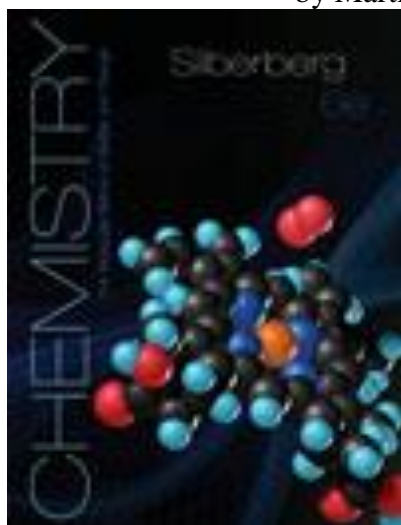


<b>CHM 2045</b>	<b>General Chemistry</b>	<b>Fall 2014</b>
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Class Period	Instructor	Office	Office Hours
MWF 6 <sup>th</sup> MWF 7 <sup>th</sup> MTR 9 <sup>th</sup>	Mitchell	CLB 214 Just upstairs	Office phone 392-0517 jamitchell@chem.ufl.edu
			M W F 8 <sup>th</sup> period TR 6 <sup>th</sup> , 7 <sup>th</sup> , and 8 <sup>th</sup> periods  Subject to change but will announce
			TR 8 <sup>th</sup> period will end early at 3:30

**TEXTBOOK: Chemistry: The Molecular Nature of Matter and Change (6<sup>th</sup> Edition)**  
by Martin Silberberg (McGraw-Hill)



**INFORMATION:** CHM 2045 and CHM 2045L constitute the first semester of the two term sequence of General Chemistry, CHM 2045-2045L-2046-2046L. This sequence is suitable for all science and engineering majors.

**PREREQUISITES:** Credits: 3; Prereq: MAC 1147 or the equivalent, (Statistics does not count.)

passing score on ChRA or passing grade in CHM 1025; Coreq: CHM 2045L.

A minimum grade of C is required to progress to CHM 2046. (P) A detailed list of course topics by chapter and course objectives are listed at the end of this syllabus.

Warning!! If you drop your math class and do not have MAC 1147 or the equivalent or higher you **will not** be able to go on to CHM 2046 **even if you pass CHM 2045!** Read the Guide to Majors catalog. **This means that you must be taking the correct math this term or have it show on your transcript. You will be ejected from CHM 2046 at the start of the next term even if the system allows you to register if you do not have the proper math prerequisite.**

Lecture schedule Fall 2014: I will follow this schedule very closely.

**Exam dates will not change!!**

**Section # \_\_\_\_\_; Discussion day and location \_\_\_\_\_**

Dates	Topics (# of lectures)	Chapters
Aug. 25–29	Introduction and Review: Atoms, Molecules, and Ions (3)	Chap. 1–2
Sep. 2 - 5	Mass Relations and Stoichiometry (2)	Chap. 3
Sep. 8–12	Aqueous Reactions (3)	Chap. 4
Sep. 15–22	Enthalpy & Calorimetry (3-4)	Chap. 6
<b>Tuesday, Sep. 23 (8:20-10:20 pm)</b>	<b>Progress Exam 1</b>	<b>Chaps. 1–6</b>
Sep. 24-26	Atomic Structure (2)	Chap. 7
Sep. 29 – Oct. 3	Electron Configuration and Periodic Trends (3)	Chap. 8
Oct. 6–10	Chemical Bonding Models (3)	Chap. 9
Oct. 13–20	Molecular Geometry (2)	Chap. 10
Oct. 21–29	Covalent Bonding Theories (3)	Chap. 11
<b>Thursday, Oct. 30 (8:20-10:20 pm)</b>	<b>Progress Exam 2</b>	<b>Chaps. 7–11</b>
Oct. 31-7 Nov.	Gases (3)	Chap. 5
Nov. 10-17	Intermolecular Forces and Liquids and Solids (3-4)	Chap. 12
Nov. 18- 1 Dec.	Solutions (4)	Chap. 13
<b>Tuesday, Dec. 02 (8:20-10:20 pm)</b>	<b>Progress Exam 3</b>	<b>Chaps. 1–13</b>
Dec. 3-10	Chemical Kinetics (4)	Chap.16
<b>Saturday, Dec. 13 (8:00–10:00pm)</b>	<b>Final Exam</b>	<b>Cumulative</b>

**HOLIDAYS (no classes):** Sep. 1 (Labor Day); Oct. 17 (Homecoming); Nov. 11 (Veterans Day); Nov. 26–28 (Thanksgiving)

**Online Assessment Dates: To be Announced. I will post the list as soon as I know it.**

**MasteringChemistry e Homework Due Dates: To be Announced**

**TIPS:** Chemistry is very much a "learn by understanding" subject. Because of this you must work in this course to do well. That means you should read the textbook, work on the website, and do the electronic homework until you understand! Then you should work extra problems (from the book) to test your understanding.

