

**MARTIN COMMUNITY COLLEGE**  
**COURSE SYLLABUS**  
**Semester/Year: Spring 2011**

**COURSE NUMBER:** CHM131 5W1

**INSTRUCTOR:** Barbara M. Daly MS

**COURSE TITLE:** Introduction to Chemistry

**OFFICE NO:** Building 4 Room 9

**CREDIT HOURS:** 3

**OFFICE/VIRTUAL HOURS:** M 11:15-12:00 am, T 9:15-12:00 noon, W 9:15-10:00 am and 11:15-12:00 noon, Th 9-11:50 am

**CONTACT HRS/WK:** 3 Hours Lecture

**PREREQUISITES:** CHM 090 or High School Chemistry with a grade of C or higher.

**PHONE NO:** 252-789-0287

**COREQUISITES:** CHM 131 A

**FAX:** 252-792-0826

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**COURSE DESCRIPTION:** This course introduces the fundamental concepts of inorganic chemistry. Topics include measurement, matter and energy, atomic and molecular structure, nuclear chemistry, stoichiometry, chemical formulas and reactions, chemical bonding, gas laws, solutions, and acids and bases. Upon completion, students should be able to demonstrate a basic understanding of chemistry as it applies to other fields. *This course has been approved to satisfy the Comprehensive Articulation Agreement general education core requirement in natural sciences/mathematics.*

**PROGRAM LEARNING OUTCOMES:**

1. Apply critical thinking skills to problem solving.
2. Demonstrate the use of appropriate discipline-related technology.
3. Demonstrate effective oral and written communication skills.

**COURSE LEARNING OUTCOMES:**

1. Describe and discuss the fundamental concepts of inorganic chemistry, including measurement, matter and energy, atomic and molecular structure, nuclear chemistry, stoichiometry, chemical formulas and reactions, chemical bonding, gas laws, solutions, and acids and bases.
2. Solve mathematical and conceptual problems pertaining to the concepts of inorganic chemistry, including measurement, matter and energy, atomic and molecular structure, nuclear chemistry, stoichiometry, chemical formulas and reactions, chemical bonding, gas laws, solutions, and acids and bases.
3. Apply the fundamental concepts of inorganic chemistry to problems encountered in modern life.

**REQUIRED TEXTBOOKS**

Ebbing, Darrell, and Gammon, Steven, (2009) *General Chemistry*, (9th Ed.) Boston, MA: Houghton Mifflin. ISBN 0-618-85748-6.

Wentworth, R.A., (2009) *Experiments in General Chemistry*, (9th Ed.) Boston, MA: Houghton Mifflin. ISBN 0-618-94988-7.

You will also need a calculator, paper, and pen/pencil for every class. **BRING YOUR TEXTBOOK WITH YOU TO EVERY CLASS!**

## SUPPLEMENTAL RESOURCES:

Various suggestions will be made over the course of the semester as sources of additional information as needed. The study guide for the required text is helpful for students needing more support.

Krannich Larry K. *General Chemistry Study Guide*.(9thEd.) Boston, MA: Houghton Mifflin. ISBN 0-618-94591-1.

## LEARNING/TEACHING METHODS

-Lecture.

-Various handouts will be used where more depth is needed to clarify information.

-Problem sets are very important in this class. Students must be able to work the problems that demonstrate understanding of chemical relationships within a realistic amount of time to allow assessment. Therefore, practice problem sets will be assigned, collected, and graded. Failure to complete these problem sets will impact the final grade both as lost points in the assignment category, and in loss of speed on the tests.

Laboratory exercises designed to give hands on experience that illustrates concepts discussed in lecture are presented in the corequisite class CHM 131A Introduction to Chemistry Laboratory.

-Internet search assignments designed to allow students to access and evaluate commonly available supplemental material.

-Audio/visual aids including PowerPoint presentations, movies, videos, and DVDs on selected topics illustrative of material covered in class.

-Outside Reading Assignments

Students are responsible for all material presented.

