will make every effort to inform the students via Canvas, or on the Reedley College Website in a timely manner. Ensure that you have set up Canvas to email you all notifications.

Grading and Exams: There will be 4 exams covering the material of previous lectures and a final cumulative exam. These 5 exams will be equally weighted and count 65% all together (13% each).

Laboratory (25%):	**Lab Reports 12.5%, lab quizzes and lab practical 12.5%**
Lecture Material (75%):	**Exams 65%**
	Homework 10%

The grading scale to be used is **A** 90-100%, **B** 80-89%, **C** 70-79%, **D** 60-69%, **F** 0-59%

Student Learning Outcomes:

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

A. Use dimensional analysis to solve for an unknown parameter of density, volume, mass, pressure, temperature, molar mass, concentration, or an empirical formula.
B. Construct and balance a chemical reaction and use the reaction to predict stoichiometric

quantities.
C. Explain concepts from the periodic table and the use the periodic table to solve chemical problems.
D. Describe acid-base reactions and how to calculate pH.
E. Name and draw Lewis diagrams of inorganic and molecular compounds from the formula and vice versa.
F. Safely conduct laboratory experiments implementing concepts and principles learned in lecture.

Course Objectives:

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

A. demonstrate an appreciation for the impact of chemistry on modern society and the relationship between chemistry and other disciplines including agriculture, the medical field, and industry;
B. classify types of matter, recognize physical properties and chemical properties, and a general understanding of the Law of Conservation of Mass and the Law of Conservation of Energy;
C. perform unit conversions using the correct significant figures; between the English and metric systems, temperatures in different units, density, energy, and with SI units;
D. use the periodic table to predict physical and chemical properties of elements and calculate molar masses of compounds and molecules;
E. recognize the electromagnetic spectrum and have a basic understanding of the quantum mechanical model of the atom;
F. demonstrate the ability to name inorganic compounds given their formulas, and write formulas given names;
G. distinguish and identify metals, non-metals, metalloids, and the elements of alkali metals, alkaline earth metals, halogens, noble gases, transition metals, and elements of the lanthanide and actinide;
H. distinguish and identify between different types of intramolecular and intermolecular forces of attraction present in various substances based on chemical formulas and structures;
I. write Lewis Electron-Dot Formulas and identify the shape using VSEPR method;
J. 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;
K. calculate, empirical formulas, and percentage composition given the appropriate data;
L. distinguish and balance chemical equations of different types of reactions;
M. perform calculations involving a limiting reagent and determining the percent yield;
N. predict the physical behavior of gases to pressure, temperature, and volume changes;
O. solve simple mathematical problems involving formula calculations related to gas laws;
P. use gas laws and stoichiometry to calculate quantities (e.g. moles, volume, grams) of gas produced or consumed during a reaction;
Q. calculate various parameters of solutions including molarity, dilution techniques, percentage concentration, and density.
R. construct heating and cooling curves;
S. describe state and energy changes accompanying heating and cooling curves;
T. apply the principles of equilibrium in reversible reactions, saturated solutions, solutions of weak electrolytes and solutions of gases in solving related problems;

U. use solution properties and stoichiometry to calculate quantities (e.g. moles, volume, grams) produced or consumed during a reaction;
V. describe colligative properties of solutions (e.g. boiling point elevation, freezing point depression, and osmotic pressure);
W. define and identify acids and bases and be able to perform math calculations involving the pH;
X. determine the nature and applications for electron exchange reactions;
Y. understand the structure of the atomic nucleus;
Z. understand the fundamental types of nuclear radiation and the effects they have on biological systems
AA. and demonstrate laboratory skills which include operating an analytical balance; calibrating and/or use fundamental lab equipment such as a thermometer, barometer, buret, pipette; recognizing use and limitations of laboratory glassware; recording and reporting observations; using error analysis techniques to evaluate certainty of data; use safety precautions and general laboratory procedures.