**On Line Assessments (QUIZZES):** All Quizzes will be taken on-line and a separate schedule will be posted. Twelve (12) Quizzes will be given. **No makeup quizzes will be given for any reason.** As with the progress exams, to accommodate unavoidable conflicts, we offer a dropped-quiz policy (the best 10 of 12 quizzes counting toward your grade – see under “GRADES” below). The two lowest grades will be dropped, for a maximum total of 100 course points. **We will not have any make up quizzes!!**

To access the assessment quizzes, click on "Assessments" in Sakai. The quizzes are scheduled as indicated in the schedule. The quizzes will be opened for you to take them on the days listed, and the time period you'll be able to take the quiz is anytime during the 24-hour period that defines that particular day. NEW: For this term you will now have a 60 minute time limit to take the quiz. So, be ready with all that you need to take the quiz before you start (calculator, periodic table and info sheet etc.). No makeup quizzes will be given for any reason. **Computer issues that may arise will not be negotiated.** To accommodate unavoidable conflicts or computer issues that may arise, we offer a dropped-quiz policy (the best 10 of 12 quizzes counting toward your grade – see under “GRADES” below). It is suggested that you do the assessments early enough in the day to avoid last-minute time or computer issues.

**DISCUSSION: First discussion will start the week of September the 1<sup>st</sup>.** Day and location is based on your section number! Look on your ISIS schedule.

**Your assignment for week 1 is to go find both your discussion section location and the Chemistry Learning Center (CLC)!**

**EXAMS: Three** progress exams and a **cumulative** final exam will be given in the course. All progress exams will be **given in the evening (8:20 pm start time)** and rooms will be assigned by section number and posted on Sakai so **learn your section number!** Be on time and bring a calculator (non-graphing) and pencil to the exam room nothing else. NO NOTES OR INFORMATION SHEETS, NO COMPUTERS, CELL PHONES or any information storage device electronic or paper. If you must be absent from an exam due to a documented and approved academic or UF athletic conflict, bring the documentation to your instructor beforehand (at least one week prior to the scheduled exam). You may take the exam early for approved reasons. You may not take exams late for any reason. Planned or emergency trips home or elsewhere are **not** approved conflicts.

**No makeup progress exams will be given for any reason.** We have no mechanism with such a large number of students for makeup exams. **Exam dates are clearly indicated on the syllabus.** **Final Exam keys/solutions will NOT be posted!** Final Exam may not be taken early. Grades will be posted within 24 hours most of the time. Should you not see your grade on Sakai it is YOUR responsibility to inform me. Students may NOT use graphing calculators on exams, you must use a scientific calculator with exponents, log and ln functions. No other device may be used as a calculator i.e. cell phone, iPods etc. **Calculator dies during the exam, no do-over. I suggest you bring a spare.** No cell phones are allowed in the exam rooms. **We do not curve exams so don't expect this.** Sample progress exams are posted. Do not use these as an absolute guide to the problems you will get this term.

Please note the exam absence link [http://iteach.chem.ufl.edu/Exam\\_Absence\\_Policy\\_GChem\\_s13.pdf](http://iteach.chem.ufl.edu/Exam_Absence_Policy_GChem_s13.pdf)

Information on current UF grading policies for assigning grade points  
<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>.

**Feedback:** “Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the

semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.”