## ASSESMENTS/METHODS OF EVALUATION:

To demonstrate attainment of program and learning outcomes for CHM 131 Introduction to Chemistry, you must achieve an overall average of 70% or better. To achieve these outcomes, you must successfully complete the following:

6 Tests @ 100 pts. Each	60%
Homework and Problem Sets	20%
Outside Reading Assignments	5%
<u>Final Exam</u>	<u>15%</u>
	100%

**GRADING POLICY: This class is a college transfer class. In order to transfer this class to another institution, a grade of “C” or higher is required. It is graded on a ten point scale, therefore, in order to transfer this class, you must get a 70 or higher as your final grade.**

### GRADING SCALE:

90-100	A
80-89	B
70-79	C
60-69	D
Below 69	F

**Extra Credit** will be available during the semester in the form of write-ups and selected exercises from lab assignments. You must be present at the time it is assigned in order to take advantage of it, and it must be turned in on time in order for you to get credit for it.

## COURSE OUTLINE:

THIS IS A GUIDE AND IS SUBJECT TO CHANGE! KEEPING UP WITH CHANGES IS YOUR

RESPONSIBILITY!

Week	Topic	Chapter(s)
Week #1	<b>Chapter 1:</b> Chemistry and Measurement & Chapter 2: Atoms, Molecules, and Ions Atomic Theory and Atomic Structure	1
Week #2	<b>Chapter 2:</b> Atoms, Molecules, and Ions; Chemical Substances and Chemical Reactions/Equations.	2
	<b>Test #1 Chapters 1-2 Inclusive</b>	
Week #3	<b>Chapter 3:</b> Calculations with Chemical Formulas & Equations: Mass and Moles, Chemical Formulas, Stoichiometry: Quantitative Relations in Chemical Reactions	3
Week #4	<b>Chapter 4:</b> Chemical Reactions: Ionic Theory of Solutions and Solubility rules, Molecular and Ionic Equations, Precipitation Reactions, Acid- Base Reactions, Oxidation-Reduction Reactions, Balancing Simple Oxidation-Reduction Equations, Molar Concentration, Diluting Solutions, Gravimetric Analysis, Volumetric Analysis	4
Week #5	<b>Chapter 5:</b> The Gaseous State. Gas pressure and its measurement. Empirical Gas Laws. The Ideal Gas Law. Stoichiometry Problems involving Gas Volumes. Gas Mixtures; Law of Partial Pressures. Kinetic Theory of an Ideal Gas. Molecular Speeds, Diffusion and Effusion. Real Gases.	5
	<b>Test # 2 Chapters 3-5 Inclusive</b>	
Week #6	<b>Chapter 6:</b> Thermochemistry: Energy and its Units, Heat of Reaction, Enthalpy and Enthalpy Change, Thermochemical Equations, Applying Stoichiometry to Heats of Reaction, Measuring Heats of Reaction, Hess's law, Standard Enthalpies of formation, fuels.	6
Week #7	<b>Chapter 6:</b> Thermochemistry: Energy and its Units, Heat of Reaction, Enthalpy and Enthalpy Change, Thermochemical Equations, Applying Stoichiometry to Heats of Reaction, Measuring Heats of Reaction, Hess's law, Standard Enthalpies of formation, fuels. <b>Chapter 7</b> Quantum Theory and the Atom,: the wave Nature of Light, Quantum Effects and Photons, the Bohr theory of the Hydrogen atom, Quantum Mechanics, Quantum Numbers and Atomic Orbitals	6&7
Week #8	<b>Chapter 7</b> Quantum Theory and the Atom,: the wave Nature of Light, Quantum Effects and Photons, the Bohr theory of the Hydrogen atom, Quantum Mechanics, Quantum Numbers and Atomic Orbitals	7
	<b>Test # 3 Chapters 6-7 Inclusive</b>	
Week #8	<b>Chapter 8:</b> Electron Configurations and periodicity: Electron spin and the Pauli Exclusion Principle, Building -up Principle and the Periodic Table, Writing Electron Configuration Using the Periodic Table, Orbital Diagrams of atoms and Hood's Rule, Mendeleev's Predictions from the Periodic Table, Some Periodic Properties, Periodicity and the Main Group Elements	8
Week #9	<b>Chapter 9:</b> Ionic and Covalent Bonding, Describing Ionic Bonds, Electron Configuration of Ions, Ionic Radii, Describing	9

