

## CHEM 105: Introduction to Chemistry

### Course Instructor

Dr. Safa Khan

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|                     |                  |                             |
|---------------------|------------------|-----------------------------|
| <b>Lecture</b>      | Bell Tower 2505  | Mon, Wed & Fri 8:00-8:50 AM |
| <b>Office Hours</b> | Solano Hall 1123 | Wednesday 9:00 - 11:00 AM   |

*I am here to help you, so please visit during office hours or set an individual appointment.*

### Course Description

#### **CHEM 105: Introduction to Chemistry**

2.5 hours lecture per week.

*Prerequisite: A passing score on the Entry Level Mathematics (ELM) Examination*

Introduces the basic principles and concepts in Chemistry. Topics covered include: measurements, units and unit conversion, scientific notation, stoichiometry, atomic structure, the concept of the mole, types of compounds, and problem solving.

*GenEd: B1*

### **Course Student Learning Outcomes**

Students who successfully complete this course will be able to:

- Describe the scientific method and how it is used to approach chemical problems
- Discuss the history of chemistry
- Explain the differences between elements, chemical compounds, ions, salts, and mixtures
- Calculate moles of species, determine limiting reagents, and calculate the yield of a reaction product
- Define acids, bases, pH, and hydrogen-ion concentration
- Discuss how and why acid-base reactions occur
- Explain how and why oxidation-reduction reactions occur
- Determine the energy change in a reaction
- Explain modern atomic theory and molecular structure

### Course Materials

- Textbook - *Introductory Chemistry*, 5<sup>th</sup> ed. by Nivaldo J
- Scientific calculator. It must be able to do logarithmic calculations. **Your phone CANNOT be used in place of a calculator for exams!** Graphing calculators will not be allowing for exams.

Any additional course materials will be made available on Blackboard. All changes to the course schedule will be posted on Blackboard. It is your responsibility to check Blackboard on a regular basis.

### Grading

Your grade for this course will be based on your performance on the below items:

- Quizzes (20 %): Every **Friday** when there is no scheduled exam there will be a quiz. The quiz will cover material based on the reading, weekly assignments and lecture material. **No make-up quizzes will be given**, but the lowest one will be dropped.
- In Class Exercises and Homework (10%): You will be assigned homework from each chapter after every lecture. Unannounced and periodically, I will collect the assigned weekly homework. Typically (not always), the homework will be due one week after given (eg. Homework assigned on Wednesday will be due next Wednesday in class). It is **YOUR responsibility** to check blackboard often for new assignments and remain informed of the deadlines. I will not collect late homework. In order to learn chemistry, you need to work chemistry problems. As a result, most lecture days will have short in class activities/problem solving in order to provide an opportunity to practice applying the topics during class, so students develop a deeper understanding of the subject matter before leaving class. You may use your notes, book, or neighboring classmates to help complete in class exercises. Some of these will turn into homework and some will be collected in class. You are also expected to go through example problems and additional back of chapter problems on your own. The top students always do extra problems. **Please bring a scientific calculator to every class.**
- Three Exams, (50%): Three exams will be given according to the schedule attached. The exam will cover all the class material up to that point and you will have the entire lecture period to work on it. Each exam will emphasize the material in the class periods immediately preceding it, **but they can also be cumulative**. If you miss an exam; a student **will not be given a make-up opportunity for any reason**. An alternative may be given ONLY if the student provides **documentation** for an excused absence (i.e. illness, injury, etc). **No student is permitted to take any exam outside of the scheduled time. The make-up exam will be more difficult, and will include an oral exam section. Plus, your score will not be curved if the main exam is.**
- Final Examination, (20%): **December 11<sup>th</sup>, 8:00-10:00 AM Bell Tower 2505** The final is a **mandatory**, two-hour, cumulative final examination and it will be given during finals week. **You are not permitted to make this up for any reason.**
- Extra Credit (up to 5%): During the duration of the course there will be various opportunities to gain extra credit.

Your grade in the course will be determined by the total number of points you earn out of the points possible. If you fail to complete any of the above assignments, you will receive a zero score on the missing assignment(s). The course is typically set by the average score of the class. The average score will correspond to a C or a 73.5%. If your

score is above or below the average you can estimate your grade based on the chart below. I do not average the class until the end of the semester. If you are falling below average on your quizzes and exams you may be in the failing range.

| <u>Percentage</u> | <u>Grade</u> | <u>Percentage</u> | <u>Grade</u> |
|-------------------|--------------|-------------------|--------------|
| >100              | A+           | 77-79             | C+           |
| 91-100            | A            | 70-77             | C            |
| 89-91             | A-           | 67-70             | D+           |
| 87-89             | B+           | 61-67             | D            |
| 81-87             | B            | 59-61             | D-           |
| 79-81             | B-           | 0-59              | F            |

**Pre-Class Readings**

To keep up with the material it is helpful that you read ahead and get familiar with the subject before each class.

