Syllabus

CHE*K111 Concepts of Chemistry
Three Rivers Community College
Norwich, CT 06360

Instructor: Michael P. Carta, M.S.
Associate Professor

Office: C168

Phone: 860-215-9413

email: mcarta@threerivers.edu

Office hours: M 4:30-5:30 p.m.
T 9:00-10:00 a.m.
W 2:00-3:00 p.m.

Course Description: CHE* K111 - Concepts of Chemistry

4 CREDIT HOURS
Prerequisites: ENG K101 or ENG* K101S placement∞ or completion of ENG* K096 with a "C#" grade or better; MAT* K137 or MAT* K137S with a "C" grade or better (or permission of the instructor on math requirement).*
This course offers a brief and comprehensive survey of important chemical theories and some of the applications of chemistry. Topics covered will include measurements in chemistry, atomic structures and chemical bonding, chemical reactions, states of matter, stoichiometry, theories of solution, and basic organic and biochemical concepts. Course Design: CHE* K111 is meant for students with little or no background in chemistry who need the course in preparation for General Chemistry, or for students who need to meet a pre-admission requirement for nursing or other allied health programs, or those who need a lab science course.

Lecture (CRN 12372): TR 11:00-12:15 p.m. Room D212

Lab (CRN 12373): R 2:30-4:45 p.m. Room B216

Text: *Introductory Chemistry*, 6th ed., Tro. Publisher: Pearson.

Mastering Chemistry course code: MCCARTA86710

Lab Manual: *Concepts of Chemistry Laboratory Manual*. Publisher: Hayden-McNeill.

Other Required Materials: Chemical safety goggles, scientific calculator.

Learning Portfolio: All students are required to maintain an online learning portfolio in Digication that uses the college template.

General Course Objectives:

- To aid the student in developing an understanding of the basic concepts of chemistry.
- To encourage awareness of how chemistry affects our lives daily.
- To provide a useful body of knowledge for students studying chemistry, biology, fire science, environmental science, nursing and other allied health science areas.

Disabilities Notice:
If you have a disability that may affect your progress in this course, please meet with a Disability Service Provider (DSP) as soon as possible. Please note that accommodations cannot be provided until you provide written authorization from a DSP.

College Disabilities Service Providers	
Matt Liscum, Counselor (860) 215-9265 Room A113	• Learning Disabilities • ADD/ADHD • Autism Spectrum • Mental Health Disabilities
Elizabeth Willcox, Advisor (860) 215-9289 Room A113	• Medical Disabilities • Mobility Disabilities • Sensory Disability

Board of Regents for Higher Education and Connecticut State Colleges and Universities Policy Regarding Sexual Misconduct Reporting, Support Services and Processes Policy:

Public Act No. 14-11: An Act Concerning Sexual Assault, Stalking and Intimate Partner Violence on Campus:
"The Board of Regents for Higher Education (BOR) in conjunction with the Connecticut State Colleges and Universities (CSCU) is committed to insuring that each member of every BOR governed college and university community has the opportunity to participate fully in the process of education free from acts of sexual misconduct, intimate partner violence and stalking."

Title IX Statement of Policy:

"Title IX of the Education Amendments Act of 1972 protects students, employees, applicants for admission and employment, and other persons from all forms of sex discrimination, including discrimination based on gender identity or failure to conform to stereotypical notions of masculinity or femininity. All students are protected by Title IX, regardless of their sex, sexual orientation, gender

identity, part or full-time status, disability, race, or national origin, in all aspects of educational programs and activities."

Please Report Student Incidents to: Victoria Baker, Title IX Coordinator, Three Rivers Community College, 574 New London Turnpike Norwich, CT 06360 Room E110, (860) 215-9208, **VBaker@trcc.commnet.edu**

Non-discrimination policy:
Three Rivers Community College does not discriminate on the basis of race, color, religious creed, age, sex, national origin, marital status, ancestry, present or past history of mental disorder, learning disability or physical disability, sexual orientation, gender identity and expression, or genetic information in its programs and activities. In addition, the College does not discriminate in employment on the basis of veteran status or criminal record.
The following person has been designated to handle inquiries regarding the non-discrimination policies: Victoria Baker, Title IX Coordinator, Three Rivers Community College, 574 New London Turnpike Norwich, CT 06360 Room E110, (860) 215-9208, **VBaker@trcc.commnet.edu**

Academic Integrity:
Academic integrity is essential to a useful education. Failure to act with academic integrity severely limits a person's ability to succeed in the classroom and beyond. Furthermore, academic dishonesty erodes the legitimacy of every degree awarded by the College. In this class and in the course of your academic career, present only your own best work; clearly document the sources of the material you use from others; and act at all times with honor.

