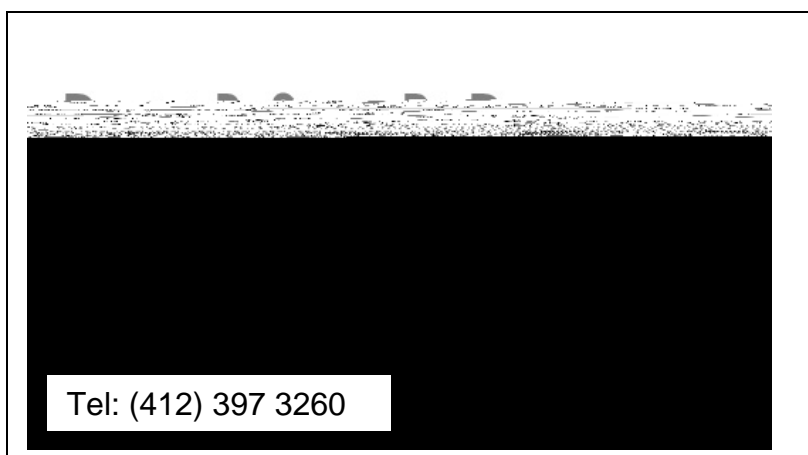




CHEM1210: Chemistry I

Course Guide



Contents:

Item	Page No.
Syllabus	2-8
Success in Chemistry	9
Homework Problem List	10
Element, Ion, Compound Bingo	11-13
Battleship Game	14
Periodic Table Activity	15
First Day Student Search	17
First Day 'Fill-In' Sheet (*)	18

(*) To Be Returned To The Instructor

CHEM1210: Chemistry I Syllabus

Contact Information

Instructor: Dr. Daniel Short

Office: 215 John Jay

Laboratory: John Jay Science Laboratories
(Environmental Science and Chemistry)

Office Phone: (412) 397 3260

E-mail: short@rmu.edu

(Please include your lecture section number in your messages to me. You must use your @rmu.edu mailbox.)

Office/Lab Hours: <http://www.localendar.com/public/dnashort>. Also, by appointment. Students are encouraged to see me immediately after class.

Web Site: <http://academics.rmu.edu/~short/index.htm>

Course Description

This course covers the general principles, theories, and concepts of inorganic chemistry. Students are exposed to chemical principles through a variety of classroom activities. Major topics include: matter and energy, measurements, modern atomic theory, electronic structure, periodic properties, chemical bonds, chemical reactions, and a wide variety of other pertinent topics.

Introduction

Chemistry 1210 is the first course in a two semester general chemistry sequence. Chemistry 1210 and 2210 provide a general background in the facts, principles and concepts of chemistry. The sequence is a prerequisite for advanced courses such as analytical (3000), organic (2320/2420) and environmental chemistry (3500).

I am also interested in helping you start to develop or improve upon your general learning and scholarship skills.

Connections

Chemistry is central to all sciences and is used to study biological, physical, medical and environmental phenomena. In order to widen your knowledge base and deepen your understanding of chemistry, it is important that you seek to make connections between the facts, principles, and theories, etc. expressed in this course.

In addition, it is also very important to make connections with people. Personal connections with fellow students, faculty, advisors, and others in

our community will greatly enhance your academic progress and personal maturity.

Course Format

During class sessions the course material will be presented in a lecture format. We will discuss principles, present demonstrations, examine theories, and work through example exercises.

- (i) To prepare for lecture you should read the chapter in advance.
- (ii) Bring your course guide to every lecture.
- (iii) During lecture take notes on everything presented.
- (iv) After lecture you should review your notes and work on the suggested homework exercises.
- (v) Selected lectures use visual media such as 'The Elements', 'The Atom', and mpeg files of demonstrations. These are available outside of the lecture either from my web site or the library.