Please be aware of the following rules:

- Tardiness, cell-phone use, leaving early, and sleeping during lecture is considered disruptive behavior and will result in a partial or full absence being recorded. Students will need to sign the sign-in sheet within the first 10 minutes of class.
- Fraudulent behavior during exams is graded with a (0) zero. This zero will not be replaced with the final exam score.
- Copying of homework, experimental data, and lab reports is considered fraudulent behavior for both the copier and the originator and points (10-100%) may be deducted from both the copier and the originator. DO NOT HAND IN IDENTICAL HOMEWORK.
- No homework may be handed in after I have returned it or gone over it in class. No alternative homework will be given. I will drop the lowest two homework assignments though.
- No extra credit will be given. You need to work consistently from the beginning.
- Please turn your cell phones onto "silent buzzer" mode during lectures so as not to disturb the class. No cell phones or i-pods will be allowed during exams.

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.

With this statement on my course syllabus, I am referring each of my enrolled students in need of academic support to tutorial services. Referral reason: Mastering the content, study skills, and basic skills of this course is aided by the use of trained peer tutors

CHEM 3A Spring 2020 - Cornel and Naito

Week	**Dates**	**Lectures**	**Wed Lab**
1	Jan 13-17	Intro, Periodic Table 2.2 Scientific Notation 2.3 Significant Figures and Density	Safety
2	Jan 20-24	**Mon: Martin Luther King Day** 3. Matter, Physical and Chemical Changes Temperature Conversions	Lab 3. Density of liquids and solids
3	Jan 27-31	2.6 Dimensional Analysis and Measurements 4. Atoms, Elements and Ions	Lab 1: Properties and changes of matter
	Jan 31	**Last Day to add a class, or drop class to avoid a "W"**	
4	Feb 3-7	**Exam 1** 5. Chemical Nomenclature: Ionic Compounds 5. Chemical Nomenclature: Molecules	*Nomenclature worksheet*
5	Feb 10-14	5.11 and 6.1-6.1 The Mole 6.7 Percent Composition 6.8 Empirical Formulas	**Lab Quiz 1 (labs 1, 3, safety and lab equipment)** Lab 4: The Mole
6	Feb 17-21	**Mon: Washington Day** 5. Polyatomic Ions and Hydrates Percent Water in Hydrates	Lab 5: Empirical Formulas of a Compound
7	Feb 24-Feb 28	7.1-7.4 Balancing Chemical Reactions 7.10 Types of Reactions 8. Stoichiometry	Lab 13: Percent water in hydrates
8	Mar 2-6	**Exam 2** 8.6 Limiting Reactants and 8.7 Percent Yield 8. Calorimetry: Energy and Specific Heat Capacity	Lab 8: Alum production from scrap aluminum **Lab Quiz 2 (labs 4, 5, 13)**
9	Mar 9-13	8. Thermochemistry 9. Orbital Diagrams and Electronic configuration	Lab 2: Calorimetry experiment
	Mar 13	**Last Day to drop class with a "W" (letter grades assigned after this date)**	
10	Mar 16-20	9.7, 9.9 and 10.2 Periodic Table Trends 10. Bonding and 10.5 Lewis diagrams 10.7 Geometry	Lab 7 : Reaction Types: Copper Chemistry
11	Mar 23-27	11. Gases 11. Combined Gas law 11. Ideal Gas Law	Lewis diagrams and molecular models
12	Mar 30-Apr 3	**Exam 3** 11. Gas Stoichiometry and Partial Pressure	Lab 9: Production of hydrogen gas
	Apr 6-10	**Spring Break**	
13	Apr 13-17	13. Solutions, Dilutions 14. Acids and Bases 14.6 Titrations	Lab 14: Molar mass of a volatile gas
14	Apr 20-24	10.8 Electronegativity, Polar Bonds and Molecules 12. Liquids, Solids and Intermolecular Forces	**Lab Quiz 3 (labs 2, 7, 8 and 9)**
15	Apr 27-May 1	14. pH 14. pOH	Lab 11: Acid base titration lab, mock practical
16	May 4-8	**Exam 4** 15. Chemical Equilibrium	**Lab practical-acid base titration** (first half of class)
17	May 11-15	17. Radioactivity and Nuclear Chemistry	**Lab practical-acid base titration** (second half of class)
18	**Mon May 18**	**Mon: Final Exam 5-7pm** (Cumulative, counts twice, lowest exam dropped) No lab	