## Student Responsibilities:

1. **You are required to attend all classes and discussions. (No you don't get points for doing what you are supposed to do like coming to class.)** You don't show to class it is up to you to find out what you missed. You are responsible for everything I say in lecture even if you don't come. Read the syllabus and check the online notes. I have my class video recorded, how to access the videos will be posted. **DO NOT depend on reviewing these the day before exam or use them as an excuse for not attending class.** Note: You cannot sit and watch 3 hours in a row of my lectures and be successful in the class.
2. **You are required to read and follow the syllabus it is a grading contract.** You fail to comply and you will lose the points!
3. You must make check Sakai on a regular basis to make sure all your grades are posted or if an announcement is made. If you find something is wrong you must see me I will be glad to fix the problem. Come see me for missing electronic homework and exam grades and do so promptly. Do not wait until after the course ends (that is the last day of lecture), I will not be understanding.
4. Exam grades are posted promptly, usually within 24 hours unless we have a problem. So, if yours does not show see your instructor. **Scantron errors are not negotiable and you will pay the price in lost points for any and all errors.** This includes Form Code errors, registry errors, name and UFID numbers to name but a few. If you wait until the last few days of the semester to discover an incorrect grade you may lose points. **DO NOT WAIT TO POINT OUT A MISSED GRADE! If you come to me after the last day of class you will lose the points no discussion!**
5. **Final Exam keys/solutions will NOT be posted! You will NOT get to keep the Final Exam sheet!**
6. You must work “lots of problems”, lots is different for everyone. These include end of chapter problems, problems on the notes / power point slides I have posted. Do not come to me with I did all the problems you said but still failed the exam. You take 20 minutes to do a problem at home but on the exam you have only 5 minutes to do the same problem. If you can't work a problem in 5 minutes you did not do enough problems!
7. You must keep up with the lecture material, the on-line homework and quiz material. All due dates are posted either on the syllabus or the course home page so you have no excuse what so ever for missing or not knowing a due date. At first you may know the material and think you can slack off, don't do this it will harm your grade. Keep working, things happen fast here and once you get behind you may not be able to catch up.
8. **Please do not e-mail me with mundane and trivial questions.** Read the syllabus and review the lecture video. If you want me to do something for you then you come see me at the start or end of class. Office hours will be posted on the course home page and on my office door. If I am in I will answer the phone.
9. If you need help get it early, help is available. The Chemistry Learning Center in Flint 257-278 it will have graduate students to assist you. A schedule with TA names and their times in the CLC will be posted on the course home page. You also have Broward Hall services.
10. Learn how to fill out a scantron. Scantron errors are not negotiable. This includes Form Code errors, registry errors, and name and UFID numbers. Make it hard for me to post your grade and you will lose points. You WILL BE penalized for scantron errors that require me to do extra work to get your grade into the Sakai grade book. First offense 9 points (this means that your grade will end in a 1 not a 0), second offense 18 points, third offense 24 points and fourth offense 36 points. It pays to learn how to fill out a scantron properly. A copy of a scantron is below look at it. We will give you a scantron for each exam at the start of the exam.
11. **If you want to see your scantron you MUST come see me within 5 school days of the exam. They will not be e-mailed or given to a second party.**
12. Need an interview for First year Florida I will do them but only in a group and only a few days. I will announce this in class.

## SCORING:

Your grade for the term will be determined as follows:

Progress Exams (best 2 of 3@ 250 pts each)	500
MasteringCehmistry electronic homework ( <b>FREE!</b> )	100
<b>On Line Assessments</b> Quizzes (best 10 of 12 @ 12 points each)	100
Final Exam	300
TOTAL	1000 pts

*Grades will not be curved. The following grade cutoffs will be used: This is fixed; points **will not** go up. We are now using minus grades so your grade will be based on the scale below. **Note we do NOT use C-**. Off by one point you get the grade you earned.*

A = 900 - 1000	B - = 760 - 799	<b>D = 630 - 659</b>
A - = 860 - 899	C + = 730 - 759	<b>D - = 600 - 629</b>
B+ = 830 - 859	C = 700 - 729	<b>E &lt; 600</b>
B = 800 - 829	<b>D + = 660 - 699</b> <b>Failing grade</b>	

**On-line Homework:** MasteringCehmistry is free but you **MUST** register by 9/7/14 or it is not free!!

MasteringCehmistry points, max 100 for the course, you will have far more than 100 points during the term to get your max. You will have many more points than 100 possible for MasteringCehmistry, you get to keep only 100. Sections of MasteringCehmistry will be assigned regularly based on chapter material covered in class. You need to keep up and do about 45 minutes 4-5 times a week (not all at once). Due dates are on the MasteringChemistry site and I will post them on the syllabus during the first week of classes.

