CHM 1010 - GENERAL CHEMISTRY I
Professor Sinex

Course Website: http://academic.pgcc.edu/~ssinex/chm101.html

Office: Chesapeake Hall Room 100G
Office Hours: _____
Phone: 301-341-3023
E-mail: ssinex@pgcc.edu

Required Materials for Course:

- Silberberg (2007), **Principles of General Chemistry**, 1st edition, McGraw-Hill
- Gage, Sinex, and Basili (2003), **Exploring the Chemical World: CHM 101 Laboratory and Classroom Activity Manual** (PGCC) Online at http://academic.pgcc.edu/psc click on student resources
- TI-83 or 83 Plus (or TI-84) Graphing Calculator (others are usable but instructions are ON YOUR OWN!)
- Package of graph paper **(at least 10 blocks per inch)**
- Metric ruler (30 cm long)
- Colored pencils (at least 5 different colors)

Course Objective and Some Good Common Sense:
The overall objective is to provide the student with an introduction to general chemistry and the processes of scientific thinking. We will do this by guided-inquiry, where YOU will perform an activity in the laboratory or classroom, and then we follow it with discussion. We do a minimum amount of lecturing. YOUR instructor is your guide to the topics and will help YOU to build an understanding of the topics covered. YOU the student MUST do the work! Many of the activities are done in groups. ALL PERFORMANCE LABORATORIES are assessed and done individually. If you have a problem with material, get extra help ASAP! Take advantage of my office hours before and after class. Extra help is available through the Tutoring Center in Bladen Hall Room 107, call 301-322-0478 for information (no charge for this service). Form a study group and study regularly! For other student services – call 301-322-0886.

Your prompt arrival at the beginning of class and constant attendance will be greatly appreciated and beneficial to your success.

Upon successful completion of this course a student will be able to:

- Perform, analyze, and report on a variety of laboratory measurements with appropriate precision and accuracy.
- Collect, process, display, and evaluate data, employing scientific tools such as the graphing calculator, spreadsheet, and appropriate software.
- Explain and analyze the energetics associated with physical and chemical processes.
- Apply the correct chemical symbolism and nomenclature to chemical species and reactions.
- Compare the characteristics and explain the behavior of matter on a microscopic scale; analyze ideal gas systems qualitatively and quantitatively.

- Explain the concepts of chemical reactivity and apply these concepts to various chemical systems; determine the stoichiometry of reactions and apply it to chemical computations.
- Characterize the components and structures of atoms on the basis of historical and modern research; analyze and explain atomic properties on the basis of periodic trends.
- Explain the conditions and forces that govern chemical bonds and apply these concepts to the formation of bonds, electron arrangements and molecular geometries and in describing intermolecular interactions.
- Characterize electrolyte and non-electrolyte solutions; determine the solubilities of solutes and the concentrations of solutions.

Grading:

3 exams at 100 points with possible take-home components		300
4 Out-of-Class Data Analysis Projects at 25 points		100
4 performance laboratories at 50 points		200
(25% of grade is lab work!)		
Comprehensive Final Exam (required)		200
	TOTAL	**800**

Exams in class will last 1.5 hours. Exams will consist of questions and problems on material covered in class. Old exam samples will be posted on the course web pages. You are required to have a graphing calculator for all exams. Take-home components may be part of the hour exams. They would be distributed on Wednesday before an exam and due at the exam on Friday. If you miss getting the take-home, you miss getting the take-home! An activity or discussion will follow each exam. **A two-hour comprehensive final exam is required to be taken at the end of the course**.

No MAKE-UP opportunities are available during the semester. Your grade on the final exam will be substituted for any work that is missed and accompanied with a documented medical or severe personal excuse. **Late projects will be penalized 40% of the grade**, so you start with a "D" if the project is late.

Be considerate to other members of the class.

TURN-OFF cell phones or set to vibrate!

During exams graphing calculators may **not** be passed to another person, and you may **not** leave the room. If you leave, your exam is over.

CHEATING will NOT be tolerated and the greatest possible penalty will be applied. All incidences will be reported to the Vice-President of Student Services.

See Code of Academic Integrity in Student Handbook.

You are responsible for knowing the Code of Conduct in the Student Handbook
See - http://www.pgcc.edu/students.html.