Course Outline (Subject to change)

Week	M	W	F
1	Intro Session	Chapter 1: Matter, Measurement...	
2	Chapter 2: Atoms and Elements		
3	Chapter 3: Molecules, Compounds, and Chemical Equations		
4	Chapter 3: Molecules, Compounds, and Chemical Equations		Test 1

5 Chapter 4: Chemical Quantities and Aqueous Reactions

Chapter 4: Chemical Quantities and Aqueous Reactions

Attendance

Attendance of each scheduled lecture session is strongly advised. If you are absent when a test is scheduled you are required to provide me with documentation (note from doctor, health center, or appropriate College administrator); tests must be made up within 72 hours. A test missed because of an unexcused absence cannot be made up.

Changes in the class schedule, information on coursework, tests and other notices will be given in the lectures and via the RMU email system. It is **your** responsibility to keep up-to-date with these changes.

Participation and Active Learning

I expect students to attend class regularly and to be on time. You are encouraged to be an actively engaged member by answering questions, raising questions, initiating discussions and being prepared to share your knowledge with the class. While class participation is not an explicit component of your grade in this course, students who are actively participating on a regular basis and who are on the border between two grades will receive the higher of the two possible grades.

The chosen textbook should not be used as the sole source of information. Additional texts, journals, the Internet, library and other media should all be sought out as a way of enriching your learning experience.

You should plan on spending about 4-6 hours a week working on chemistry. It is to your advantage to spread this time out evenly over all the days in a week, rather than trying to spend 4-5 hours in a single day once a week.

More suggestions for success in this course are provided in this document.

F <60 Performance indicating that there are serious deficiencies in a student's understanding of the course material, usually accompanied by poor coverage, lack of organization, and/or inadequate writing.

Coursework

Homework (40%) will be assigned in class on a weekly basis. Problems and worksheets must be handed in on their respective due dates and in legible condition. Write down the full question followed by your answer; include all steps in your calculations. **Late homework will not be graded;** I also observe the right not to grade incomprehensible work or calculations with intermediate steps missing. I will only be grading a random sample of questions from the homework and your grade for each chapter will only be assigned according to the questions graded.

Attending lectures and reading the text book is not an adequate means to learn chemistry. You must make every effort to attempt the questions and problems in the homework and worksheets. Problem solving is an essential skill in chemistry and the only way to improve your problem solving skills is practice. Consider working together with other students. You can get extra help from anyone.

Tests

Tests (60%) will be short answer, with questions being drawn from material covered in the lectures and homework's.

Example tests are provided online. Making sure you keep up with the weekly lecture material and homework assignments will bring you one step closer to success.

Academic Honesty

In this course you are encouraged to study with other students. When taking the tests you are to work alone, in addition, your **submitted homework must be all your own work** and should not resemble another students.

Copying material from other students, the Internet or other sources and submitting it towards the grade in your course is unacceptable, does not qualify as being your own work and is viewed as plagiarism.

Every student at Robert Morris University should make themselves familiar with the University's Academic Integrity Policy (below).

RMU Academic Integrity Policy

Academic Integrity is valued at Robert Morris University. All students are expected to understand and adhere to the standards of Academic Integrity as stated in the RMU Academic Integrity Policy, which can be found on the RMU website at <http://www.rmu.edu/academicintegrity>. Any student who violates the Academic Integrity Policy is subject to possible judicial proceedings which may result in sanctions as outlined in the Policy. Depending upon the severity of the violation, sanctions may range from receiving a zero on an assignment to being dismissed from the university. If you have any questions about the policy, please consult your course instructor.

Recommended Materials

Text - Tro, N. J. (2008) *Chemistry; A Molecular Approach*. Prentice Hall.

Calculator - A scientific calculator is required. Programmable calculators are acceptable during tests as long as they do not contain in any of their storage devices the course material subject to the testing. You cannot share a calculator during a test. Computers (laptops, notebooks, etc.) cannot be used during tests. Have a calculator and a pad for calculations ready for each class period.

Stationary - For tests it is assumed that everybody will use a pen. Only answers written in permanent ink can be reconsidered if you suspect an error in grading or expect reconsideration for partial credit).

Learning Aids

Communicate with your instructor – you should take full advantage of the availability of your instructor outside of the classroom for face-to-face meetings and via telephone/email contact.