MasteringCehmistry points will be up dated on Sakai several times during the semester, usually when progress exam grades are posted.

**Each posting is the new total of the points you have. Keep up with your MasteringCehmistry grade and know your due dates. If you do not see your MasteringChemistry points on Sakai after I have announced it in class that they are posted see me and we will find the problem. If you can see your points in MasteringCehmistry then you have them we just need to get them into Sakai. If you wait till after the classes end to discover a grade is incorrect you will lose points. We will not reopen up or extend the dates just because you missed the due date. You have several days to complete each MasteringCehmistry assignment. Do not wait till the last minute to do your assignments! You will not have enough time to complete your assignments at the last minute. Assignments average about 3 hours of work per chapter to complete. Computer and server problems are yours and will not be considered.**

**Follow the direction below to register for FREE in MasteringCehmistry. Do not register more than once if you do I will deduct points.**



## Get Started with Pearson's MasteringChemistry

### First, make sure you have these 3 things...

**Email:** You'll get some important emails from your instructor at this address.

**Course ID:**  
MCMITCHELL48822

**Access code:**

PSSACT-SPADA-MESIC-REGNA-METIS-SPIES  
(Valid thru 9/7/2014 only)



### Next, get registered!

1. Go to [www.masteringchemistry.com](http://www.masteringchemistry.com). Under the large **Register Now** section on the right side of the page, click the **Student** button.
2. Read the onscreen instructions and select your location. Enter the **Course ID** code provided above, type it in and Click **Go**.
3. You will now need to enter your **Access Code** (SEE ABOVE- YOU **MUST** REGISTER BY SEPTEMBER 7<sup>th</sup>)
4. You'll then be asked to **Accept** the License Agreement before moving on. After this, either **Create** a new Pearson username/password, or, if you've already registered for another Pearson product (i.e. MyMathLab, MySpanishLab), enter that username/password.
5. On the next page, fill out the appropriate personal information fields then click **Next**. If you entered an **Access Code**, you will be brought to a page from which you can access your product.
6. You are now registered! Click **Log In Now**. Once signed in you can: enter your **Course ID** (same as Step #2 if you missed it then) and your Gator Link ID (REQUIRED)
7. Next Time: Choose "LOGIN" and enter your Username/Password

### Need help?

Visit [www.masteringchemistry.com](http://www.masteringchemistry.com) for:

- Helpful videos
- Frequently Asked Questions
- Set Up Your Computer

Or visit our 24/7 Technical Support site at <http://247pearsoned.custhelp.com>

Correct answers to MasteringChemistry assignments require very precise attention to significant-figure rules – if you do not fully understand the usage of significant figures, you should read pages 25-28 in your Silberberg textbook (or another source for detailed significant-figure instruction). Also, the correct answers to MasteringChemistry assignments sometimes have narrow acceptance windows – you must be very careful in the numbers you use for calculations and how you carry them through the problem-solving procedure.

You'll have three (3) attempts for each problem question. Each question is worth 0.5 points.

Please do not email instructors about MasteringChemistry problems - if you need help, come to office hours or the CLC for help - be sure to have the problem printed out in full and show what work you've done. Again, pay extra careful attention to significant figure rules because MasteringChemistry is not tolerant of incorrect sig figs.

**Sakai:** To access Sakai you should go to the website: <http://lss.at.ufl.edu> . Choose “Sakai”, then “University of Florida”. To log in, you must use your GatorLink username and password. If you do not yet have one, you must obtain one. If you have any problems with your GatorLink name or password you should contact the Help Desk at 392-HELP, or go to 520 CSE. They will only help you with GatorLink items, not WebCT problems. For the latter, see your instructor.

**HONOR SYSTEM:** All exams and online quizzes are given under the Honor System. Any student caught cheating will receive the maximum punishment I can bring to bear. (Cheating of any kind will result in a grade of E.) Check the website for the UF policy on honesty and cheating:  
[http://www.dso.ufl.edu/stg/Code\\_of\\_Conduct.html](http://www.dso.ufl.edu/stg/Code_of_Conduct.html)

“UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<http://www.dso.ufl.edu/scrr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.”