Academic and Classroom Misconduct:
The instructor has primary responsibility for control over classroom and laboratory behavior and maintenance of academic integrity, and can request the temporary removal or exclusion from the classroom or laboratory of any student engaged in conduct that violates the general rules and regulations of the institution, or any student engaged in conduct deemed hazardous in the laboratory. Extended or permanent exclusion from lecture or laboratory activities or further disciplinary action can only be effected through appropriate procedures of the institution. Plagiarism, cheating on quizzes or tests, or any form of academic dishonesty is strictly prohibited. Students guilty of academic dishonesty directly or indirectly will receive a zero for the exercise or quiz or test and may receive an "F" grade for the course in addition to other possible disciplinary sanctions which maybe imposed through the regular institutional procedures. Any student that believes that he or she has been erroneously accused may appeal the case through the appropriate institutional procedures if their grade was affected.

Class Attendance Policy:
Attendance of all lecture and laboratory periods is required. Attendance is taken at each class meeting, usually at the start of class. Students should make every effort to arrive on time. However, if you are late for class it is your responsibility to notify me so you are not marked absent. An explanation of the cause of any absence should be provided prior to the next class meeting (or in advance if it applies).

Revisions to the Syllabus:
Students are responsible for learning all of the course objectives and material discussed in lecture and lab. The instructor reserves the right to revise the objectives or academic schedule contained in this syllabus as necessary.

Make-Ups:
Make-ups are granted only if a test is missed due to extenuating circumstances such as illness, bereavement, work commitment, travel emergency, or other condition beyond the control of the student. Students must contact the instructor as soon as possible, prior to the next class meeting to explain the absence and arrange for a make-up. Labs can only be made up during the same week if another instructor can accommodate the student.
NOTE: Students with documented testing accommodations should schedule tests well in advance to ensure seat availability.

- Testing Center: Room A117. Phone 860-215-9061. Email: testing@threerivers.edu
- Students can also schedule make-ups via the school website, under student services/placement testing.

Cell phones and other electronic devices: Electronic devices must be silenced at all times. Under no circumstances are phones to be answered in class. When there are extenuating circumstances requiring a student to be available by phone, the student must notify the instructor prior to class, so that together they can arrive at an agreement. *A cell phone is not permitted as a substitute for a calculator on exams.*

Grade Determination:

5 Lecture Exams…….....…...75% of grade

2 Lab Exams plus 9 lab reports……..…….....25% of grade

How it breaks down:

5 lect. exams: 500 possible points x 0.75 = 375

2 lab exams: 200 possible points
9 lab reports: 300 possible points
500 possible points x 0.25 = 125

Total possible points = 500*

**Up to five extra credit points may be earned by completing online homework assignments in Mastering Chemistry.* Mastering Chemistry course code: MCCARTA86710

Grade Scale:

A ≥ 94	B+ 87-89	C+ 77-79	D+ 67-69
A- 90-93	B 84-86	C 74-76	D 64-66
	B- 80-83	C- 70-73	D- 60-63
			F ≤ 59

Course Withdrawal:

- Course withdrawals are recommended if you cannot complete the course and are accepted up until the week before classes end.
- Specific deadline dates are posted in the academic calendar and are strictly enforced.
- A grade of "W" will be assigned after you formally withdraw.
- If you stop attending classes without withdrawing, a grade of "W" will not be automatically assigned. Neglecting to withdraw may result in a grade of "F".
- It is strongly advised that you speak with your instructor before withdrawing. Instructor signature is not required to withdraw.

Course Objectives:

1. The student will develop "critical thinking skills" and will learn to derive sound scientific conclusions by analyzing scientific data.
2. The student will demonstrate knowledge of the scientific method through examples.
3. The student will be able to define science.
4. The student will be able to define chemistry, list and describe the various branches of chemistry.
5. The student will be able to define matter.
6. The student will be able to identify the three physical states of matter and describe their basic characteristics.
7. The student will be able to distinguish between homogenous and heterogeneous matter.
8. The student will be able to explain the difference between pure substances, solutions, homogeneous mixtures, and heterogeneous mixtures.
9. The student will learn the laws of conservation of energy and mass, and explain the interrelationship between these two laws.
10. The student will learn the division of elements into metals and non-metals and will be able to describe their chemical and physical properties.
11. The student will learn the rules for identifying significant digits.
12. The student will learn the correct use of significant digits in basic mathematical operations.
13. The student will learn the metric system of measurements and its application in science.
14. The student will be able to make conversions within the metric system.
15. The student will be able to covert metric units to English units and vice versa.
16. The student will learn the basic measures of matter.
17. The student will learn the correct procedures for measuring mass (weight).
18. The student will learn the correct procedures for measuring volume.
19. The student will be able to define and/or describe the distinguishing characteristics of the following terms: mass, weight, energy, calorie, joule, Newton of force, specific heat, density, and specific gravity.
20. The student will be able to define the term atom, describe the structure of an atom and give the general characteristics of atoms.
21. The student will be able to name the subatomic particles, explain their unique characteristics, and describe the arrangement of these particles in an atom.
22. The student will be able to define the term isotope and explain how isotopes differ from each other.
23. The student will be able to describe the unique characteristics of natural radioactive isotopes.
24. The student will be able to understand the principle energy levels and their electron capacities in relationship to the Quantum Mathematical Model.