**Academic Dishonesty**

All students are expected to complete assignments in this course as their own work. Plagiarism is defined as to pass off the ideas or words of another as one’s own without crediting the source. If the instructor suspects a student has violated the academic honesty guidelines, she will discuss the apparent violation with the student to provide them with an opportunity to explain the situation. If the instructor feels that Academic Dishonesty has occurred, she will report the matter to the Vice Presidents for Academic Affairs and Student Affairs. Depending on the severity of the offense, the instructor may assign the responsible student a failing grade on the assignment/exam or an overall course grade of an “F”.

**Students Needing Accommodations**

Students who need accommodations are encouraged to contact the Student Services office (437-3331) for assistance.

**Make friends/network:**

To succeed in this course and many others it is very helpful to make friends. In class we will do group activities that will require you to work with others. I recommend you exchange phone numbers and emails with at least 2-3 other students. Study groups are extremely beneficial.

| <u>Name</u> | <u>E-mail</u> | <u>Cell Phone</u> |
|-------------|---------------|-------------------|
| 1.          |               |                   |
| 2.          |               |                   |

### Need Extra-help?

Chemistry is a class where the material builds on itself. If you do not understand a certain concept it can keep returning to haunt you. Do not fall behind! Below are resources for tutoring on campus.

- Aliso Hall, 2<sup>nd</sup> Floor at the open study area. The tutors are chemistry majors and any of them should be able to help you.
- Learning Resource Center: Located at the Broome library. For tutoring schedules check: <http://www.csuci.edu/learningresourcecenter/subjects-schedules.htm>
- El Dorado Hall: This is a great place to study and get help. They have a microwave, sink, computers and lots of tables. For tutoring schedules check: <http://www.csuci.edu/projectacceso/f15bytutor.pdf>

### Class Rules

- ***Phones are NOT allowed in class*** – if you have an emergency and need to be available by cell phone, please see me prior to class. If you are found texting, e-mailing, or messaging, you will receive a “0” for your in class assignment for that day.

*By taking this class, you agree to abide by the rules in this syllabus.*

### How to Succeed in this Class

- ***ALWAYS read the appropriate material in the text BEFORE coming to class!*** *The pace of lecture will likely seem fast if you come to lecture without familiarizing yourself with the material beforehand.*
- ***Review the material from class, immediately (or as soon as possible).*** Don't wait until the exam or quiz. Right after class review the material and problems covered in class. Make sure you understand EVERYTHING. Write down important things to memorize on a single sheet of paper for easy quick review later.
- ***Work problems from the textbook!*** In order to get the grade you want, you need to be willing to put the effort required into the class. You need to work many problems in addition to reading the book and attending lecture to succeed in this class. Do not fall behind on the homework. If you have extra time, do extra problems from the book. The A+ students always do extra problems.
- ***Don't ever let yourself get behind!*** On average, plan to spend at least 10-20 hours per week outside of class working problems. Spend additional time preparing for each test.
- ***Form study groups.*** Learning from each other is an excellent way to succeed in this class (which is part of the reason why the in-class activities exist).
- ***Double (or even triple!) check your work.*** It is very easy to forget to write the units of an answer, or to have the incorrect number of significant figures. Minor point deductions will add up and could affect your final grade. Only the paranoid survive.
- ***Go to office hours or tutoring every week*** to get help on understanding the lecture notes and homework. If you don't have questions, then you are not studying properly.
- ***Before the exam review everything!*** *Check your list of things to memorize, redo problems, quizzes and old exams. Exam time should be review time, not learning the material for the first time.*

