

## CHEM 3A: Introductory General Chemistry Spring 2022

**Instructor:** Bill Blanken

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**Office hours will be announced in lab and on Canvas**

**Course Objectives:** Chemistry 3A is an elementary survey course in chemistry including hands on lab work. It is designed to give the student a chemistry background for a wide variety of careers including agriculture, forestry, nutrition, nursing, physical therapy, teaching and other biological and health related fields. It can also serve as a prep course for chem. 1.

**College level algebra or high school chemistry are strongly recommended.** Many students attempt to take CHEM3A without any prior chemistry. This is possible, but it takes a lot of **hard work**. Start seeing a tutor right from the beginning if you're having problems. Students will need to be familiar with college level algebra before taking this course as there is a lot of math and critical thinking involved. I also cannot stress enough the importance of working outside of class in study groups. This can be very helpful to some students. At the minimum, exchange email addresses and phone numbers with other class members to help keep up with what's going on in class throughout the semester.

**Study Recommendations:** Chemistry 3A is a fully transferable college level chemistry course and is treated as such. As a subject chemistry is very challenging, and the generally accepted rule of thumb for study time outside of class is 2 – 3 hours of study for every hour of lecture time. So for chem 3A you need to expect to devote 8 - 10 hours per week. Some students will require more and some less, this is dependent on the individual.

### **Text and Required Materials and Equipment:**

- **Textbook:** Nivaldo J. Tro: “Introductory Chemistry”, 6<sup>th</sup> edition, ISBN-13: 978-0321910295, or whatever the current edition is in the campus bookstore.

**However, in order to save money the 3<sup>rd</sup> and 4<sup>th</sup> and 5<sup>th</sup> editions are acceptable as well.** These can be rented or purchased through Amazon or other retailers. I also strongly recommend that the student purchase or rent the Student solutions manual that goes with the edition of textbook you are using. This will help with homework and studying for exams.

- **Safety goggles and lab coats are required for lab**, these can be purchased at the bookstore, online, or from other students, the ones from Home Depot are \$1.81 <https://www.homedepot.com/p/3M-Clear-Chemical-Splash-and-Impact-Resistant-Safety-Goggles-91252-8002S/203030336>

- You will also need materials to take notes and a basic scientific calculator with “exp” (or “EE”) and “log” keys  
<https://www.walmart.com/ip/Texas-Instruments-TI-30X-IIS-Scientific-Calculator-10-Digit-LCD/1535939?athbdg=L1600>
- You are required to buy an access code to Masteringchemistry.com, this can be purchased bundled with the textbook or purchased by itself, directly from [www.masteringchemistry.com](http://www.masteringchemistry.com)

**Lab work and experiment explanation:** the labs for each lab period will be available on the chem. 3A Canvas site for download. These are to be printed out and read in advance of coming to lab. After carefully reading the lab directions and theory sections, the prelab is to be completed before coming to class. The prelab is worth 30% of the experiment. The prelab will be collected at the beginning of lab after which a quiz may be administered. The grade breakdown for each lab is as follows, 30% for prelab completed correctly, 50% for the experimental work and calculations and 20% for postlab questions. The laboratory notes and calculations must be legible to receive credit, if I can't read it I won't grade it and calculations must be present to receive credit for a numerical answer. Lab work will follow as closely as possible the material discussed in the lectures. The total lab grade is broken down later in the syllabus. Lab periods will also be used to go over lecture content and answer questions pertaining to lecture content including HW. Please refer to the lab schedule to determine which lab will be done during each lab period.

**Laboratory Work:** Lab work will follow as closely as possible the material discussed in the lectures. The student is required to complete all the assigned experiments; 50% of the final lab grade will include the average of the graded lab work. The other 50% of your lab grade is determined by the average of the lab exam and a lab practical, which is a demonstration of your laboratory skill. Please refer to the lab schedule to determine which lab will be done during each lab period. If you know you need to miss a lab, you should try to attend the other lab section during the same week. **No make up labs or make up lab quizzes will be allowed after the week they were assigned, the 2 lowest lab grades will be dropped.**

**Important dates:**

Monday Jan 17 – MLK holiday

Friday Jan 28 – Last day to drop a full-term class without receiving a “W”

Monday Feb 21 - Washingtons holiday

Friday, March 11 – Last day to drop a full-term class with a W.