	Covalent Bonds, Polar Covalent Bonds: Electro-negativity, Writing Lewis Electron Dot Formulas, Delocalized Bonding Resonance, Exception to the Octet rule, Formal Charge and Lewis Formula, bond Length and Bond Order, Bond Energy	
Week #10	<b>Chapter 10:</b> Molecular Geometry and Chemical Bonding: the Valence Shell Electron-Pair Repulsion Model, Dipole Moment and Molecular Geometry, Valence Bond Theory, Description of Multiple Bonding, Principles of Molecular Orbital Theory, Electron configuration of Diatomic Molecules of the Second Period Elements, Molecular Orbitals and Delocalized Bonding.	10
	<b>Test #4 Chapters 8,9, and 10</b>	
Week #11	<b>Chapter 11:</b> States of Matter: Liquids and Solids, Phase Transitions, Phase Diagrams, Properties of Liquids: Surface Tension and Viscosity, Intermolecular Forces; Explaining Liquid Properties, Classification of Solids by Types of Attractions of Units, Crystalline Solids; Crystal Lattice and Units Cells, Structures of some Crystalline Solids, Calculations involving Unit Cell Dimensions, Determining Crystal Structure by X-Ray Diffraction,	11
Week #12	<b>Chapter 12:</b> Solutions, Types of Solutions, Solubility and the Solution Process" Effects of Temperature and Pressure on Solubility, Ways of expressing Concentration, , Vapor Pressure of a Solution, Boiling -Point Elevation and Freezing Point Depression, Osmosis, Colligative Properties of Ionic Solutions, Colloids	12
Week #13	<b>Chapter 16:</b> Acids and Bases: Arrhenius Concept of acids and bases, Bronsted-Lowry concept of Acid and Bases, Lewis Concept of Acids and Bases, Relative Strength of Acids and Bases, Molecular Structure and Acid Strength, Self-Ionization of water, Solutions of a Strong Acid or Base, The pH of a Solution	16
	<b>Test #5 Chapters 11, 12 and 16</b>	
Week #14	<b>Chapter 17:</b> Acid-Base Equilibria, Acid-Ionization Equilibria, Polyprotic Acids, Base -Ionization Equilibria, Acid -Base Properties of Salt Solutions, Common-Ion Effect, Buffers, Acid-Bases Titration Curves.	17
Week #15	<b>Chapter 21:</b> Nuclear Chemistry, Radioactivity, Nuclear bombardment Reactions, Radioactivity and Matter: Detection an Biological Effects, Rate of Radioactive Decay, Applications of Radioactive Isotopes. Mass-Energy Calculations, Nuclear Fission and Nuclear Fusion	21
	<b>Test #6 Chapters 17 and 21</b>	
Week #16	<b>Comprehensive Final Exam</b>	

#### **STUDENT ATTENDANCE POLICY:**

The Martin Community College Attendance Policy (Martin Community College Career Catalogue 2009-11page 44) is in effect, as well as the administrative withdrawal policy (Martin Community College Career Catalogue 2009-11page 44). Students must attend at least once within the first 10% of the scheduled hours of the class in order to be enrolled, or their names will be removed from the attendance roster. Students missing more that 6 (six) contiguous contact hours without contacting, and speaking to the instructor or more than 10% (5 hours) of the total contact hours may be administratively withdrawn from class, and in that case will receive a "WF"

which counts as an "F" as their final grade. Students may only be readmitted to class with the written approval of the instructor, as the instructor must file a form with the registrar in order to readmit the student. Students who have been administratively withdrawn from a class will not be allowed in the classroom/lab for liability reasons. The student is responsible for all material covered, including any announcements, such as test dates made while he/she was out. Students should be prepared to submit all missed work at the time of re-entry to the class. A student may remove the "WF" grade by submitting appropriate paperwork for an official withdrawal by the last day to officially withdraw without receiving an "F" during the semester to the Registrar's office. The last day to officially withdraw from this class is 3/24/11.

In compliance with G. S. 115D-5. MCC policy permits a student to be excused, with the opportunity to make-up any test or other missed work, a minimum of two excused absences per academic year for religious observances required by the student's faith. The policy limits the excused absences to a maximum of two days per academic year.