FALL 2009 CHM 1010 LABORATORY AND DISCUSSION SCHEDULE SINEX

Tentative

WEEK	DATE	MONDAY	WEDNESDAY	FRIDAY
1	8/31, 9/2, 4	Introduction **Measurement**	**Measurement** cont. ☑Matter-Nuts and Bolts of It	**Exploration of Surface Area, Volume, and Graphing**
2	9/7, 9, 11	LABOR DAY No Classes	**Kinds of Matter and Separation Techniques**	Discussion (1, 2) ☑Atomic Book-Keeping
3	9/14, 16, 18	**Performance Lab*: Measurements and Separations**	Discussion (2) Naming/Formulas	Modeling data on the Graphing Calculator Review
4	9/21, 23, 25	**An Investigation of Chemical Reactions I**	Discussion on chemical reactions (3, 4, 6.1-6.2)	**EXAM I** ☑Reaction Dynamics
5	9/28, 30, 10/2	**Moles, Molecules, Formula**	**An Investigation of Chemical Reactions II**	Chemical Calculations (3, 4)
6	10/5, 7, 9	**Spectroscopy: A Key to Elemental Identity**	☑The Shape of AO's Discussion (7,8)	**The Ins and Outs of Energy in Systems**
7	10/12, 14, 16	**Performance Lab*: Percent Composition and Graphing**	☑Discovering Periodic Trends	Chemical Bonding with Lewis Dot Structures Discussion (9)
8	10/19, 21, 23	**Behavior of Gases**	☑Investigating the Gaseous State of Matter Discussion (5)	**EXAM II** ☑STELLA Diffusion
9	10/26, 28, 30	**It's All in the Shape**	☑It's All in the Shape II	☑Hybridization
10	11/2,4,6	**Uncovering Properties of Liquids & Solids**	Discussion on molecular geometry (10,11) with review sheet	☑Molecular Structure: How does it influence physical properties?
11	11/9, 11, 13	**Investigating Solutions**	☑IMF: May the Force Be With You! Discussion on IMF's (12)	☑Isomers and Polar Molecules
12	11/16, 18, 20	Discussion on solutions and calculations (13)	☑Crystalline Solids: Models of Their Crystal Structure	**EXAM III** Discussion on solids (12) Last day to withdraw with a "W"

WEEK	DATE	MONDAY	WEDNESDAY	FRIDAY
13	11/23, 25, 27	**Performance Lab*: Lights, Color, Absorption** (done as a group)	THANKSGIVING BREAK NO CLASSES	THANKSGIVING BREAK NO CLASSES
14	11/30, 12/2, 4	**Exploring Acids and Bases**	☑The Power of H^+ Discussion of acids, bases, and salts (4.4,18.1-18.3)	☑Solids, Liquids, Gases, and Solutions:The Influence of Temperature and pressure
15	12/7, 9, 11	More Solutions Discussion (13) Review	**Perforance Lab*: Analysis of Solutions**	
16	12/14	**FINAL EXAM** 12:00 – 2:30pm		

Laboratory activities are given in **BOLD** and are typically on Mondays.

(1) is the chapter in Silberberg – see next page for problem assignments in each chapter.

☑ indicates a handout

*performance labs are **DUE** at the end of the laboratory period!

Success in this course is going to require **you** to put the time in working problems and completing assignments, and studying!

A Google Group for help with assignments and questions in general is being set-up – more in class

Many great student support items can be found on the Physical Sciences and Engineering Department webpage –

http://academic.pgcc.edu/psc

READING AND PROBLEM ASSIGNMENTS:

Chapter:	Reading and Problems:
1	1.14, 1.21, 1.27, 1.31, 1.42, 1.44, 1.46, 1.54,
2	2.23, 2.25, 2.27, 2.29, 2.38, 2.71
3	3.7, 3.36, 3.39, 3.41, 3.43, 3.45, 3.47,3.82
4	4.24, 4.26, 4.36, 4.62
5	5.8, 5.14, 5.18, 5.22, 5.31, 5.44 5.58, 5.60
6	Read 6.1 -6.2 only no problems
7	7.10, 7.16
8	8.20, 8.22, 8.30, 8.35, 8.39, 8.41, 8.45, 8.56
9	9.6, 9.8, 9.10, 9.16, 9.18, 9.28, 9.399.46, 9.48, 9.52, 9.54
10	10.3, 10.5, 10.11, 10.19, 10.32, 10.34, 10.44, 10.51, 10.5310.75
11	Read 11.1 – 11.2 only plus 11.20, 11.39
12	12.4, 12.11, 12.24, 12.28, 12.36, 12.38, 12.52
13	13.2, 13.6, 13.8, 13.12, 13.41, 13.64, 13.66, 13.70
18	Read 18.1 – 18.3 only no problems Acid-base problems 3.71, 3.75, 4.38, 4.40