25. The student will be able to demonstrate the arrangement of electrons in the principle energy levels, the arrangement of electrons in the sub-levels and the arrangement of electrons in the orbitals.
26. The student will be able to explain what is meant by valence electrons.
27. The student will be able to explain ionic charge, valence, and oxidation numbers.
28. The student will be able to explain electron arrangement as it relates to chemical bonding (ionic and covalent).
29. The student will be able to define terms, ions (cation and anion), molecules and compounds.
30. The student will learn to write chemical formulas for compounds.
31. The student will be able to understand the structure of some representative compounds.
32. The student will learn the general characteristics of the series and groups of elements in the periodic table.
33. The student will learn how to use the periodic table of elements as one of the tools for studying chemistry.
34. The student will learn the scientific methods for naming inorganic compounds.
35. The student will learn to calculate formula weights of elements, ions, molecules and compounds.
36. The student will learn to calculate the molar masses of elements, ions, molecules and compounds.
37. The student will learn to calculate the percent composition of each element in a compound.
38. The student will learn to calculate the empirical formula for compounds.
39. The student will learn the basic concepts of chemical equations.
40. The student will learn the terms and symbols used in writing a chemical equation, as well as their meanings.
41. The student will learn the guidelines for balancing chemical equations.
42. The student will be able to write and balance chemical equations.
43. The student will be able to do simple calculations involving chemical equations (Stoichiometry).
44. The student will be able to demonstrate knowledge of the unique characteristics of gases and the gas laws.
45. The student will be able to perform calculations involving the gas laws.
46. The student will demonstrate knowledge of the characteristics of water and other liquids.
47. The student will demonstrate knowledge of the characteristics of solids.
48. The student will be able to define the term solution, identify and give the characteristics of different types of solutions.
49. The student will be able to explain solubility and list factors that affect solubility, as well as, factors that affect the rate of solubility.
50. The student will be able to explain the difference between saturated, unsaturated and supersaturated solutions.
51. The student will be able perform calculations involving solutions (percent mass, molal, molar, normal).
52. The student will be able to give various definitions of acids and bases, and explain their properties.
53. The student will be able to define pH.
54. The student will be able to define the term buffer and explain the process of neutralization.
55. The student will be able to distinguish between electrolytes and non-electrolytes.
56. The student will be able to understand oxidation-reduction reactions and balance Redox equations.
57. The student will be able to understand reaction rates and chemical equilibrium.
58. The student will be able to define organic chemistry.
59. The student will be able to give the chemical composition and the basic characteristics of carbohydrates, lipids, proteins, nucleic acids and vitamins.

60. The student will be able to define the following terms: metabolism, anabolism and catabolism.
61. The student will learn the basic biochemical mechanisms of photosynthesis, DNA and RNA synthesis, protein synthesis, and cellular respiration.
62. The student will learn the characteristics and classification of the major groups of hydrocarbons.
63. The student will learn the IUPAC system for naming hydrocarbons.
64. The student will learn the chemical composition of some of the derivatives of the hydrocarbons.

…….

Tentative Academic Schedule: CHE*K111 Concepts of Chemistry SP18
Lecture (12372): TR 11:00 a.m.-12:15 p.m. D212
Lab (12373): R 2:00-4:45 p.m. B216

NOTE: End of chapter homework problems listed below are separate from online extra credit problems assigned in *Mastering Chemistry* and are not graded.

Week 1

T Jan 16 Faculty Professional Day

R Jan 18 11:00 a.m. Ch 1- The Chemical World.

2:00 p.m. No lab. Ch 2- Measurement and Problem Solving.

Ch 1 problems: 19, 20, 25.

Ch 2 problems: 31, 33, 37, 49, 57, 61, 65, 69, 71, 83, 93, 105.

Week 2

T Jan 23 Ch 3- Matter and Energy.

R Jan 25 11:00 a.m. Ch 3- Matter and Energy.

2:00 p.m. *Lab Safety and Orientation*; introduction to measurements.

Ch 3 problems: 35, 37, 39, 41, 45, 49, 63, 75, 81, 107.

Week 3

T Jan 30 Ch 4- Elements and Atoms.

R Feb 01 11:00 a.m. Ch 4- Elements and Atoms.

2:00 p.m. *Measurements (exp #1)*

Ch 4 problems: 21, 27, 29, 33, 35, 51, 53, 65, 67, 73, 81, 83, 91, 97, 109.