Cooperative learning Groups – students are asked to form groups of 4-5. Groups should sit together when requested. Group discussions, exercises, and assignments may occur in lecture. Each group may find it helpful to study together outside of class.

Chemical of the Week – to increase your knowledge about chemicals, their properties, production, cost, uses, etc., fact sheets will be distributed on a weekly basis during class. You may be tested on their content during each test or homework assignment.

Exam questions - an archive of past Chemistry I tests is included in this guide. You should attempt the examples as part of your review and study

for the tests. Compare your solutions and answers with those of fellow students. If your solutions do not agree you should work on the problems together.

Discussion sessions – these informal sessions are held 1-3 times during the semester. The aim is to enable the professor to meet students in small groups. The sessions are open to all those registered in this lecture session. Topics of discussion may or may not be related to course materials.

A Student Study Guide to accompany the main text is available, and many students will find it useful. If you are unsure of your math background, the book *Math Survival Guide*, by Jeffery R. Appling (John Wiley & Sons), or *Basic Mathematics for Beginning Chemistry*, by D. M. Goldish (4th edition, Macmillan, © 1990) is recommended.

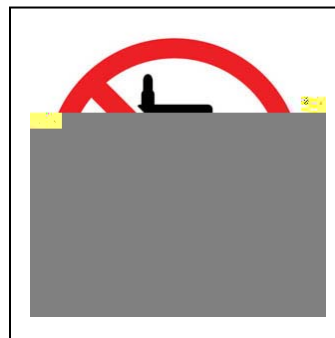
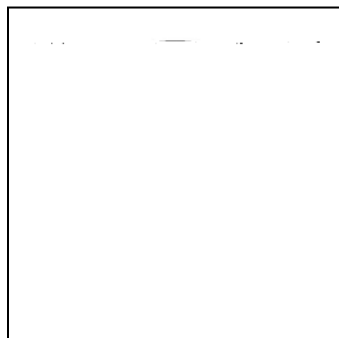
Workbook for General Chemistry – lessons provide instruction and additional exercises. Shakashiri, B.Z. and Schreiner, R. (2004) *Workbook for General Chemistry*. Stipes Publishing Co.

University Center for Student Success – students who may be eligible to

Success in Chemistry

1. Read the text book the day before the class where this material will be discussed.
2. Read to find out "why?" in addition to "what?"
3. Don't miss a lecture. Attend class regularly and never be late!
4. Sit near the front of the class, so that you feel like a participant, not merely a passive observer.
5. Take notes on virtually EVERYTHING that is said, discussed, or put on the board in class.
6. Review your notes after the lecture, to make sure that you understand what you wrote and to identify anything that is confusing or not clear. If you don't understand part(s) of your notes, look up the topic in your book and/or come see me, and/or a tutor, and/or your study group.
7. Ask questions in class. This will help you feel a part of the class, instead of watching others learn.
8. Set up your schedule so that you are able to devote approximately one hour each day to working on chemistry.
9. As you work on understanding new concepts, be sure to take time to make connections that identify how new ideas fit with earlier material.
10. Organize a study group of 3 or 4 friends with whom you review class material 2 or 3 days prior to the tests.

No Food or Phone Calls are Permitted in the Classroom



CHEM1210: Chemistry I Homework Problems

The following list of problems are subject to change, please make sure to check with the list of problems distributed in class before submission.

TEXT: [Tro](#) (2006) Chemistry: A Molecular Approach. Prentice Hall.