Students who wish to be excused for a Religious Observance required by their faith must complete and submit a request form to the instructor(s) prior to the census date of each class. The Request for Excused Absences for Religious Observances form can be picked up from Student Services. This does not supersede the college-wide attendance policy as outlined in the college catalog or syllabus for the course, with the exception of a reasonable accommodation for the make-up of missed course work.

## **COURSE POLICIES:**

### **TESTING POLICY:**

Students must notify the instructor BEFORE the test in order to qualify for a makeup. If a student fails to take a test at the announced time, he or she must provide a written, verifiable, medical reason for the absence in order to qualify for a makeup. Students may make up ONE exam if the student has such a reason. A 10-point per day penalty will be assessed for each day the makeup test is not taken immediately upon returning to class, including weekends. After four days a grade of zero will be given to those students who have not made up work. There will be no additional make-ups, regardless of the reason for the absence. Missing an arranged time for a make-up counts as an additional missed exam. This will result in a zero grade for that exam, and loss of make-up privileges for all future missed work.

### **ACADEMIC INTEGRITY POLICY:**

Lying, cheating and plagiarism are forms of academic dishonesty that violate the integrity of any academic process and will not be tolerated. For purposes of this class:

**Lying** includes but is not limited to falsifying information provided as verification for the reason you were not able to complete work on time.

**Cheating** is but is not limited to:

1. Receiving, giving, or helping another student receive or give any information during a quiz, test, examination, or individual assignment without the express permission of the instructor.
2. Copying work from another student, or submitting work done by another student as your own.
3. Using unauthorized materials or equipment during a quiz, test, or examination, e.g. notes or books or electronic devices.
4. Communicating the subject matter, or contents of a quiz, test, or examination to another student unless specifically authorized by the instructor to share it.
5. Taking a quiz, test, or examination for another student.
6. Obtaining quiz, test, or examination questions beforehand, including viewing any quiz, test or examination presented on the internet before answering for submission.
7. Tampering with the grading of a quiz, test, or examination.
8. Working with others in completing take-home quizzes, tests, examinations, or individual assignments unless

the instructor specifically authorizes collaborative work.

**Plagiarism is:**

Webster's New World Dictionary defines the word "plagiarize" as "to take (ideas, writings, etc.) from (another) and pass them off as one's own". Plagiarism is fraud, and under US law it is theft. Almost all forms of expression are covered by some form of legal protection, as intellectual property of the originator. Using another's words or thoughts and not giving them credit appropriately will result in an "F" for the assignment for a first offense, and an "F" for the class for the second offense. You will receive detailed instructions describing how to footnote and cite information before being asked to turn in written material. Failing to consult that information, and properly cite the work you have used as a reference will result in consequences.

Any violation of academic integrity will result in disciplinary action. An instructor, department head or the Dean of Academic Affairs and Student Services may impose either of the following disciplinary actions for a violation of academic integrity:

*Loss of Grade:* an instructor may give a zero for the assignment, quiz, or test.

*Loss of Credit:* the student will receive an F for the course and will be dropped from the current semester roll.

For more information concerning the behavior expected of a student at Martin Community College please see the Student Governance and Conduct Code in the Martin Community College Career Catalogue for 2009-11.

Keep in mind that as your instructors are often asked to provide your references, Academic Integrity Violations and/or violations of the Student Governance and Conduct Code may affect your ability to get a job in the future. As future professionals you should cultivate a professional attitude and professional conduct and behavior now. Unprofessional habits are hard to break later on!

