

# Syllabus – CHEM 3A

Fall 2018

## Chemistry 3A: Introductory General Chemistry

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<b>Course No:</b> CHEM 3A (54221)	<b>Lecture:</b> Room PHY-76
<b>Semester:</b> Fall 2018	Tu, Th 5-6:15pm
<b>Instructor:</b> Mrs. Heredia	<b>Lab:</b> Room PHY- 82
<b>E-mail:</b> katie.heredia@reedleycollege.edu	Th 6:30-9:20pm

**Catalog Description:** Composition of matter and physical and chemical changes; fundamental laws and principles; atomic and molecular structure; acid-base theory, redox and equilibria; qualitative and quantitative theory and techniques.

**Prerequisites:** Math 103, Students will need to be familiar with basic algebra before taking this course, as there is a lot of math involved.

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

### *Important Dates*

- August 13 (M) start of Fall semester
- August 24 (F) last day to drop full-term class to get refund
- August 31 (F) last day to register for full-length class or drop to avoid a “W”
- September 3 (M) Labor Day (no classes held, campus closed)
- September 14 (F) last day to change a fall class to/from a Pass/No-Pass grading basis
- October 12 (F) Last day to drop a full-term class
- November 12 (M) Veterans Day (no classes held, campus open)
- November 22-23 (Th-F) Thanksgiving holiday (no classes held, campus closed)
- December 10-14 (M-F) final exams week

### *Materials and Resources*

- **Nivaldo J. Tro: “Introductory Chemistry” 6<sup>th</sup> Edition.** The Mastering Chemistry is required.
- **Safety glasses:** required for lab section.
- **Lab handouts:** It will be posted on Canvas, you are responsible for printing it out and do the pre-lab before the lab period.
- **Scientific Calculator** – Calculator with “exp” (or “EE”) and “log” keys (\$12 at Walmart), but not a programmable calculator or the pink STATS calculator.
- **Access to Canvas & Email** – You will need access to Canvas, all the lecture Power Points, exam study guides, exam answer keys, lab handouts, and important announcements will be posted on Canvas.

## Course Goals – Primary Learning Outcomes

This course will provide students an introduction to general concepts in chemistry. After completing this course, students will be able to:

1. 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;
2. 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;
3. perform unit conversions using the correct significant figures; between the English and metric systems, temperatures in different units, density, energy, and with SI units;
4. use the periodic table to predict physical and chemical properties of elements and calculate molar masses of compounds and molecules;
5. recognize the electromagnetic spectrum and have a basic understanding of the quantum mechanical model of the atom;
6. demonstrate the ability to name inorganic compounds given their formulas, and write formulas given names;
7. 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;
8. distinguish and identify between different types of intramolecular and intermolecular forces of attraction present in various substances based on chemical formulas and structures;
9. write Lewis Electron-Dot Formulas and identify the shape using VSEPR method;
10. 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;
11. calculate, empirical formulas, and percentage composition given the appropriate data;
12. distinguish and balance chemical equations of different types of reactions;
13. perform calculations involving a limiting reagent and determining the percent yield;
14. predict the physical behavior of gases to pressure, temperature, and volume changes;
15. solve simple mathematical problems involving formula calculations related to gas laws;
16. use gas laws and stoichiometry to calculate quantities (e.g. moles, volume, grams) of gas produced or consumed during a reaction;
17. calculate various parameters of solutions including molarity, dilution techniques, percentage concentration, and density.
18. construct heating and cooling curves;
19. describe state and energy changes accompanying heating and cooling curves;
20. apply the principles of equilibrium in reversible reactions, saturated solutions, solutions of weak electrolytes and solutions of gases in solving related problems;
21. use solution properties and stoichiometry to calculate quantities (e.g. moles, volume, grams) produced or consumed during a reaction;
22. describe colligative properties of solutions (e.g. boiling point elevation, freezing point depression, and osmotic pressure);

23. define and identify acids and bases and be able to perform math calculations involving the pH;
24. determine the nature and applications for electron exchange reactions;
25. understand the structure of the atomic nucleus;
26. understand the fundamental types of nuclear radiation and the effects they have on biological systems
27. 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.

### *Safely conduct laboratory experiments implementing concepts and principles learned in lecture. How To Do Well In This Course*

*The class expectation is that students spend 2-3 hours per unit per week of time outside of class. Just because you put in the time will not guarantee that you get the grade you want, but if you are unable to allocate **5 hours between** each class outside of class and lab times, it is very unlikely that you will do well in the course. The following suggestions include ideas on how you can use this time effectively.*

**Prerequisites** – *This course assumes that you are competent at algebra and pre-calculus mathematics.* If you are taking this course without these prerequisites you are starting at a disadvantage and will need to allocate significantly more time early in the course to catch up on these concepts.

**Allocate Time To Study Outside of Class** – Set aside regular time each day to spend on the material.

**Prepare by Reading Before Class** – My lectures are not a substitute for reading the textbook. Take time before class to read the assigned sections of the textbook, work through examples embedded in the textbook, read the chemical skills section at the end of the chapter and complete the Self Assessment quiz at the end of the chapter.

**Lecture Attendance** – Lecture is an opportunity to begin practicing how to use the concepts to solve problems, to ask questions about concepts you don't understand, and to learn what I think is most important and how I think about the subject. Take advantage of this time.

**Laboratory Attendance** – Laboratory attendance is absolutely mandatory. Unexcused absences from lab are the most common reason that students receive an F in this course. The development of laboratory skills is an important part of this course.