### CHEM 105: Semester Schedule

|            |            |   |  |
|------------|------------|---|--|
| <b>Aug</b> | 24         | Introduction and math review  | 1.1-1.5                                |
|            | 26         | Math review continued and the atom <b>periodic table handout</b>  | Ch 4                                   |
|            | 28         | Catch up and begin new material   | 4.1-4.6                                |
|            | 31         | Atomic structure, ions and the p-table  | 4.1-4.6                                |
| <b>Sep</b> | 2          | Isotopes, atomic mass and calculations  | 4.7-4.9                                |
|            | 4          | Catch up and begin new material, <b>quiz</b>  |  |
|            | 7          | <b>Labor Day, Sept 7<sup>th</sup> – No Class</b>  |  |
|            | 9          | Chemical formulas and naming ions, <b>naming handout</b>  | 5.1-5.7                                |
|            | 11         | Naming chemicals and formula mass, <b>quiz</b><br><b>Last day to add or drop via CI Records</b>                   | 5.8-5.11                               |
|            | 14         | Catch up and begin new material   | 2.1-2.5                                |
|            | 16         | Scientific Notation, Sig Figs and Units <b>scientific notation handout</b>  | 2.1-2.5                                |
|            | 18         | Catch up and start new chapter, <b>quiz</b>   |  |
|            | 21         | Unit conversion, dimensional analysis, * <b>density</b>   | 2.6-2.10                               |
|            | 23         | Catch up and review   |  |
|            | 25         | <b>EXAM 1 – Sept 25<sup>th</sup></b>  | <b>1, 2.1-2.5, 4, 5</b>                |
|            | 28         | Matter and Energy   | 3.1-3.8                                |
|            | 30         | Phys/chem. changes, temperature and heat capacity<br><b>(Note: Chapter 1-5 are on the placement exam for 121)</b> | 3.9-3.12                               |
|            | <b>Oct</b> | 2   | Catch up and new material, <b>quiz</b> |
| 5          |            | The Mole: atomic number, grams, molecules, introduce molarity (Chapter 13.6)                                      | 6.1-6.5, 13.6                          |
| 7          |            | Continue Chapters 6 and 13  | 6.1-6.5, 13.6                          |
| 9          |            | Catch up and new material, <b>quiz</b>  |  |
| 12         |            | Empirical and molecular formulas  | 6.6-6.9                                |
| 14         |            | Empirical and molecular formulas  | 6.6-6.9                                |
| 16         |            | Catch up and new material, <b>quiz</b>  |  |
| 19         |            | Chemical Equations and solubility rules and precipitation reactions, <b>solubility handout</b>                    | 7.1-7.5                                |
| 21         |            | Catch up and review   |  |
| 23         |            | <b>EXAM 2 – Oct 23<sup>rd</sup></b>   | <b>2.6-2.10, 3, 6, 13.6</b>            |
| 26         |            | Chemical Equations continued  | 7.1-7.5                                |
| 28         |            | Chemical equations, reaction types acid/base and gas evolution  | 7.7-7.10                               |
| 30         |            | Catch up and new material, <b>quiz</b>  |  |
| <b>Nov</b> | 2          | Chemical equations and Redox (16.1-16.5)  | 7.7-7.10, 16                           |
|            | 4          | Relationships from chemical equations, mole to mole, mass-to-mass, volume to volume conversions                   | 8.1-8.4, 13.8                          |
|            | 6          | Stoichiometry continued, <b>quiz</b>  | 8.1-8.4, 13.8                          |
|            | 9          | % yield, Limiting and Excess Reagent, Enthalpy  | 8.5-8.6                                |

|     |    |   |              |
|-----|----|---|--------------|
| Nov | 11 | Vetran's Day Nov 11 – No Class                                |              |
|     | 13 | Catch up and new material, quiz                               |              |
|     | 16 | The Electromagnetic Spectrum and Atomic Models                | 9.1-9.4      |
|     | 18 | Electron Configuration and periodic trends                    | 9.5-9.9      |
|     | 20 | Catch up and review, quiz                                     |              |
|     | 23 | EXAM 3 – Nov 23 <sup>rd</sup>                                 | 7, 8, 9.1-9. |
|     | 25 | Writing Lewis Structures and resonance                        | 10.1-10.6    |
|     | 27 | Thanksgiving Holiday Nov 27 – No class                        |              |
|     | 30 | Writing Lewis Structures and resonance continued              | 10.1-10.6    |
| Dec | 2  | Exceptions and Molecular Shape Electronegativity and Polarity | 10.7-10.8    |
|     | 4  | Catch up, quiz  |              |
|     | 7  | Review  |              |
|     | 9  | No Class – Finals Week  |              |
|     | 11 | FINAL EXAM Dec 11, 2015 at 8:00 – 10:00 AM                    | Everything   |

**Disclaimer:** *This syllabus is a “work in progress” and is therefore subject to change. It is the student’s responsibility to remain informed about alterations in course structure/ content/ assignments. All changes will be posted on Blackboard.*