DATA ANALYSIS PROJECTS

These projects may be done with the graphing calculator or computer spreadsheet programs such as Excel. Handouts will address the analysis of the data and questions to be answered. Each project is worth 25 points. All graphs must be properly done by hand or printed from a computer (see below). **Late projects will be penalized 40% of the grade**, so you start with a "D" if the project is late.

Topic	Project	DUE DATE
General data handling with Excel	**How are the Temperature Scales related?**	
Curve fitting data and judging goodness of fit for a model	**Investigating the Height of a Stack of Cookies**	
Bond energy calculations with Excel	**Reaction Dynamics: The Energetics**	
Vapor pressure data in Excel	**What happens to the vapor pressure of a solvent as solute is added?**	

GRAPHING TIPS

You will need graph paper with at least 10 blocks per inch. When you draw the axes, they should essentially occupy a full sheet of graph paper. Choose your x-axis and y-axis scales to handle all your data. Label the axes clearly with the variable names, units of each variable, and values on the scales. Remember the dependent variable is plotted on the y-axis and the independent variable on the x-axis.

Plot your data points as small symbols (▪, ◦, ♦) and draw a smooth curve through the points that best describes the pattern of the points. Use a ruler if it is a straight line. The limits of the curve are usually the limits of the data. Do not play "connect the dots" with the data points. A proper graph should have a title. If you use a computer program to draw the graphs, it should meet the requirements given above.

How to Learn General Chemistry

You are embarking on a journey of the guided-inquiry mode of instruction for General Chemistry. You will **experience things in the laboratory and/or classroom** where YOU will attempt to figure things out for yourself. Now you do not work alone, as many of the activities are done in groups. Your instructor serves as your guide. Feel free to ask questions at any time; however, don't expect answers! Your instructor will guide you via asking you questions that will direct you towards an answer. This is your job to figure it out! You and your fellow classmates are playing the role of the scientist or chemist in this course. Your instructor is a more experienced fellow scientist, **who will assist you in your learning**. We will ***discover*** many important ideas and relationships along our journey.

After each exploration of a topic we will have a discussion, NOT a lecture. Since you have experience with the topic **you can contribute to a discussion**. At times we will stop and do some problem solving. We use algebra and the graphing calculator to support our learning efforts.

You will learn how science is done by doing science.

Things you need to do:

- BE PROMPT and PRESENT for each and every class! (Inquiry learning is a participation sport; hence be ready for the game!)
- Be prepared for the laboratory activity of the day, do the prelab queries.
- Follow through by answering ALL questions in the activities.
- Be curious and ask questions at ALL TIMES as this is the nature of science.
- Read over the activity after completion and address any post-lab questions.
- Read over your notes from discussion after each day and consult the textbook for further information.
- Work problems assigned in textbook.

Now all of this is going **to take time and effort**. You are going to be **required to think** in this course. You must put time in outside of class time. Study groups are a good way to work! GOOD LUCK and play ball!

Explore the Department of Physical Sciences and Engineering

http://academic.pgcc.edu/psc

- General information and courses
- Links to faculty web pages and their course pages
- Free downloads as pdf files of CHM 1010, CHM 1030, CHM 2010, CHM 2040, PSC 1020, and PSC 1210 laboratory manuals
- Free downloads of instructions as pdf files for using the TI-83 graphing calculator, Excel, and Graphical Analysis with scientific data, RasMol, ChemSketch, PowerPoint, MathType, and links to free software (Adobe Reader, Chime, ChemSketch, MathType, Microsoft Readers), Student Guide to Using Chime, Scientific Data: What do I do with it? and What is it telling me?, and Creating Chime Web Pages in FrontPage
- Career information with links to surrounding transfer institutions
- Links to Library Research site and Tutoring Center