Week 4

T Feb 06 Ch 9- Electrons in Atoms and the Periodic Table.

R Feb 08 11:00 a.m. **Exam 1** (chapters 1-4)

2:00 p.m. *Penny Chemistry (exp #2)*

Ch 9 problems: 25, 29, 31, 33, 41, 45, 51, 61, 65, 67, 75, 79, 83, 87, 89, 93, 101.

Week 5

T Feb 13 Ch 9- Electrons in Atoms and the Periodic Table.

R Feb 15 11:00 a.m. Ch 5- Molecules and Compounds.

2:00 p.m. *Percent Water in a Hydrate (exp #3)*

Ch 5 problems: 9, 25, 29, 37, 41, 43, 45, 47, 59, 61, 65, 69, 71, 73, 75, 87, 95, 97, 99.

Week 6

T Feb 20 Ch 5- Molecules and Compounds.

R Feb 22 11:00 a.m. Ch 6- Chemical Composition.

2:00 p.m. *Ionic Compounds: Nomenclature and Bonding (exp #4)*

Ch 6 problems: 19, 35, 39, 41, 43, 51, 55, 57, 61, 71, 73, 75, 87, 91, 103, 121.

Week 7

T Feb 27 **Blackboard Assignment/class does not meet** (Ch 6- Chemical Composition)

R Mar 01 11:00 a.m. Ch 6- Chemical Composition/Ch 10- Chemical Bonding.

2:00 p.m. *Covalent Bonding and Molecular Structure (exp #5)*

Ch 10 problems: 37, 45, 51, 57, 69, 75, 85, 89, 91.

Week 8

T Mar 06 Ch 10- Chemical Bonding.

R Mar 08 11:00 a.m. **Exam 2** (chapters 5, 6, 9, 10)

2:00 p.m. Ch 7- Chemical Reactions.

Ch 7 problems: 35, 39, 47, 53, 63, 71, 79, 81, 83, 85, 87, 89, 93.

Week 9

T Mar 13 SPRING BREAK

R Mar 15 SPRING BREAK

Week 10

T Mar 20 **Lab Midterm**

R Mar 22 11:00 a.m. Ch 8- Quantities in Chemical Reactions.

2:00 p.m. Ch 16- Oxidation & Reduction (secs. 16.1, 16.2, 16.3, 16.5).

Ch 8 problems: 21, 33, 39, 41, 53, 73, 85, 87, 91.

Ch 16 problems: 47, 49, 51, 57, 77, 93, 95.

Week 11

T Mar 27 Ch 11- Gases.

R Mar 29 11:00 a.m. Ch 11- Gases.

2:00 p.m. *Stoichiometry (exp #6)*

Ch 11 problems: 35, 39, 55, 59, 69, 75, 79, 93, 105, 109, 125.

Week 12

T Apr 03 **Exam 3** (chapters 7, 8, 11, 16)

R Apr 05 11:00 a.m. Ch 12- Liquids and Intermolecular Forces.

2:00 p.m. *Acids, Bases, Electrolytes (exp #7)*

Ch 12 problems: 51, 57, 59, 63, 67, 69, 71, 81, 85, 87, 95.

Week 13

T Apr 10 Ch 12- Liquids and Intermolecular Forces / Ch 13- Solutions.

R Apr 12 11:00 a.m. Ch 13- Solutions.

2:00 p.m. *Solution Stoichiometry (exp #8)*

Ch 13 problems: 43, 55, 63, 73, 75, 79, 81, 83, 95, 105.

Week 14

T Apr 17 Ch 14- Acids and Bases.

R Apr 19 11:00 a.m. Ch 14- Acids and Bases.

2:00 p.m. Ch 15- Equilibrium (and kinetics).

Ch 14 problems: 29, 31, 37, 45, 49, 53, 55, 57, 59, 71, 77, 83, 85, 91, 97.

Ch 15 problems: 45, 53, 55, 75, 93, 95.

Week 15

T Apr 24 **Exam 4** (chapters 12, 13, 14)

R Apr 26 11:00 a.m. Ch 17- Nuclear Chemistry.

2:00 p.m. *Titration of Vinegar (exp #9)*

Ch 17 problems: 59, 61, 63, 65, 87.

Week 16

T May 01 Ch 18- Organic Chemistry.

R May 03 11:00 a.m. Ch 18- Organic Chemistry.

2:00 p.m. Ch 19- Biochemistry.

Ch 18 problems: 65, 83, 84, 85, 103, 111, 115.

Ch 19 problems: 45, 53, 54, 59, 65, 75, 77.

Week 17

T May 08 REVIEW SESSION

R May 10 11:00 a.m. **Exam 5** (chapters 15, 17, 18, 19)

2:00 p.m. **Lab Final**