**OTHER COURSE POLICIES:**

1. Students are expected to read the topics to be discussed in class before coming to class that day. This will give you a leg up in understanding the discussion for the day, and allow you to participate in an active way. Extra credit points in the form of pop quizzes are always a possibility.
2. No food or drink is allowed in the classroom, or laboratory, as this is a violation of OSHA standards. Food or drink brought into the room will be confiscated, as will any makeup that is taken out of a purse or backpack. This is a professional work environment, not a lounge area, cultivate a professional attitude and professional conduct and behavior now. Unprofessional habits are hard to break later on!
3. Attendance is taken by signing the roll for each hour. Failure to sign the roll will result in an absence for that period. It is the student's responsibility to sign the roll, even if you come in late. If your name is not on the roll you will be marked absent.
4. It is your responsibility to keep track of your absences, the instructor will not warn you when you are close to or over the limit. If you cannot remember when you were absent, you did not have a memorable and therefore not particularly important reason for being absent. As future professionals, you are expected to cultivate professionalism as part of your education. Attending class regularly is a sign of maturity and commitment. You will not keep a job if you miss work often, nor will you receive a passing grade in this class.
5. Three tardies are counted as one hour of absence for attendance purposes.
6. You are responsible for material covered in class whether you are present or not including announcements of class-work due or test date changes if it becomes necessary.
7. Confirmed Test Dates are announced two class meetings in advance! If you are absent on the day a test is announced, you are still responsible for taking the test on time.
8. There is to be no talking during an exam. Raise your hand and wait to be recognized by the instructor before speaking. Any student talking during an exam will receive a zero for that exam.
9. Exams will begin and end on time, students arriving late will not receive additional time. Do not arrive late for tests or exams!

10. Cell phone use is prohibited during class. This includes "bluetooth" and any other hands free devices. If your cell phone goes off during a test, you will receive a zero for the grade for that test.
11. If you leave the room for any reason during an exam, you will be required to turn in your test, and you will not get it back. Visit the restroom before beginning the exam.
12. Lab reports and any other assignments will not be accepted late.
13. Extra credit is a privilege not a right. It is assigned at the discretion of the instructor, and will not be accepted late.
14. For your protection, you will need a lab coat which buttons fully down the front, and eye protection that fits over your glasses if you use them. These items will be necessary for some of the labs with experiments that involve handling chemicals. Failure to produce the items when directed to bring them to lab will result in expulsion from the lab, with the time credited as absence, and a "0" for any assigned work during that time. Due to budgetary restraints, labs may not be able to be made up. **STUDENTS SHOULD NOT MISS LAB, AS THEY MAY RECEIVE A "0" FOR MISSED LAB WORK.**
15. Long hair must be pulled back and tied at all times in the laboratory.
16. Close-toed shoes are a requirement in the laboratory. This is an OSHA requirement. Students arriving in open-toed shoes (sandals, or flip-flops, slings or anything without closed toes) on laboratory days will be asked to leave and given a "0" for any work assigned that day. On lecture days the first violation will result in a oral warning, a second violation will result in a written warning, and a third violation will result in expulsion and a "0" for any work for that class day including tests.
17. Students must comply with all posted safety notices, and instructions from the instructor. They are there for your protection. Failure to comply with posted safety instructions or obey instructors will result in disciplinary action.
18. There is no horseplay in the classroom/laboratory. This is a work environment, and horseplay generally puts someone at risk of injury, or even death. Students violating this rule in a minor (discretion of the instructor) way will be given an oral warning, a second violation will result in a written warning, and a third violation will result in expulsion and an "F" for the class. Students deliberately putting another student at risk of injury or death (any second violation will be interpreted as deliberate) will be expelled from class and will receive an "F" as a final grade.
19. Students vandalizing or deliberately misusing equipment may be required to pay for damage to or replacement of that equipment. Students violating this rule in a minor (discretion of the instructor) way will be given an oral warning, a second minor violation will result a written warning, and a third minor violation will result in expulsion and an "F" for the class. Students deliberately putting equipment at risk of damage that would make it not available to other students or dangerous to use or be around (any second violation will be interpreted as deliberate) will be expelled from class, will receive an "F" as a final grade, and be required to pay for the repair or replacement of the equipment.
20. Theft of college equipment or supplies will result in an "F" for the class, suspension or expulsion, and may result in criminal charges being filed.
21. **You will also need a calculator, paper, and pen/pencil for every class. BRING YOU TEXTBOOK WITH YOU TO EVERY CLASS!**

**If you cannot reach your instructor, you may contact Dr. Phyllis Broughton, Dean of Academic Affairs and Student Services at (252)789-0246 by phone, pbroughton@martincc.edu by e-mail, or in person at her office in Building 2, Room 33.**

**To access the Martin Community College Career Catalog for policies and curriculum requirements, please go online to [www.martincc.edu](http://www.martincc.edu).**

*If you have a need for a disability-related accommodation, please notify the Student Services counselor at (252) 789-0293.*