Final exam week May 16 - 20

See the lab schedule and schedule of courses for additional dates and times

**Online Lecture Content:** since this is a hybrid class there is no in-class lecture. All the lecture content is delivered online. This will consist of narrated Powerpoint lectures, video demonstrations of problem solving and experiments. These will all be available via a link on Canvas. Access to a reliable internet connection is necessary for this class. There are free wifi locations available nearly everywhere, such as the RC campus, Starbucks and McDonalds.

**Homework, Quizzes:** Homework will be assigned for every chapter. It is essential to your success in this chemistry course that you do all the assigned homework and read the relevant chapters in your textbook. The homework is electronic, and can be accessed through the Mastering Chemistry website, using the access code that was included with the textbook if you purchased the textbook new from the bookstore. If you purchased a used textbook, you can purchase an access code at <https://mlm.pearson.com/northamerica/masteringchemistry/>  
There will be no make-up homework assignments, but the first assignment is extra credit.

**Attendance:** Attendance in lab period is mandatory. Students may be dropped if you miss a cumulative total of 2 weeks of class without contacting the instructor. Since we are meeting only once per week this can be two unexcused absences to lab. Do not be late to lab, the door will be locked shortly after the start of class for safety purposes. Attendance is particularly vital during the first 3 weeks of the semester in order to determine course census. If a student is absent twice in the first 3 weeks they will be dropped. Students wishing to be added the course will only be added if space is available without exceeding the course cap.

**Grading and Exams:** There will be **4 exams** throughout the course of the semester and a final exam at the end of the semester. The exams will take place, in person, during the lab period. The 4 exams will be equally weighted, and the lowest score will be dropped, this of course does not pertain to the final exam. **There are no makeup exams.** If for whatever the reason you cannot take the exam the day the rest of the class takes the exam, that exam will be the one that is dropped. The only possible exception to this rule is a valid medical emergency with documentation to verify the medical emergency complete with contact information for the medical personnel who wrote the note. If an exam is missed and a make up is allowed, the make up exam will be different than what the class completed, and the exam will be more difficult. The final exam is a **comprehensive exam** covering all the course content of the semester.

The final grade is calculated as follows:

	<b>Percent of total grade percentage</b>
Laboratory (30%) of total grade	<b>Lab practical, acid/base titration 10%</b>
	<b>Lab reports and experimentation 20%</b>
Lecture Material (70%) of total grade	<b>Exams 30%</b>
	<b>Final 15%</b>
	<b>Homework Assignments 25 %</b>

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

Here is an example in grade calculation. Suppose a student earned a 65, 70, 78, 58 on the four exams and a 69 on the final. They received a 78 for the lab and an 85 for the homework. All the scores are in percent. The 58 would be dropped and the average calculated for those 3 scores 71%. The calculation for the final grade percentage is:

$$\frac{71\%}{100} \times 30 + \frac{69\%}{100} \times 20 + \frac{78\%}{100} \times 25 + \frac{85\%}{100} \times 25 = 76.3\%$$

**Please be aware of the following policies:**

- Although key points of the syllabus and schedule are discussed on the first day of the semester, it is the student's responsibility to be aware of the content of the syllabus.
- Tardiness and leaving early during lecture or lab sessions are considered disruptive behavior and will result in an absence being recorded. Students will need to sign the sign-in sheet within the first 5 minutes of class. If a cumulative total of 2 weeks (2 class meetings) of absences is recorded, the student may be dropped.
- Shortly after the beginning of lecture and lab the door will be closed and locked for safety reasons, do not be late to class or lab as it is disruptive and a safety hazard in lab.
- Course content will also cover current news and events as they pertain to science and chemistry
- Texting in class is discouraged
- Loud disruptive talking or visiting during the lecture is not permissible, and if it occurs the students involved will be asked to leave and will be given an absence for the day.
- Cheating during exams is graded with a zero and will be reported to the Dean of students and other appropriate administration officials. Cell phones are prohibited during exams; if a cell phone is observed during the exam the student will be awarded a zero for the exam and this will not be the exam that is dropped.
- Copying of homework, experimental data, and lab reports is considered fraudulent behavior for both the copier and the originator.
- Turn in lab reports before the end of the lab period.
- Late lab reports will not be accepted.
- Lab materials left at home or in the car etc. will not be accepted after the lab period.
- Homework is through Masteringchemistry.com; No alternative homework will be given.
- **No extra credit will be given except on the exams.**
- Dangerous behavior in the lab will result in the student being asked to leave the lab. Come prepared to lab, this includes lab coats and safety eyewear.
- Please silence your cell phones during lectures so as not to disturb the class. No cell phones or ipods will be allowed during exams.
- A cumulative total of 2 weeks of absences could result in being dropped from the course