**CHEMISTRY LEARNING CENTER (CLC):** There is free help to be had from graduate student teaching assistants in the CLC Monday through Friday in Flint Hall 257 and 258. Your discussion TA will have office hours in the CLC, but you may go there anytime and see any TA to get help on questions pertaining to chemistry. A schedule of the TA schedules will be posted in the corridor outside the CLC and on e-Learning.

**The CLC ends their office hours the last day of class I will ask them to stay for the reading days. I end my office hours the last day of class.**

**Other Information:**

Honor Code: <http://www.chem.ufl.edu/~itl/honor.html>

Disabilities: <http://www.chem.ufl.edu/~itl/disabilities.html>

Counseling: <http://www.chem.ufl.edu/~itl/counseling.html>

**STUDENT ATHLETES and official SCHOOL EVENTS:**  
**You must see me in person each and every time about taking a progress exam outside posted times that means early, but never late.**

**DISABILITY RESOURCES:** “Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.”

Disability resources students must see me the first week of class or as soon as you receive your DRC letter.. If you are applying for disability resource status please come see me the first week of class. Students requesting classroom and exam accommodations must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation. Students will then go to the disability resource center.

The Dean of Students Office provides individualized assistance for students with documented disabilities. Services are based upon student need and impact of their specific disability. There is no requirement for any student to self-identify as having a disability. However, students requesting classroom accommodations must register with the Dean of Students Office and provide the appropriate documentation verifying their disability. The Dean of Students Office determines what is and is not appropriate documentation. Examples of accommodations that are available to students include, but are not limited to, registration assistance, approval of reduced course load, course substitutions, classroom and examination accommodations, auxiliary learning aids, additional course drops when disability related, and assistance in other university activities. The designated coordinator for compliance with Section 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) is the Assistant Dean of Students responsible for Students with Disabilities Programs, P202 Peabody Hall, 392-1261 (Voice), or 392-3008 (TDD).

The Disability Resource Center strives to provide quality services to students with physical, learning, sensory or psychological disabilities, to educate them about their legal rights and responsibilities so that they can make informed decisions, and to foster a sense of empowerment so that they can engage in critical thinking and self-determination.

Contact information for the Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc/Default.aspx>, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

**Physical Sciences (P):** Physical science courses provide instruction in the basic concepts, theories and terms of the scientific method in the context of the physical sciences. Courses focus on major scientific developments and their impacts on society, science and the environment, and the relevant processes that govern physical systems. Students will formulate empirically-testable hypotheses derived from the study of physical processes, apply logical reasoning skills through scientific criticism and argument, and apply techniques of discovery and critical thinking to evaluate outcomes of experiments.

### General Education Student Learning Outcomes

The general education student learning outcomes (SLOs) describe the knowledge, skills and attitudes that students are expected to acquire while completing a general education course at the University of Florida. The SLOs fall into three areas: **content**, **communication** and **critical thinking**.

Area	Institutional Definition	Institutional SLO
<b>CONTENT</b>	Content is knowledge of the concepts, principles, terminology and methodologies used within the discipline.	Students demonstrate competence in the terminology, concepts, methodologies and theories used within the discipline.



**COMMUNICATION**

Communication is the development and expression of ideas in written and oral forms.

Students communicate knowledge, ideas, and reasoning clearly and effectively in written or oral forms appropriate to the discipline.

**CRITICAL THINKING**

Critical thinking is characterized by the comprehensive analysis of issues, ideas, and evidence before accepting or formulating an opinion or conclusion.

Students analyze information carefully and logically from multiple perspectives, using discipline specific methods, and develop reasoned solutions to problems.

**Course Objectives: CHM 2045 (General Chemistry I)**

You will be required to build a basic fund of knowledge of the science of chemistry covering the topics below: You will be required to analyze scientific concepts and think critically. This means being able to answer both mathematical and conceptual multiple choice problems in a limited period of time. Additionally you will have to write or orally communicate during your discussion periods. Progress exams allow 5 minutes per questions and the Final only 4 minutes per question.

You will review the importance of chemistry in our everyday lives.

You will be required to utilize the methods of science as a logical means of problem solving through critical thinking. This means you must analyze information carefully and logically from multiple perspectives, using discipline specific methods, and develop reasoned solutions to problems.

