FOOTHILL COLLEGE

Chem25: Fundamentals Of Chemistry, Fall, 2017

Lec (TTh 5:30 - 7:20pm; Rm. 4502), Lab (TTh 7:30 - 10:20pm; Rm. 4812)

Prerequisites: Satisfactory score on the mathematics placement test or MATH 105 or 108. Proficiency in understanding verbal instructions in English is essential for success in the lab.

Advisory: Concurrent enrollment in ESLL 25 or ENGL 209; UC will grant transfer credit for a maximum of one course from the following: CHEM 25, 30A or 30B.

Grade Type: Letter Grade, the student may select Pass/No Pass

Not Repeatable.

FHGE: Natural Sciences Transferable: CSU/UC

4 hours lecture, 3 hours laboratory. (84 hours total per quarter)

Instructor: Ashok Sinha, Ph.D. Website: SinhaInstitute.com/FH_Chem25.php	Email: asinha071@yahoo.com Office Hours: TTh 4:20-5:20pm, Rm. 4431

1. **Student Learning Outcomes -**

Students will be able to recognize basic patterns of chemical reactivity, express reactions in terms of balanced equations and be able to determine quantities of reactants and products in terms of moles, mass and volumes of solutions.

The students will be able to use dimensional analysis to set up and solve numerical problems.

The students will understand the meaning and uses of the mole and of Avogadro's number.

The students will be able to identify physical and chemical properties and change

2. Course Description

The course includes basic chemical laboratory techniques and methods, a survey of important chemical principles with emphasis on problem solving, and a description of the elements and their compounds. This is a 5 unit introductory course, intended for students who wish to meet general educational requirements in physical science or need background preparation for Chem1A. This class meets for four hours lecture, one hour lecture-laboratory, two hours laboratory every week.

3. Chem25 Learning Objectives

By the end of this quarter, you will be able to:

A. Understand the scientific method and distinguish between a theory and a scientific law.
B. Report the correct number of significant figures in measured and calculated quantities.
C. Use dimensional analysis to set up and solve numerical problems.
D. Classify matter and describe the properties of matter.
E. Understand and apply the fundamental assumptions of Dalton's atomic theory and describe the structure of the atom.
F. Use the periodic table to explain and predict the properties of elements.
G. Interpret chemical formulas and write the names and formulas for ionic compounds, molecular compounds, and acids.
H. Understand the meaning and uses of the mole and of Avogadro's number.
I. Write, balance, and classify chemical equations and recognize patterns of chemical reactivity to predict the products of a chemical reaction.
J. Perform stoichiometry calculations and understand the concept of a limiting reactant.
K. Understand the basis of the gas laws and derive the gas laws from the ideal gas law.
L. Describe the properties of solids and liquids and understand the manifestations of intermolecular forces.
M. Describe the properties of solutions and define and use molarity in calculations.
N. Describe the properties of acids and bases and understand the basis of the pH scale.

4. Required Materials for Lecture and Lab

- Tro, Introductory Chemistry, 5th Edition ((Hard copy or etext, 4th edition also ok)).
- Mastering Chemistry: An online access code for the 5th edition is required by the first weekof class. Codes can be purchased with the text or separately at www.masteringchemistry.com. Our course ID is discussed below.
- Lab Manual: Fundamentals of Chemistry, Chemistry 25 Foothill College (bookstore only, 2nd edition)
- Supplies: Safety Goggles/Visorgogs**,** **non**-graphing scientific calculator, Scantron forms (bookstore)

5. Grading

Grading will be based upon three midterm exams, a comprehensive final, online homework, online prelab assignments, laboratory experiments, reports and subjective points. When computing course grades, each student's overall percentage will be determined from the following:

3 Midterms (3x15%)	45%
Comprehensive Final	25 %
Online Homework	12%
Lab experiment & report	10 %
Online Prelab Assignment	6%
Subjective	2%
Total	100%

You will NOT receive a passing grade if you FAIL the Lecture or Laboratory section of the course!

Letter grades will be assigned on a percentage scale as shown

Letter Grade	A+ ≥ **97%**	A ≥ **93%**	A- ≥ **90%**	B+ ≥ **87%**	B ≥ **83%**
	B- ≥ **80%**	C+ ≥**75%**	C ≥**68**±1**%**	D ≥ **60%**	F < **60 %**

The final cut-off percentages will be determined after all points for lecture and laboratory have been totaled.
Tests will consist of mix of short question, multiple-choice question and/or true/false types. Students should bring their own calculator, pencil eraser and scantron papers (form no 882-E) for the tests. Students must use pen for writing their lab reports. They may use pen eraser if they need.

