



Morehead State University,  
Professional Education Unit  
Department of Biology and Chemistry

Course Syllabus CHEM 112 (Face to Face)  
Spring 2010

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### **Course Description**

**CHEM 112. Principles of Chemistry II.** (3-2-4); I, II. Prerequisite: Grade of "C" or better in CHEM 111. Continuation of CHEM 111. An introduction to chemical equilibria, thermodynamics, and kinetics, electro-chemistry, and coordination compounds, with laboratory. The descriptive chemistry of selected groups of elements is introduced.

**Field Experience Hours:** Not Applicable

### **COMMUNITY ENGAGEMENT: A LIGHT TO AND FROM THE MOUNTAINS**

The Professional Education Unit at Morehead State University delivers rigorous, high quality programs that prepare professionals informed by the best national and international scholarship, research, literature, and experiences specific to Appalachia-preparing professionals to improve schools, quality of life, and the communities in which they live and serve. This statement is not only the strategic mission for the College, but it also incorporates the conceptual framework that guides our activities.

### **Conceptual Framework Outcomes (CFOs):**

The Unit and the faculty within individual programs assess the degree to which its graduates:

1) Master the content knowledge, professional and the twenty – first century skills need to make an optimal contribution to “whole” student learning in education settings.

- 2) Are competent in the collection and use of data to inform decision – making and to demonstrate accountability for student learning.
- 3) Demonstrate professional dispositions
- 4) Are culturally competent and understand the regions from which they have come utilizing knowledge and experiences to effectively “bridge the gaps” (economic, achievement, and geographic) ensuring optimal learning for all students.
- 5) Engage in authentic field experiences in collaboration with committed school – based partners and are empowered to improve the quality of education throughout this region and beyond.

**Student Learning Outcomes (SLOs):** By the end of the course, the candidate will be able to:

1. Use Reference tools
2. Make sense of materials they read
3. Make sense of things they observe
4. Use mathematical ideas and procedures to communicate, reason and solve problems

**Required Text:** "Chemistry. A Molecular Approach" Tro. ISBN 978-0-13-1000065-0

Course Evaluations: Will be administered at the end of the semester using an evaluation formspecific for the Department of Biology and Chemistry.

Explanation of assignments and their point values are explained in the following two tables. The point values will vary depending on instructor.

**NCATE/ EPSB Accreditation Alignment of CFOs and SLOs:**

Program: Chemistry 9-12		CHEM 112			
Aligned with → Assessment (point values) ↘	Kentucky Teacher Standards (KYS)	Kentucky Education Reform Act (KERA)	Education Professional Standards Board (EPSB)/ NCATE	National Science Teachers Association (NSTA)	NCATE
Homework (paper or on-line), In-Class Quizzes (15-30%) CFO: 1,2 SLO: 1,2,3,4	1.1	SC-H-STM-U (1,5,6,7,8); SC-H-STM-S (5,13,14) SC-HS-1.1.4, 1.1.6, 1.1.8	Literacy	Biology: Supp: 22, 24 Chemistry: Core: 4,5,7,8,9,11,12,13 Adv. 17,18,20,25,26,27 Physics: Supp: 29	1
In-Class Exams (30-40%) CFO: 1,2 SLO: 1,2,3,4	1.1	SC-H-STM-U (1,5,6,7,8); SC-H-STM-S (5,13,14) SC-HS-1.1.4, 1.1.6, 1.1.8	Literacy/Reading	Biology: Supp: 22, 24 Chemistry: Core: 4,5,7,8,9,11,12,13 Adv. 17,18,20,25,26,27 Physics: Supp: 29	1
Final Exam (ACS Standardized) (15-20%) CFO: 1,2 SLO: 1,2,3,4	1.1	SC-H-STM-U (1,5,6,7,8); SC-H-STM-S (5,13,14) SC-HS-1.1.4, 1.1.6, 1.1.8	Literacy/Reading	Biology: Supp: 22, 24 Chemistry: Core: 4,5,7,8,9,11,12,13 Adv. 17,18,20,25,26,27 Physics: Supp: 29	1
Laboratory (25%) CFO: 1,2 SLO: 1,2,3,4	1.1	SC-H-STM-U (1,5,6,7,8); SC-H-STM-S (5,13,14) SC-HS-1.1.4, 1.1.6, 1.1.8	Literacy/Reading	Biology: Supp: 22, 24 Chemistry: Core: 4,5,7,8,9,11,12,13 Adv. 17,18,20,25,26,27 Physics: Supp: 29	1

**Assignment/Assessment Descriptions:**

Program: Chemistry 9-12	CHEM 112
Assessment (point value)	Description
Homework (paper or on-line), In-Class Quizzes (20%)	HW is designed to reinforce concepts discussed in the text or lecture.
In-Class Exams (35%)	Exams will apply to course lecture, assigned reading material and homework assignments.
Final Exam (ACS Standardized) (20%)	The exam is comprehensive for all material covered for the entire semester and is multiple-choice in format.
Laboratory (25%)	The laboratory component will consist of lab experiments and exercises that compliment the lecture material. Lab reports will be typed and formatted.