**The Foundation of Chemistry**

Matter and Energy-Basic Concepts of Chemistry

Measurements

Significant Figures

Metric System

Scientific Notation

Dimensional Analysis

**Chemical Formulas and Stoichiometry**

Atoms, Ions, Molecules and Compounds

Nomenclature of Inorganic Compounds

The Mole Concept

Percent Composition

Empirical Formula

Molecular Formula

**Chemical Equations and Reaction Stoichiometry**

Balancing of Chemical Equations

Calculations Based on Chemical Equations-moles/masses of reactants/products

Limiting Reagent Calculations

Percent Yield and Theoretical Yield Calculations

Sequential Reactions

Concentration of Solutions-Calculations Involving Mass % and Molarity

Dilution of Solutions: Calculations Involving  $V_1M_1=V_2M_2$   
Calculations Involving Solution Stoichiometry

## **Chemical Reactions**

Organization of the Periodic Table  
Aqueous Solutions-Strong and Weak Electrolytes  
Reactions in Aqueous Solutions  
Oxidation Numbers

## **Thermodynamics**

The First Law of Thermodynamics  
Enthalpy,  $\Delta H$   
Calorimetry (constant-pressure and constant volume)  
Thermochemical equations  
Internal energy,  $\Delta E$   
Relationship between  $\Delta E$  and  $\Delta H$   
Hess' Law  
Standard enthalpies of formation and reaction  
Bond energy and  $\Delta H$   
The Second Law of Thermodynamics & Spontaneity

## **The Structure of the Atom**

Experiments that led to the discovery of the fundamental particles of the atom  
Subatomic Particles, Isotopes, Atomic Weight  
Development of Quantum Mechanics  
Quantum Mechanical Model of the Atom  
Electronic Configuration and the Relationship to the Periodic Table  
Orbital Diagrams  
Quantum Numbers  
Chemical Periodicity

## **Theory of Ionic and Covalent Bonding**

Lewis Dot Formulas of Atoms  
Formation of Binary Ionic Compounds-Coulomb's Law, Lattice Energy  
Formation of Covalent Compounds  
Lewis Structures for Molecules and Polyatomic Ions and the Octet Rule  
Resonance and Formal Charges  
Exceptions to the Octet Rule for Lewis Structures  
Polar and Nonpolar Covalent Bonds

## **Molecular Structure**

Valence Shell Electron Pair Repulsion Theory (VSEPR)  
Electronic and Molecular Geometry and Molecular Dipole Moments  
Valence Bond Theory and Hybridization of Orbitals  
Molecular Orbital Theory

## **Gases**

Gas Laws and Ideal Gas Law  
Density and Molar Mass  
Stoichiometry of Reactions Involving Gases  
Kinetic Molecular Theory-Molecular Speeds  
Real Gases