6. **Lecture Content and Recommended Text Problems:** Do these text problems first **before** working on Mastering Chemistry online home works. (Answers for the text problems are in the book.)

Text Coverage	Key Concepts	Recommended Text Problems
chapter 1 all sections	the scientific method success in chemistry	7, 9, 13, 19
chapter 2 all sections	units of measurement significant figures dimensional analysis	1, 9, 17, 29, 31, 33, 41, 45, 49, 53, 55, 57, 63, 65, 69, 73, 81, 85, 89, 95, 99, 101,115

chapter 3 all sections	classification of matter properties of matter temperature and heat	13, 15, 35, 39, 41, 45, 49, 51, 61, 77, 79, 81, 85, 99, 101, 113, 116
chapter 4 all sections	atomic structure the periodic table ion formation	18, 21, 25, 33, 35, 47, 53, 65, 69, 75, 77, 81, 89, 91, 97, 99, 105, 113
chapter 5 all sections	classification of compounds chemical formulas nomenclature	1, 7, 9, 13, 25, 39, 45, 49, 51, 53, 55, 59, 61, 65, 69, 71, 73, 75, 79, 81, 85, 87, 95, 97, 99
chapter 6 all sections	the mole molar mass empirical formulas	1, 3, 5, 11, 13, 21, 25, 33, 41, 51, 55, 63, 67, 75, 85, 89, 93, 99, 103,111, 117, 126
chapter 7 all sections except 7.7 and 7.9	balancing chemical equation aqueous reactions classification of reactions	3, 5, 11, 25, 33, 39, 47, 49, 53, 57, 59, 63, 65, 79, 81, 83, 89, 93, 103, 105, 109
chapter 8 except section 8.7	stoichiometry limiting reactant percent yield	3, 5, 7, 9, 11, 13, 19, 23, 29, 39, 41, 49, 55b, 57b, 59, 61, 65, 77, 89
chapter 13 all sections except 13.9, and 13.10	properties of solutions molarity solution stoichiometry	1, 3, 13, 14, 15, 23, 31, 39, 63, 73, 75, 81, 91, 93, 117, 133
chapter 14 all sections except 14.10 & 14.11	properties of acids and bases acid-base titration the pH scale	9, 11, 12, 15, 17, 19, 23, 33, 35, 37, 39, 49bc, 53, 55, 71, 73, 75, 87, 117, 123
chapter 11 all sections	kinetic molecular theory gas laws gas stoichiometry	1, 4, 25, 33, 39, 45, 49, 53, 61, 69, 75, 85, 95, 99, 101, 105, 107, 119, 121
chapter 12 all sections except 12.6 and 12.7	properties of solids and liquids intermolecular forces changes of state	1, 3, 13, 15, 21, 33, 43, 45, 53, 55, 85, 89, 101

Mastering Chemistry Online Homework due dates: (Mastering Chemistry course id's shown in the next section below):

Assignment	**Due Date**	**Assignment**	**Due Date**
MC Fundamentals	09/30/17 at 11:59pm	Chapter 8	11/27/17 at 11:59pm
Chapters 1 and 2	10/16/17 at 11:59pm	Chapters 13	11/27/17 at 11:59pm
Chapter 3	10/16/17 at 11:59pm	Chapters 14	11/27/17 at 11:59pm
Chapter 4	10/16/17 at 11:59pm	Chapter 11	12/13/17 at 11:59pm
Chapter 5	11/08/17 at 11:59pm	Chapter 12	12/13/17 at 11:59pm
Chapters 6 and 7	11/08/17 at 11:59pm		

7. Homework

In this course you will be using MasteringChemistry®, an online tutorial and homework program that accompanies your textbook.

What You Need:

- ✓ **A valid email address**
- ✓ **A student access code**
  (Comes in the Student Access Code Card/Kit that may have been packaged with your new textbook or that may be available separately in your school's bookstore. Otherwise, you can purchase access online at www.masteringchemistry.com.)
- ✓ **The ZIP or other postal code for your school: 94022**
- ✓ **A Course ID: FHCHEM25FALL17SINHA6 (Tue Lab)**
  FHCHEM25 FALL 17SINHA7 (Thursday Lab)

1. Register

- Go to www.masteringchemistry.com and click **Students** under **Register**.
- To register using the student access code inside the MasteringChemistry Student Access Code Card/Kit, select **Yes, I have an access code**. Click **Continue**.

