

Special Topics in Chemistry (SCIT 1494)



Credit: 4 semester credit hours (3 hours lecture, 2 hours lab)

Corequisite: MATH 1332

Course Description

Topics address recently identified current events, skills, knowledge, and/or attitudes and behaviors pertinent to the technology or occupation and relevant to the professional development of the student.

Required Textbook and Materials

1. *Introductory Chemistry: Concepts and Connections* by Charles Corwin, Sixth edition, Pearson Prentice Hall Publishers.
 - ISBN-10: 0321803213
 - ISBN-13: 9780321803214
2. Three ring binder.
3. Tabbed dividers.
4. Scientific calculator.
5. Pens or pencils.
6. Safety glasses or goggles.

Course Objectives

Upon completion of this course, the student will be able to:

1. Define the terminology as related to basic inorganic and organic chemistry.
2. Describe basic atomic and molecular structure.
3. Name and write chemical formulas for common inorganic compounds and hydrocarbons.
4. Write and balance chemical equations, and be able to describe how this relates to material balance in a process facility.
5. Identify reaction types and predict products of basic reactions.
6. Categorize hydrocarbon derivatives.
7. Describe basic polymer chemistry.
8. Draw the pH scale and explain its relationship to acids and bases.
9. Demonstrate laboratory skills related to chemistry principles, including measuring physical and chemical properties of matter, and applying safe laboratory practices.

Course Outline

A. Introduction to Chemistry

1. Evolution of Chemistry

Approved 1/2014

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Course Syllabus

- 2. Modern Chemistry
- B. Scientific Measurement
 - 1. Uncertainty in Measurements
 - 2. Significant Digits
 - 3. Scientific Notation
 - 4. Unit Analysis
 - a. Conversion Factors
 - b. Dimensional Analysis
- C. The Metric System
 - 1. Basic Units, Symbols, Prefixes
 - 2. Metric Conversion Factors
 - a. Metric-Metric
 - b. Metric-English
 - 3. Volume by Calculation
 - 4. Volume by Displacement
 - 5. Density
 - a. Concepts of Density
 - b. Density Calculations
 - c. Specific Gravity
- D. Matter and Energy
 - 1. Physical States of Matter
 - 2. Elements, Compounds and Mixtures
 - 3. Names & Symbols of Elements
 - 4. Metals, Nonmetals & Semimetals
 - 5. Compounds & Chemical Formulas
 - 6. Physical and Chemical Properties
 - 7. Physical and Chemical Changes
 - 8. Conservation of Mass
- E. Models of the Atom
 - 1. Atomic Notation
 - 2. Atomic Mass
- F. The Periodic Table
 - 1. Classification of Elements
 - 2. Periodic Law Concept
 - 3. Groups & Periods of Elements
 - a. Representative Elements
 - b. Transition Elements
 - 4. Periodic Trends
 - 5. Properties of Elements
- 6. Valence Electrons
- 7. Electron Dot Formulas
- 8. Ionization Energy
- 9. Ionic Charges
 - a. Metals
 - b. Nonmetals
- G. Chemical Bonding
 - 1. The Chemical Bond Concept
 - 2. Ionic Bonds
 - a. Cations
 - b. Anions
 - 3. Covalent Bonds
 - a. Polar Covalent Bonds
 - b. Non Polar Covalent Bonds
 - 4. Lewis Bonding Structures
- H. The Language of Chemistry
 - 1. Classification of Compounds
 - 2. Ions
 - a. Monatomic Ions
 - b. Polyatomic Ions
 - 3. Writing Chemical Formulas
 - 4. Ionic Compounds
 - a. Binary
 - b. Ternary
 - 5. Molecular Compounds
 - a. Binary Covalent
 - b. Binary Acids
 - c. Ternary Acids
- I. The Mole Concept
 - 1. Avogadro's Number
 - 2. Mole Calculations
 - 3. Molar Mass
 - 4. Percent Composition
- J. Chemical Reactions
 - 1. Evidence for Chemical Reactions
 - 2. Symbols in Chemical Reactions
 - 3. Writing Chemical Equations
 - 4. Balancing Chemical Equations
 - 5. Material Balance
- 5. Classifying Chemical Reactions
 - 1. Combination Reactions
 - 2. Decomposition Reactions

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- 3. Single Replacement
- 4. Double Replacement
 - a. Special type-
- Neutralization
- 5. Combustion of Organics
- K. Acids and Bases
 - 1. Properties of Acids and Bases
- L. Organic Chemistry
 - 1. Structures and Naming
 - a. Hydrocarbons
 - b. Alkanes
 - c. Alkenes and Alkynes
 - d. Arenes
 - 2. Common Reactions
 - 3. Polymers
 - a. Monomers and Polymers
 - b. Addition Reactions
 - c. Condensation Reactions
- e. Hydrocarbon Derivatives
 - 1. Halides
 - 2. Alcohols
 - 3. Aldehydes
 - 4. Ketones
 - 5. Carboxylic Acids
 - 6. Ethers
 - 7. Esters
 - 8. Acid Anhydrides
 - 9. Amides
 - 10. Amines

Grade Scale

90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
0 – 59	F

Course Evaluation

Final grades will be calculated according to the following criteria:

1. 3 or 4 Unit Tests	50%
2. Comprehensive Final Exam	20%
3. Homework and Class Binder	10%
4. Laboratory	20%

Course Requirements

1. Semester binder containing all handouts, homework, tests, and labs.
2. Laboratory projects.
3. Chapter homework.
4. Unit tests.
5. Comprehensive Final Exam.