**In the lab:**

- **Attendance to the lab is mandatory, coming late will result in the student not being allowed to perform the experiment, coming late is a violation of standard safety protocol.**
- Cleanliness in the lab is very important in preventing accidental contamination. At the end of each lab thoroughly clean work area by disposing of loose paper and wiping countertops. Points will be deducted from experiment if work area is left messy.
- Safety goggles and lab coat are required to be worn whenever somebody near you is conducting an experiment.
- No experiments may be conducted without the instructor or teaching assistant present
- No horseplay or unauthorized experiments. Do not taste any chemical or smell any chemical directly.
- No visitors inside the lab. You need to go outside to meet with them.
- No food or drinks allowed.
- Backpacks should not be left on the floor where others can trip over them.
- Closed toed shoes must be worn in the lab at all times, no sandals.
- Long hair should be tied back so it will not fall into chemicals or flames.
- If any accident occurs in the lab, inform your instructor immediately and follow safety procedures. (To be discussed during first lab period)
- Clean up any spills promptly (Clean-up procedures will be discussed during first lab period)
- Do not point the open end of a test tube towards anybody
- Turn off flames when working with organic solvents. Dispose of them in waste bottles in the fume hood, not down the sink.
- At the beginning of each lab your instructor will inform you of any special safety precautions and how to dispose of used chemicals. You need to be on time for the lab so that you hear these instructions.
- Do not dispose of matches, paper or solid chemicals in the sink. Use the large evaporating dishes for spent matches.
- Put broken glassware in the “broken glassware container”, not with the trash.
- Before leaving the lab, wipe the desktop and wash your hands with soap and water.

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 me as soon as possible.

### Student Learning Outcomes

Student Learning Outcomes are statements about what the faculty expects you will be able to do at the end of the course. This is NOT a guarantee: the ultimate responsibility for whether you will be able to do these things lies with you, the student.

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;
12. identify different types of intramolecular and intermolecular forces of attraction present in various substances based on chemical formulas and structures;
13. define and identify acids and bases and perform math calculations involving pH measurements;
14. explain colligative properties of solutions (e.g. boiling point elevation, freezing point depression, and osmotic pressure);
15. calculate empirical formulas, and mass percentage composition given the appropriate data;
16. explain state and energy changes accompanying heating and cooling curves;
17. recognize the electromagnetic spectrum and explain the basic principles of the quantum mechanical model of the atom;
18. diagram heating and cooling curves;
19. perform unit conversions using the correct significant figures; between the English and metric systems, temperatures in different units, density, energy, and with SI units;
20. understand the structure of the atomic nucleus;
21. explain the fundamental types of nuclear radiation and the effects they have on biological systems
22. predict the physical behavior of gases to pressure, temperature, and volume changes;
23. apply gas laws and stoichiometry to calculate quantities (e.g. moles, volume, grams) of gas produced or consumed during a reaction;
24. perform calculations involving a limiting reactant and determine the percent yield;
25. name inorganic compounds given their formulas, and write formulas given names;
26. complete, identify type and balance chemical equations of reactions;
27. demonstrate laboratory skills which include operating an analytical balance; calibrating and/or use fundamental lab equipment such as a thermometer, barometer, burette, pipette; recognizing use and limitations of laboratory glassware; recording and repo