  –OR– *Purchase access online*: Select **No, I need to purchase access online now**. Select your textbook, whether you want access to the eText, and click **Continue**. Follow the on-screen instructions to purchase access using a credit card. The purchase path includes registration, but the process is a bit different from the steps printed here.
- **License Agreement and Privacy Policy:** Click **I Accept** to indicate that you have read and agree to the license agreement and privacy policy.
- Select the appropriate option under "Do you have a Pearson Education account?" Continue to give the requested information until you complete the process. The **Confirmation & Summary** page confirms your registration. This information will also be emailed to you for your records. You can either click **Log In Now** or return to www.masteringchemistry.com later.

2. Log In

- Go to www.masteringchemistry.com.
- Enter your Login Name and Password and click **Log In**.

3. Join Your Instructor's Online Course and/or Open Self-Study Resources

Upon first login, you'll be asked to do one or more of the following:

- **Join a Course** by entering the **MasteringChemistry Course ID** provided by your instructor. If you don't have a Course ID now, you can return to join the MasteringChemistry course later. When you join a course, you may also be asked for a Student ID (follow on-screen instructions).
- **Explore the Study Area** or **Launch Your eText**, if these resources are available for your textbook.

To Access MasteringChemistry Again Later

Simply go to www.masteringchemistry.com, enter your Login Name and Password, and click **Log In**.

After you have joined a course: You can open any assignments from the **Assignments Due Soon** area or from the **Assignments** page. For self-study, click **eText** or **Study Area**, if these options are available.

Support

Access Customer Support at http://www.masteringchemistry.com/support, where you will find:

- System Requirements
- Answers to Frequently Asked Questions
- Additional contact information for Customer Support, including Live Chat

8. Rules of Conduct

- All students attending the class must be officially registered to sit in the class.

- Students with disabilities will be accommodated by the Disabled Student Office. Please contact your instructor for additional help you may need or difficulties you are encountering.

- Attend lectures regularly. Lectures provide an opportunity to ask questions and help to direct study of the textbook for exams. Repeated absences from lecture typically lead to poor performance. Many problems similar to the ones discussed in the class show up in the exam.

- **No make-up exams will be given**. Please make sure to attend regular exams.

- **Dropping the class is student's responsibility and you must drop by the stipulated deadline. No request to drop the class after that deadline (Friday, Oct 6, 2017, drop with a W) will be allowed.** A student should drop the class officially; otherwise the student would be assigned an "F" grade – no exceptions.

- If you miss two consecutive weeks of labs without any valid reasons, you will be asked to drop the class.

- Academic integrity: It is your responsibility to understand what constitutes academic dishonesty in accordance with the Foothill College Academic Honor Code (www.foothill.edu/services/honor). If you are caught cheating or plagiarizing at any time, then your violation will be reported and you may be dropped from the course. **In this course, cheating includes using data/results or discussion question responses from lab reports of former students**.

- Please practice common courtesy during lecture. Be prompt, turn off your cell phone or pager, and save any comments or questions for relevant discussion with the entire class. Save your snacks/lunch for breaks.

- Prepare for class in advance. You'll make the most of lectures and save everyone time during question/answer periods if you review the chapter briefly before class.

- Take advantage of office hours for clarification of ideas and/or discussion of specific questions. Schedule a private meeting (via email) if needed. Suggestions or concerns are welcomed during office hours as well.

- Chemical Disposal: As a concern for the environment, proper chemical disposal is essential. Students who do not comply with directed procedures may be dropped from the course for repeated offenses. Check with the lab instructor for specific directions.

9. Foothill College views disability as an important aspect of diversity, and is committed to providing equitable access to learning opportunities for all students. Disability Resource Center (DRC) is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations

• If you have, or think you have, a disability in any area such as, mental health, attention, learning, chronic health, sensory, or physical, please contact DRC to arrange a confidential discussion regarding

equitable access and reasonable accommodations.

- If you are registered with DRC and have accommodations set by a DRC counselor , please use Clockwork to send your accommodation letter to your instructor and contact your instructor early in the quarter to review how the accommodations will be applied in the course.