### **Laboratory:**

You may purchase the lab manual, towel and apron in Lappin 426 the first week of class.

Your laboratory course is designed to reinforce the concepts of the lecture, give you practice in observing, writing what you observe, performing simple reactions and making conclusions. Your attendance is imperative. An unexcused absence will result in a zero for that experiment. Lab reports should be typed (unless otherwise notified) and turned in one week after completion of the experiment. The format of the reports will be discussed at a later time. Notebooks will be periodically checked during lab periods but not collected. A penalty of 10% will be assessed each day for report turned in late (weekends count). NO make-up labs will be given without an official excused absence. You must come and talk to me about attending another lab section **during the same week**. Make up labs must be performed in the same week as originally scheduled. Missing or not turning in a lab report for 3 or more lab periods will result in a failing grade for lab and the course as a whole. You must pass lab independent of lecture and vice versa.

**Terms-definitions**, please read and understand the definitions to all of the bold type words in each chapter. A glossary is included in your lab manual for most of the terms.

### **Homework and quizzes:**

**Read** the pages of the text for that day. **Work** the assigned problems. If you cannot work all of the problems, ask about them during class or come and see me. Be assured, other students will have the same questions. Written homework is due at the beginning of class.

There is much to be learned and a lot of stuff to be memorized. Normally, on most class days, we will have a quiz to see that you have memorized symbols for elements, charges of ions, definitions for that day, or whether or not you can work a problem that we covered the day before. No make-up quizzes will be given. You will have two quiz scores to drop during the semester; a missed quiz will simply be your dropped quiz.

### **Tests:**

Three 1-hour in-class tests will be given on or near the specified dates in the course schedule. No make-up exams will be given. For official excused absences, your final exam score will also count as your missed test score. Contact me immediately after you know you are going to miss or have missed an exam.

### **Attendance:**

Mandatory. 7 or more unexcused absences will earn a failing grade for the course. Please be in class on time. Coming in late is a big distraction to the rest of the class. Please come and talk to me immediately in the event you do miss a class. If you know you are going to miss a class, come and tell me BEFORE that date.

### **Academic Honesty:**

Any form of cheating will not be tolerated. Your work is to be your own, not copied in part or whole from another source. The bare minimum penalty will be a zero for the assignment and will depend on the nature of the infraction and could result in expulsion from the class with a failing grade.

### **Grading:**

Lecture	75%	Total
Final Exam	20%	
Tests (in class)	35%	
Quizzes/HW	20%	

Lab 25% Total

A failing grade in the laboratory section will result in a failing grade for the course. You must pass both the lecture and lab independently to pass the course. Failure to attend or complete 3 laboratories (3 weeks of lab) will result in a failing grade for the course.

I will use the standard scale:

>90.0	=	A
80.0-89.9	=	B
70.0-79.9	=	C
60.0-69.9	=	D
<59.9	=	E

I do reserve the right to adjust (curve) this scale according to class performance. Rounding will occur to the tenths digit. Therefore, an 89.95 will round to a 90.0 score. An 89.94 will round to an 89.9 score.

### **Class Etiquette:**

Use of a cellular phone in any capacity is prohibited during class. Turn off cellular phones before class begins. If you have an issue where it is imperative that you are able to receive a call during class, come to me before class and explain your situation. General disruptions to class such as conversations, snoring, etc. should be avoided. You may be asked to leave the class if you cannot be respectful to the rest of class or the professor.

### **Academic Honesty**

Cheating, fabrication, plagiarism or helping others to commit these acts will not be tolerated. Academic dishonesty will result in severe disciplinary action including, but not limited to, failure of the student assessment item or course, and/ or dismissal from MSU. If you are not sure what constitutes academic dishonesty, read the Eagle: Student Handbook or ask your instructor. An example of plagiarism is copying information from the internet when appropriate credit is not given. The policy is located at <http://morehead-st.edu/units/studentlife/handbook/academicdishonesty.html>

### **Americans with Disabilities Act (ADA)**

In compliance with the ADA, all students with a documented disability are entitled to reasonable accommodations and services to support their academic success and safety. Though a request for services may be made at any time, services are best applied when they are requested at or before the start of the semester. To receive accommodations and services the student should immediately contact the Disability Services Coordinator in the Office of Academic and Career Services, 223 Allie Young Hall, 606-783-5188, [www.moreheadstate.edu/acs/](http://www.moreheadstate.edu/acs/) Students should contact the instructor by the second week of class if accommodations are needed.

### **Campus Safety Statement:**

Emergency response information will be discussed in class. Students should familiarize themselves with the nearest exit routes in the event evacuation becomes necessary. You should notify your instructor at the beginning of the semester if you have special needs or will require assistance during an emergency evacuation. Students should familiarize themselves with emergency response protocols at <http://www.moreheadstate.edu/emergency>

**Class Schedule** Tentative reading schedule. Page numbers are from Tro and “Notes” refer to reading material in your lab manual.