Homework Problems, Fall 2009

Chapter 1 - 1.38, 1.42, 1.46, 1.48, 1.52, 1.58, 1.64, 1.72, 1.84, 1.92

Chapter 2 - 2.32, 2.42, 2.44, 2.50, 2.54, 2.60, 2.64, 2.70, 2.76, 2.82

Chapter 3 - 3.24, 3.32, 3.38, 3.44, 3.46, 3.50, 3.56, 3.58, 3.68, 3.80

Chapter 4 - 4.25, 4.32, 4.38, 4.42, 4.56, 4.64, 4.70, 4.72, 4.78, 4.82

Chapter 5 - 5.30, 5.36, 5.46, 5.52, 5.58, 5.62, 5.74, 5.80, 5.96, 5.100

Chapter 6 - 6.32, 6.34, 6.46, 6.48, 6.56, 6.58, 6.64, 6.68, 6.70, 6.74

Chapter 7 - 7.32, 7.38, 7.40, 7.42, 7.48, 7.52, 7.58, 7.64, 7.66, 7.72

Chapter 8 - 8.29, 8.42, 8.44, 8.48, 8.52, 8.54, 8.60, 8.66, 8.74, 8.86

Chapter 9 - 9.32, 9.40, 9.44, 9.52, 9.56, 9.60, 9.64, 9.68, 9.72, 9.80

Element Bingo

<h1>B i n g o</h1>				
Lead	Silicon	Oxygen	Fluorine	Tin
Hydrogen	Aluminum	Helium	Iodine	Sulfur
Carbon	Iron	X	Silver	Chlorine
Sodium	Gold	Nitrogen	Mercury	Magnesium
Nickel	Cobalt	Lithium	Calcium	Zinc

<h1>B i n g o</h1>				
S	Ag	N	I	C
N	Mg	H	Zn	Co
Cl	Li	X	Pb	Sn
Hg	Fe	Au	Si	F
O	Ca	He	Al	Ni

Ion Bingo

B i n g o				
NO_3^-	Cl^-	Hg_2^{2+}	PO_4^{3-}	NH_4^+
HCO_3^-	O^{2-}	HSO_4^-	ClO_3^-	C^{4-}
SO_3^{2-}	OH^-	X	Hg^{2+}	$\text{S}_2\text{O}_3^{2-}$
SO_4^{2-}	PO_3^{3-}	Cr^{3+}	Sn^{4+}	MnO_4^-
O_2^{2-}	NO_2^-	ClO_4^-	CrO_4^{2-}	O^{2-}

B i n g o				
Chlorate	Chloride	Hydroxide	Sulfite	Nitrite
Chromate	Carbide	Hydrogen carbonate (Bicarbonate)	Peroxide	Hydrogen sulfite (Bisulfate)
Ammonium	Sulfate	X	Oxide	Permanganate
Perchlorate	Nitrate	Mercury (I) (Mercurous)	Chromium (III) (Chromic)	Phosphite
Oxide	Tin (IV) (Stannic)	Thiosulfate	Phosphate	Mercury (II) (Mercuric)

Compound Bingo

<h1 style="font-size: 2em; margin: 0;">B i n g o</h1>				
$\text{Fe}(\text{NO}_3)_3$	NaCl	N_2O_2	H_3PO_4	SO_2
NaHCO_3	CaO	$\text{Na}(\text{CH}_3\text{COO})$	NI_3	CuSO_4
SiC	NH_4OH	X	AgCl	NaBr
HCl	$\text{Cu}(\text{NO}_3)_2$	HNO_3	Na_2SO_3	KMnO_4
$\text{Cu}(\text{NO}_2)_2$	NO_2	HClO_4	K_2CrO_4	H_2SO_4

<h1 style="font-size: 2em; margin: 0;">B i n g o</h1>				
Copper Sulfate	Silver Chloride	Nitric Acid	Nitrogen Triiodide	Silicon Carbide
Phosphoric Acid	Sodium Bromide	Sodium Bicarbonate (Sodium Hydrogen Carbonate)	Potassium Permanganate	Nitrogen Dioxide
Potassium Chromate	Perchloric Acid	X	Dinitrogen Dioxide	Sulfur Dioxide
Sodium Sulfite	Iron (III) Nitrate	Copper (II) Nitrate	Sodium Chloride	Ammonium Hydroxide
Copper (II) Nitrite	Calcium Oxide	Sodium Acetate	Hydrochloric Acid	Sulfuric Acid

MOLECULAR BATTLESHIPS!