Students who need accommodated test proctoring must meet appointment booking deadlines at the Testing Center.

- Exams must be booked at least three (3) business days/weekdays in advance of the instructor approved exam date/time.
- Finals exams must be scheduled seven (7) business days/weekdays in advance of the instructor approved exam date/time.
- Failure to meet appointment booking deadlines will result in the forfeit of testing accommodations and you will be required to take your exam in class.
- Contact the DRC if you cannot find or utilize your MyPortal Clockwork Portal

- DRC strives to provide accommodations in a reasonable and timely manner, some accommodations may take additional time to arrange. We encourage you to work with DRC and your faculty as early in the quarter as possible so that we may ensure that your learning experience is accessible and successful.

DRC Location: Building 5400, Student Resource Center
Phone: 650-949-7017
On the web: http://www.foothill.edu/drc/
Email: drc@foothill.edu

10. **LABORATORY SYLLABUS**

LABORATORY LECTURE:
The beginning of each laboratory session is designated as a laboratory lecture period for which you must be on time in order to perform the scheduled experiment. In addition to arriving to class on to, you are also required to:

- Read and understand both the background information and the procedure BEFORE coming to the laboratory
- Complete the online prelab assignment prior to class time

The instructor will use this lecture period to outline important details of the procedure, overview theory and calculations, and emphasize safety hazards and proper chemical disposal. If you repeatedly fail to comply with the procedures for proper chemical disposal, then you will be dropped from this course.

LABORATORY EXPERIMENTS:
Scheduled experiments are conducted in Lab 4812 following the laboratory lecture time.

LABORATORY CHECK-IN:
Lab check-in is on the 1st day of the class. If you drop this course, then ***you*** must arrange to check-out with the instructor to get your deposit back ***before Finals Week***. You must be present in the lab check-out date to check out of the lab. Failing to do so will result in 20% reduction of your total lab points.

LABORATORY SAFETY AND PREPARATION:
Laboratory safety will be discussed in the mandatory first lab session. It is expected that you put safety first in the laboratory, and if you deliberately neglect the directed safety rules, then you will be dropped

from this course. *Any student who is absent and does not make arrangements to attend another lab session the first week will be dropped from the class.*

A safety exam will be given the second lab session, which must be passed with a grade of 85% or higher to remain in the class.

For your protection, safety goggles or visorgogs with indirect ventilation and an ANSI minimum rating of Z87 must be worn AT ALL TIMES in the laboratory. Appropriate clothing and shoes are also required.

LABORATORY PRELAB:
The prelab assignments are completed online using Mastering Chemistry and are be due BEFORE laboratory lecture. There will be NO MAKE-UP EXPERIMENTS. The lab questions will be part of the integrated exams that you will take during the quarter.

SUBJECTIVE EVALUATION:
A subjective laboratory evaluation will be assessed by the instructor at the end of the quarter to reward your preparedness for lecture and laboratory sessions, your ability to follow both written and verbal instructions, your adherence to the safety rules, your cleanliness practices, and your overall respect for the laboratory through the proper care and use of all laboratory equipment.

You must pass the lab portion of the class ($\geq$68%) in order to receive an overall passing grade.

11. CHEM 25 SAFETY QUIZ STUDY SHEET

HANDLING CHEMICALS SAFELY:
Why should you pour from smaller containers versus larger ones?

How do you safely smell a chemical?

Do you place unused or excess chemicals back into their containers? Why?

What should you do if you spill a chemical?

When should you work in a fume hood?

BUNSEN BURNER AND GLASSWARE SAFETY:
Why do you check the gas hose for cracks?

When using a Bunsen burner, what color/shape indicates a hot flame? What color flame is never used in the
laboratory? Why?

When using a Bunsen burner, what indicators tell you to immediately stop the flow of gas?

Why is it important to check glassware prior to heating for cracks and stars in the glass?

How do you safely heat a chemical in a test tube using a Bunsen burner?

DRESSING FOR SAFETY:
What type of shoes should you wear in the laboratory? Why?

Why should you not wear contact lenses in the laboratory?

What are you required to wear to protect your eyes in the laboratory? When is it okay to remove your eye protection in the laboratory?

BEHAVIOR IN THE LABORATORY:
Why is horseplay not tolerated in the laboratory? Do food and drinks belong in the laboratory?