Course Policies

1. Each unit has assigned homework problems. All homework is due on the testing day for that unit and must be turned in inside a binder containing dividers as assigned by the instructor. All calculations must be shown to receive credit.

Completing only odd problems and skipping even problems will result in a grade of ZERO (0).

2. Makeup work, including labs and exams, may only be made up at the instructor's discretion. It is the responsibility of the student to contact the instructor as soon as possible to arrange for makeup work. All makeup work must be completed within one week of the original due date.
3. There is a 20 point penalty for work turned in less than one week late. There is a 50 point penalty for work turned in more than one week late, but less than two weeks late. Work turned in more than two weeks late will not be accepted.
4. Students will not be automatically dropped from the class due to poor attendance or grades. Discontinuing class attendance without properly submitting a drop request will result in a failing grade (F).
5. Students are expected to stay for the full duration of the lab period or until all data is taken, calculations are performed and the lab assignment is turned in. Reports are to be neat and complete. DO NOT USE RED INK. Corrections should be made by a single line through the incorrect data and the correction entered next to the old data. Calculations may be done in pencil, but data should be recorded in ink.
6. Safety rules must be abided by at all times. Any student who continually breaks the safety rules will be removed from the class to insure the safety of the other students in the class.
7. All electronic devices need to be turned off unless prior approval has been given by instructor to have them set to vibrate. (Permission will only be given in emergency situations.)
8. Children are not allowed in either the lecture class or laboratory at any time.
9. No food, drinks, or use of tobacco products in class.
10. Attendance in class is vital to understanding chemistry. If an absence is unavoidable, arrange with the instructor to attend another session of the class. If you are absent, it is your responsibility to obtain copies of at least two other student's notes and rewrite them in your notebook. If you need further assistance, please sit up an appointment with the instructor for a tutoring session. Excessive unexcused absences (per instructor's discretion) will result in a ten point deduction from the final semester grade. Attendance in lab is mandatory. Missed labs may be made up within one week without penalty at the instructor's discretion. Labs not made up within two weeks will result in a grade of zero (0). A lab that is one day to one week late will incur a 20 point penalty. A lab that is more than one week, but less than two weeks late will incur a 50 point penalty. At the end of the semester, three missed labs (grades of 0) will result in an automatic failing grade (F) for the course.

Disabilities Statement

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit the office in Student Services, Cecil Beeson Building.

Course Schedule

Week of	Topic	Reference
Week 1	Chapter 1: Introduction to Chemistry	pp. 1-9
	Chapter 2: Scientific Measurements	pp. 10-37
	Chapter 3: The Metric System	pp. 38-71
Week 2	Chapter 3: The Metric System, cont.	pp. 38-71
	Chapter 4: Matter and Energy	pp. 72-105
Week 3	Chapter 4: Matter and Energy, cont.	pp. 72-105
	Chapter 5: Models of the Atom	pp. 113-118, 122, 130-3
Week 4	Chapter 6: The Periodic Table	pp. 140-166
Week 5	Test 1: Chapters 1, 2, 3, 4, 5, 6	
	Chapter 12: Chemical Bonding	pp. 322-354
	Chapter 7: Language of Chemistry	pp. 168-194
Week 6	Chapter 12: Chemical Bonding, cont.	pp. 322-354
	Chapter 7: Language of Chemistry, cont.	pp. 168-194
Week 7	Chapter 12: Chemical Bonding, cont.	pp. 322-354
	Chapter 7: Language of Chemistry, cont.	pp. 168-194
Week 8	Chapter 7: Language of Chemistry, cont.	pp. 168-194
	Chapter 9: The Mole Concept	pp. 230-240, 244-245
Week 9	Test 2: Chapters 12, 7, 9	
	Chapter 8: Chemical Reactions	pp. 196-228
Week 10	Chapter 8: Chemical Reactions	pp. 196-228
Week 11	Chapter 8: Chemical Reactions	pp. 196-228
Week 12	Chapter 15: Acids and Bases	pp. 416-424
	Test 3: Chapters 8, 15	
Week 13	Chapter 19: Organic Chemistry	pp. 536-569

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Week 14	Chapter 19: Organic Chemistry	pp. 536-569
Week 15	Chapter 19: Organic Chemistry	pp. 536-569
Week 16	Test 4: Chapter 19	
	Final Exam: Comprehensive	

*The instructor reserves the right to make adjustments to this schedule as necessary.