YOUR Battle Ships							
	N	O	Cl	S	I	H	F
C							
H							
I							
P							
S							
Cl							
F							
N							

Diver

Cruiser

Destroyer

Submarine

Aircraft carrier

ENEMY Battle Ships							
	NO_3^-	CO_3^{2-}	SO_3^{2-}	SO_4^{2-}	PO_4^{3-}	$\text{Cr}_2\text{O}_7^{2-}$	N^{3-}
K^+							
NH_4^+							
Ca^{2+}							
Hg_2^{2+}							
Fe^{2+}							
Al^{3+}							
Ti^{3+}							
Pb^{4+}							

YOU SUNK MY SHIPS!!!

Mystery Periodic Table Activity

Construct a periodic table of the representative elements of the first four rows from the clues provided. See if you understand the patterns. The following sets of elements belong together:

ZRD, PSIF, JXBE, LHT, QKA, WOV, GUN, YMC

Here are the clues:

- U has a total of six electrons
- I_2A is the simple formula of an oxide
- P is less dense than S
- S is an alkali metal
- E is a noble gas
- W is a liquid
- Z has the smallest atomic mass in its group
- B has ten protons
- O has an atomic number larger than V
- D has the largest atomic mass of its group
- C has five electrons in its outer energy level
- F is a gas
- X has an atomic number one higher than F
- Y is a metalloid
- O is a halogen
- The mass of T is more than that of H
- J has an atomic number three times that of T
- Q has an atomic mass 2 times that of A
- Atoms of I are larger than those of S
- M has an atomic number one less than that of A
- The electrons of atom N are distributed over three energy levels
- The atomic radius of K is the largest of the group

Puzzle

In the 2 x 2 box shown here, each answer must be correct four ways: horizontally, vertically, diagonally, and by itself. Instead of words, use symbols of the elements. When the puzzle is complete, the four spaces will contain the overlapping symbols of ten elements. There is only one correct solution.

1	2
3	4

Horizontal

1-2: Two-letter symbol for a metal used in ancient times.

3-4: Two-letter symbol for a metal that burns in air and is found in group 5A.

Vertical

1-3: Two-letter symbol for a metalloid.

2-4: Two-letter symbol for a metal used in U.S. coins.

Single squares: all one-letter symbols

1. A colorful nonmetal.

2. Colorless gaseous nonmetal.

3. An element that makes fireworks green.

4. An element that has medicinal uses.

Diagonal

1-4: Two-letter symbol for an element used in electronics.

2-3: Two-letter symbol for a metal used with Zr to make wires for superconducting magnets.

CHEM1210: First Day 'Fill-In' Sheet

1. Name: _____
 2. How do you want to be called? _____
 3. Lecture Section: _____ Lab Section: _____
 4. EMAIL address: _____ @ rmu.edu
 5. Your dorm, cell, or home phone: _____
- If you don't remember, send me an e-mail message.
(If you don't have a rmu email account, sign up for one at the computer center).
6. Year in school (please check one): (Fr) (So) (Jr) (Sr)
 7. Check one: (a) new student; (b) continuing student;
(c) transfer from (name of your previous school) _____
 8. Your major: _____ minor: _____ undecided:
 9. Number of high school chemistry years completed: 0 1 2 3 AP
Indicate year of last high school chemistry course: _____
 10. Name and location of high school: _____
 11. Give the number of college chemistry courses taken: 0 1 2 3
 12. Give the number of credit hours you are taking this semester: _____
 13. Give the number of hours per week you are working (paid or volunteer): _____
 14. Rate yourself in terms of listening and note taking skills
(A) Average; (B) Better than average; (C) Need help
 15. Rate yourself in terms of reading, comprehension, and retention
(A) Average; (B) Better than average; (C) Need help
 16. I plan to take another chemistry course beyond this: Yes No Don't know
 17. You are recommended to have a buddy system in this class. Do you know
other persons in this class:
(Yes) Names: _____ (No)
 18. Please tell me a couple of interesting things about yourself.

When completed, please return to the instructor. Thank you.