**Keep Up** – As this class progresses we will be building on ideas and concepts we covered earlier in the course. For this reason, it is imperative that you do not fall behind, otherwise nothing new will make sense and it will be difficult or impossible for you to catch up.

**Get Help When You Need It** – If you are struggling with this material there is plenty of help available. Get help right away rather than waiting for a more convenient time. Waiting will make it harder to understand the next concept and the concept after that. Before you know it you will be in over your head.

## Course Policies

### Grading

Mastering Chemistry Homework	15%
Laboratory	25%
4 Exams	40%
Final Exam (comprehensive, required)	15%
Participation	5%

The letter grades assigned at the end of the course will be based on your cumulative points as follows:

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

#### *Mastering Chemistry Homework*

We will be using the Mastering Chemistry online homework system for this course. The homework **MUST** be accessed through blackboard.

Your effort reading the textbook and completing the assigned homework is critical to your understanding the concepts and being able to do the problems you will encounter on exams. Late assignments are penalized 10% for each day they are late with a maximum 50% reduction. Missed assignments can be completed anytime for 50% credit until Dec 9<sup>th</sup>.

#### *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, without contacting the instructor with a valid excuse, they will also be dropped. If you miss a lecture you need to read and summarize the chapter in the textbook **before** meeting with the instructor to discuss any problems. 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".

#### *Exams*

There will be four 60-minute midterm exams. Each exam will be cumulative of all material covered in the lecture, laboratory, reading, or homework portions of the course. **There will be no make-up exam** for any reason; the final exam grade will count as an exam and will also be used to replace the missing exam (only one 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.

### *Participation*

Participation is NOT just attendance. You will have 100 participation points to begin with. One absence counts as a 5-point penalty (the first 2 absences will NOT affect you but the third one will). Class participation is needed for full credit. (Answer questions, group work, working out problems on the board...) Five points are deducted each time for not participating, correct answer is not required.

### *Subject to Change Statement*

This syllabus and schedule are subject to change at the instructor's discretion in the event of extenuating circumstances. If you are absent from class, it is your responsibility to check on announcements made while you were absent.

### *Classroom expectation*

- 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 highest exam score.
- Copying of homework, experimental data, and lab reports is considered fraudulent behavior. Points (10-100%) may be deducted from both the copier and the originator.
- 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, ipads or other electronic devices 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.

Week	Dates	Lectures	Thursday Lab
1	Aug 13-17	Intro, Periodic Table 2.2-3 Scientific Notation & Significant Figures	Safety Check into lockers
2	Aug 20-24	2.6 Dimensional Analysis and Measurements 3. Matter, Physical and Chemical Changes 4. Atoms, Elements and Ions	Exp 3. Density of liquids and solids
3	Aug 27-Aug 31	5. Chemical Nomenclature: Ionic Compounds 5.11 and 6.1-6.1 The Mole	Exp 1: Properties and changes of matter
	Aug 31	<b>Last Day to drop class to avoid a "W"</b>	
4	Sept 3-8	<b>Tues: Exam 1</b> 5. Chemical Nomenclature: Molecules 5. Polyatomic Ions and Hydrates	Exp 4: The Mole
5	Sept 10-14	6.7 Percent Composition 6.8 Empirical Formulas Percent water in Hydrates	<b>Lab Quiz 1 (labs 1, 3, safety and lab equipment)</b>
6	Sept 17-21	7.1-7.4 Balancing Chemical Reactions 7.9-7.10 Types of Reactions 7.7 Net Ionic Equations, Electrolytes	Exp 5: Empirical Formulas of a Compound
7	Sep 24-28	8. Stoichiometry 8.6 Limiting Reactants and percent yield	Exp 13: Percent water in hydrates
8	Oct 1-5	<b>Tues: Exam 2</b> 9 Electronic configuration	Exp 7: Reaction Types: Copper Chemistry
9	Oct 8-12	9.7, 9.9 and 10.2 Periodic Table Trends 10. Bonding and Lewis Diagrams 10.7 Geometry	Exp 8: Alum production from scrap aluminum
	Oct 12	<b>Last Day to drop class with a "W" (letter grades assigned after this date)</b>	
10	Oct 15-19	11. Gases 11. Combined Gas law 11. Ideal Gas Law	<b>Lab Quiz 2 (labs 4, 5, 7, and 13)</b> <u>Lewis diagrams and molecular models</u>
11	Oct 22-26	11. Gas Stoichiometry and Partial Pressure 13. Solutions, Dilutions 14. Acids and Bases 14.6 Titrations	Exp 14: Molar mass of a volatile gas
12	Oct 29-Nov 2	<b>Tues: Exam 3</b> 8. Calorimetry	Exp 11 Acid base titration lab, mock practical
13	Nov 5-9	8. Thermochemistry 10.8 Electronegativity, Polar Covalent Bonds and Polar molecules	Exp 2: Calorimetry experiment
14	Nov 12-16	12. Liquids, Solids and Intermolecular Forces 14. pH	<b>Lab Quiz 3 (Labs 2, 8, 11, 14 and Lewis diagrams)</b> Exp 9: Production of hydrogen gas
15	Nov 19-23	14. pOH <b>Nov 22,23 Thanksgiving no class</b>	<b>Thanksgiving no lab</b>
16	Nov 26-Nov 30	<b>Tues: Exam 4</b> 15. Chemical Equilibrium	<b>Lab practical</b> -acid base titration. First half of class. Check out
17	Dec 3-7	16. Oxidation and reduction	<b>Lab practical</b> -acid base titration. Second half of class. Check out
18	Dec 11	<b>Tues, Dec 11: Final Exam 5:00-6:50pm</b>	No lab