## **Liquids and Solids**

Intermolecular Attractions and Phase Changes

Physical Processes and Properties of Liquids

Melting Point/Boiling Point

Phase Changes of Matter and Phase Diagrams

Molar Heat of Vaporization and Molar Heat of Fusion

## **Solutions**

Dissolution Process for Solids, Liquids and Gases

Factors Affecting Solubility

Saturated, Unsaturated and Supersaturated Solutions

Other Units of Concentration

Colligative Properties

1. Vapor Pressure Lowering
2. Boiling Point Elevation
3. Freezing Point Depression
4. Osmotic Pressure

## **Chemical Kinetics:**

Rate of a reaction

Factors that affect reaction rates

a. Nature of reactants

b. Concentration of reactants: Rate-law expressions & Reaction order

c. Concentration vs. time: Integrated rate equations and half-life

Collision theory, activation energy

Transition state theory

Mechanisms and Rate-law expressions

Arrhenius equation: temperature and rate

Catalysts

## **Chemical Equilibria**

Dynamic equilibria

Equilibrium constant  $K_c$

Reaction quotients

Calculations with  $K_c$

Heterogeneous equilibria

$K_p$  and  $K_c$

Le Chatelier's Principle: factors affecting equilibria

LAST NAME										FI	MI	TEST FORM CODE:					A	B	C	D	E		
A	A	A	A	A	A	A	A	A	A	A	A	1	2	3	4	5	41	1	2	3	4	5	
B	B	B	B	B	B	B	B	B	B	B	B	2	1	2	3	4	5	42	1	2	3	4	5
C	C	C	C	C	C	C	C	C	C	C	C	3	1	2	3	4	5	43	1	2	3	4	5
D	D	D	D	D	D	D	D	D	D	D	D	4	1	2	3	4	5	44	1	2	3	4	5
E	E	E	E	E	E	E	E	E	E	E	E	5	1	2	3	4	5	45	1	2	3	4	5
F	F	F	F	F	F	F	F	F	F	F	F	6	1	2	3	4	5	46	1	2	3	4	5
G	G	G	G	G	G	G	G	G	G	G	G	7	1	2	3	4	5	47	1	2	3	4	5
H	H	H	H	H	H	H	H	H	H	H	H	8	1	2	3	4	5	48	1	2	3	4	5
I	I	I	I	I	I	I	I	I	I	I	I	9	1	2	3	4	5	49	1	2	3	4	5
J	J	J	J	J	J	J	J	J	J	J	J	10	1	2	3	4	5	50	1	2	3	4	5
K	K	K	K	K	K	K	K	K	K	K	K												
L	L	L	L	L	L	L	L	L	L	L	L	11	1	2	3	4	5	51	1	2	3	4	5
M	M	M	M	M	M	M	M	M	M	M	M	12	1	2	3	4	5	52	1	2	3	4	5
N	N	N	N	N	N	N	N	N	N	N	N	13	1	2	3	4	5	53	1	2	3	4	5
O	O	O	O	O	O	O	O	O	O	O	O	14	1	2	3	4	5	54	1	2	3	4	5
P	P	P	P	P	P	P	P	P	P	P	P	15	1	2	3	4	5	55	1	2	3	4	5
Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	16	1	2	3	4	5	56	1	2	3	4	5
R	R	R	R	R	R	R	R	R	R	R	R	17	1	2	3	4	5	57	1	2	3	4	5
S	S	S	S	S	S	S	S	S	S	S	S	18	1	2	3	4	5	58	1	2	3	4	5
T	T	T	T	T	T	T	T	T	T	T	T	19	1	2	3	4	5	59	1	2	3	4	5
U	U	U	U	U	U	U	U	U	U	U	U	20	1	2	3	4	5	60	1	2	3	4	5
V	V	V	V	V	V	V	V	V	V	V	V												
W	W	W	W	W	W	W	W	W	W	W	W	21	1	2	3	4	5	61	1	2	3	4	5
X	X	X	X	X	X	X	X	X	X	X	X	22	1	2	3	4	5	62	1	2	3	4	5
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	23	1	2	3	4	5	63	1	2	3	4	5
Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	24	1	2	3	4	5	64	1	2	3	4	5
												25	1	2	3	4	5	65	1	2	3	4	5

<http://gened.aa.ufl.edu/gen-ed-syllabus-policy.aspx>

### Program Area Objectives

The general education program area objectives describe the context within which the [student learning objectives](#) are achieved.

### General Education Student Learning Outcomes

The general education student learning outcomes (SLOs) describe the knowledge, skills and attitudes that students are expected to acquire while completing a general education course at the University of Florida. The SLOs fall into three areas: **content**, **communication** and **critical thinking**.

**Every general education course must address all three SLOs.** Note that the [program area objectives](#) describe the context within which the SLOs are achieved.

Area	Institutional Definition	Institutional SLO
<b>CONTENT</b>	Content is knowledge of the concepts, principles, terminology and methodologies used within the discipline.	Students demonstrate competence in the terminology, concepts, methodologies and theories used within the discipline.
<b>COMMUNICATION</b>	Communication is the development and expression of ideas in written and oral forms.	Students communicate knowledge, ideas, and reasoning clearly and effectively in written or oral forms appropriate to the discipline.
<b>CRITICAL THINKING</b>	Critical thinking is characterized by the comprehensive analysis of issues, ideas, and evidence before accepting or formulating an opinion or conclusion.	Students analyze information carefully and logically from multiple perspectives, using discipline specific methods, and develop reasoned solutions to problems.

### Physical Sciences (P)

Physical science courses provide instruction in the basic concepts, theories and terms of the scientific method in the context of the physical sciences. Courses focus on major scientific developments and their impacts on society, science and the environment, and the relevant processes that govern physical systems. Students will formulate empirically-testable hypotheses derived from the study of physical processes, apply logical reasoning



skills through scientific criticism and argument, and apply techniques of discovery and critical thinking to evaluate outcomes of experiments.