Date	Day	Reading	Topic
Jan 15	T	Ch 20, p 902-911, Ch 10, p 423-432	structure, covalent bond, $\sigma$ & $\pi$ bonds, $sp^3$ , $sp^2$ , $sp$ hybrid orbitals, functional group, heteroatom
Jan 17	Th	p 912-926	hydrocarbon, skeleton, alkane, homologous series, ring, constitutional isomer, stereoisomer, chiral, enantiomer, optical activity, alkene, unsaturated, diastereomer, cis/trans, alkyne, aromatic
Jan 22	T	p 927-938	alcohol, ether, haloalkane, amine, carbonyl, aldehyde, ketone, carboxylic acid, carboxylate, ester, amide, nitrile, phenol, phenoxide, ammonium compd
Jan 24	Th	Ch 11, p 465-472, Ch 12, p 518-533	intermolecular force, dipole moment, dispersion, hydrogen bond, surface tension, capillary action, viscosity, solute, solvent, solution, suspension, solubility, saturated, dilute, concentrated, alloy, $\Delta H_{\text{soln}}$ , hydration, Henry's law, miscible
Jan 25	F	Notes 1-3, Ch 4, p 155-159	precipitate, (net) ionic equation, spectator ion,
Jan 29	T	Ch 4, p 144-149, Ch 12, p 535-558	molarity, molality, per cent, mole fraction, colligative property, (non)electrolyte, vapor pressure lowering, boiling point elevation, freezing point depression, osmosis, van't Hoff factor
Jan 31	Th	Ch 13, p 568-579, Notes 94-97	kinetics, reaction rate, rate equation, rate constant, rate law, (reaction) order
Feb 5	T	Ch 13, p 580-593, Notes 97-107	integrated rate law, half-life, Arrhenius equation, activation energy, transition state, intermediate, collision theory, energy diagram (profile)
Feb 7	Th	Ch 13, p 594-603, Notes p 108-121	reaction mechanism, (elementary) step, uni- bi- ter-molecular, rate-determining step, catalyst, heterogeneous, homogeneous
Feb 8	F	Exam	
Feb 12	T	Ch 14, p 616-632, Notes 4-7	equilibrium, equilibrium constant, LeChatelier's principle,
Feb 14	Th	Ch 14, p 633-644, Notes 7-14	law of chemical equilibrium (mass action), reaction quotient
Feb 19	T	Ch 14, p 645-652, Notes 14-18	
Feb 21	Th	Ch 15, p 662-671, Notes 25-36,	acid/base, conjugate acid/base, acid-dissociation constant $K_a$ , $pK_a$ , base-dissociation constant $K_b$ , $pK_b$ , hydronium ion, hydroxide ion, Brønsted, Arrhenius,

			autoionization $K_w$ ,
Feb 22	F	Ch 15, p 672-697, Notes 37-42,	pH, pOH, neutralization, K,
Feb 26	T	Ch 15, p 698-707	polyprotic acids/bases, titration curves
Feb 28	Th	Ch 16, p 716-732, Notes 42-46,	buffers, Henderson-Hasselbalch eqn, buffer capacity
Mar 4	T	Ch 16, p 747-755, Notes 19-24,	solubility-product constant, $K_{sp}$ , $pK_{sp}$ , common ion,
Mar 6	Th	Ch 16, p 759-763, Notes 49-58,	complex ion, formation constant $K_F$ , ligand, mono- bi- tridentate, isomerism
Mar 7	F	Midterm, Ch 24	transition elements, coordination number, Lewis acid/base,
Mar 11	T		
Mar 13	Th	exam	
Mar 25	T	Ch 6, p 241, 253-256, Ch 17, p 774-787	laws of thermodynamics, spontaneous reaction, enthalpy, entropy
Mar 27	Th	Ch 17, p 788-803	free energy, work, temperature effect, $\Delta G$ & K/Q
Mar 28	F	Ch 17, p 804-809	
Apr 1	T	Ch 18, p 818-826, Notes 59-61,	oxidation, reduction, oxidation number, oxidizing/reducing agent,
Apr 3	Th	Ch 18, p 827-836, Notes 62-68,	balancing redox eqns, electrochemical cell, half-reaction, voltaic cell
Apr 8	T	Ch 18, p 837-841, Notes 68-75,	Nerst eqn, reduction/cell potential, $\Delta G$ & E/Q, SHE,
Apr 10	Th	Notes 76-81,	cell potential and equilibrium
Apr 11	F	Ch 18, p 842-855, Notes 81,	electrolysis, battery, corrosion, overvoltage, Faraday's law
Apr 15	T		
Apr 17	Th	exam	
Apr 22	T	Ch 20, p 938-941, Ch 21, p 961- 965, 970-973, 978	polymer, addition/condensation polymer, monomer(s),
Apr 24	Th	Ch 19, p 864-882	radioactivity, radiation, $\alpha$ , $\beta$ , $\gamma$ , decay, half-life, isotopic dating,
Apr 25	F	Ch 19, p 883-888	nuclear binding energy, mass deficit, $E=mc^2$ , fission, fusion, solar system
Apr 29	T	Ch 19, p 889-895	transmutation, transuranium elements, rad/rem, tracer
May 1	Th		
May x		Final	