Where do your personal items (backpack, jacket, purse, etc.) belong in the laboratory? Why?

Is it ever okay to sit on the laboratory bench?

EMERGENCY EQUIPMENT:
Who do you notify in the event of an accident? What kinds of accidents do you expect may occur in the laboratory?
Where do you go and for how long do you stay if a toxic chemical spills onto your body? into your eyes?

What is the best, immediate solution if your clothes catch on fire in the laboratory? How can you avoid this emergency?

Based on the incident with the Twinkie in the video, what should you do to your lab bench before leaving the lab each day (and what do your hope the person before you did?)?

KNOW YOUR WAY AROUND THE LAB: Be able to locate the following features in the lab

- Waste disposal: broken glass container and location for waste disposal from experiments
- Community drawers for clamps, beaker tongs, Bunsen burners, ring stands, lost and found, etc
- Safety shower and eye wash
- De-ionized water tap and squeeze bottles

12. Tentative Schedule: CHEMISTRY 25; Fall 2017

Week of	T Lecture Session 5:30-7:20pm; Rm.4502	Th Lecture Session 5:30-7:20pm; Rm.4502	T/Th Laboratory Session 7:25-10:20pm; Rm.4812
Tuesday, Sept 26 (1)	Syllabus, Ch.1 & 2	Ch.2 (Significant Figures)	Laboratory Safety; Check-In, Lab 0: Introduction to the Lab: Measurements, Uncertainty and Sig. Figures **(Attendance mandatory)** Bring scantron for safety test next wk.
Tuesday, * Oct 3 (2)	Ch.2 (Dimensional Analysis) and 3 (Matter & Energy)	Ch.3 (Matter & Energy) *Fri: DROP FOR REFUND*	**Mandatory Safety quiz** (Bring scantron) Lab 1: Investigating Density (Online Prelab Due) Lab reports due next Mon/Th
Tuesday, Oct 10 (3)	Ch 4 (Atoms & Elements)	Ch.4, Ch5 (Molecules & Compounds)	Lab 2: Separation of a binary Mixture (Online Prelab Due)
Tuesday, ** Oct 17 (4)	***Integrated Exam1 (Ch 1, 2, 3, 4)***	Ch.5, Ch 6 (Chemical Composition)	Lab 3: MISC 629: Nomenclature (Ch 5)

Tuesday, Oct 24 (5)	Ch.6, 7 (Chemical Rxn.)	Ch.7, Review	Lab 4: ANAL 605: Percent Water (Online Prelab Due)
Tuesday, Oct 31 (6)	Chap. 8 (Quantities in chemical Rxns) (Not 8.7)	Ch.8 (Quantities in Chem. Rxns) (Not 8.7)	Lab 5: STOI 633: Determining Empirical Formula (Online Prelab Due)
Tuesday, Nov 7 (7)	Ch.13 (Solutions) (Not 13.9-10)	***Integrated Exam2 (Ch 4, 5, 6, 7)***	Lab 6: Classifying Chemical Reactions (Online Prelab Due)
Tuesday, *** Nov14 (8)	Ch.13 (Solutions) Ch. 14 (Acids & Bases)	Ch. 14 (Acids & Bases) (Not 14.10-11)	Lab 7: ANAL 625: Titration of Fruit Juice (Online Prelab Due)
Tuesday, Nov 21 (9)	Ch. 14 (Acids & Bases) (Not 14.10-11)	Ch.11 (Gases)	No Lab; ***Thanksgiving Holiday***
Tuesday, Nov 28 (10)	***Integrated Exam3 (Ch 7, 8, 13, 14,)***	Ch.11 (Gases)	Lab 8: Gas-forming reaction (Online Prelab Due),
Tuesday, Dec 5 (11)	Ch.12 (Liquid & Solid) (Not 12.7)	Ch.12 (Liquid & Solid) (Not 12.7) Catch up & Review	Lab 9: Equilibrium Demo (Online Prelab Due) Lab Drawer **Check-out**
Tuesday, Dec 12 (12)	**Comprehensive Final Exam** (Tue, Dec 12; 5:30pm – 7:30pm) ***(Ch 1,2,3,4,5,6,7,8,11, 12, 13,14)***		**No Lab on final week.**

* Last day to drop without a grade (Oct 6) **Last week for Pass/Fail (Oct 20) ***Last week to drop with a W (Nov 17)