

## Syllabus

CHE\*K121 General Chemistry I  
Three Rivers Community College  
Norwich, CT 06360

Instructor: Michael P. Carta, M.S.  
Professor of Chemistry

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Office hours: M 1:00-2:00 p.m.  
T 2:00-3:00 p.m.  
R 11:00 a.m.-12:00 p.m.

Course Description: CHE\* K121 - General Chemistry I  
4 CREDIT HOURS

*Prerequisites: ENG\* K101 or ENG\* K101S placement<sup>∞</sup> or completion of ENG\* K096 with a "C#" grade or better; MAT\* K172 and high school chemistry or CHE\* K111 all passed with a "C" grade or better; or permission of the instructor or department chairperson.*

*Corequisite: MAT\* K186.*

*In this course, students will study the fundamental principles, theories, and laws of chemistry. Topics include atomic theory and the structure of the atom, the aggregated states of matter, kinetic molecular theory, chemical bonding, stoichiometry and periodicity, solutions, and colloids. Three- hour lecture; one three-hour laboratory period.*

Lecture (CRN 30090): MW 11:00 a.m.-12:15 p.m. Room D128

Lab (CRN 30092): F 8:00-10:55 a.m. Room B216

Text: *Chemistry The Central Science*, 14<sup>th</sup> ed., Brown, LeMay, et.al. Pearson Publishing.

Mastering Chemistry Course ID: **MCCARTA58110**

Lab Manual: *CHE 121 General Chemistry I Laboratory Exercises*, 3<sup>rd</sup> ed., Carta. Academx.

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:

1. To provide students with a solid understanding of the fundamental concepts of chemistry.
2. To encourage students to apply problem-solving skills toward chemical calculations.
3. To educate students in the language and nomenclature of chemistry.
4. To help students relate chemical concepts to practical applications.

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.

<b>College Disabilities Service Providers</b>	
Matt Liscum, Counselor (860) 215-9265 Room A113	<ul style="list-style-type: none"> <li>• Learning Disabilities</li> <li>• ADD/ADHD</li> <li>• Autism Spectrum</li> <li>• Mental Health Disabilities</li> </ul>
Elizabeth Willcox, Advisor (860) 215-9289 Room A113	<ul style="list-style-type: none"> <li>• Medical Disabilities</li> <li>• Mobility Disabilities</li> <li>• Sensory Disability</li> </ul>

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: Maria Krug, Title IX Coordinator, Three Rivers Community College, 574 New London Turnpike Norwich, CT 06360 Room C131, (860) 215-9208, [mkrug@trcc.commnet.edu](mailto:mkrug@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: Ken Saad, Equity and Diversity Officer, Three Rivers Community College, 574 New London Turnpike Norwich, CT 06360, (860) 215-9319, [KSaad@trcc.commnet.edu](mailto:KSaad@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).

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.

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@threeivers.edu](mailto:testing@threeivers.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:

4 Unit Tests.....75% of grade

2 Lab Tests plus 11 lab reports.....25% of grade

*How it breaks down:*

4 unit tests: 400 possible points x 0.75 = 300

2 lab tests: 200 possible points

11 lab reports: 200 possible points  
400 possible points x 0.25 = 100

Total possible points = 400\*

*\*Up to six extra credit points may be earned by completing online homework assignments in Mastering Chemistry.*

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 Objectives:

1. The student will be able to convert English to metric units and vice versa.
2. The student will learn how to report a result to the correct number of significant figures.
3. The student will learn the difference between elements, compounds, solutions and heterogeneous mixtures.
4. The student will be able to determine the number of protons, neutrons and electrons in atoms or ions of a given isotope.
5. The student will be able to distinguish between metallic and nonmetallic properties.
6. The student will be able to distinguish between mass and weight.
7. The student will become familiar with the SI units of mass, volume, length, area, pressure, density, force and energy.
8. The student will learn the proper use of volumetric equipment in the laboratory.
9. The student will learn proper use of balances to measure mass.
10. The student will be able to determine the number of atoms, ions or molecules in a given mass of substance.
11. The student will become familiar with the terms cation, anion and polyatomic ion.
12. The student will be able to determine oxidation numbers.
13. The student will learn both systematic and common naming conventions for inorganic compounds.
14. The student will learn how to determine empirical formula.
15. The student will learn the concept of structural formula and how to write Lewis structures.
16. The student will learn how to determine molecular formula from empirical formula and molar mass.
17. The student will be able to work with the following concentration units: molarity, molality, % by mass, % by volume, parts per million.
18. The student will be able to write and balance chemical equations.
19. The student will be able to distinguish between various reaction types such as synthesis, decomposition, displacement, oxidation-reduction and acid-base neutralization.
20. The student will be able to perform stoichiometric calculations to determine limiting reagent, theoretical and percent yield.
21. The student will understand the differences between acids and bases, including the concept of pH.
22. The student will learn how to interpret the periodic table and be able to predict periodic properties.
23. The student will be able to perform calculations involving the gas laws.
24. The student will be able to understand the basic energy relationships in endothermic and exothermic processes and be able to perform calculations involving energy changes, including calorimetry.
25. The student will be able to understand basic atomic theory including early models of the atom.
26. The student will be able to understand the concept of atomic orbitals and the rules of orbital filling.
27. The student will learn how to write electron configurations using the periodic table.
28. The student will be able to understand the definition of quantum numbers and how they relate to electronic structure.
29. The student will be able to define ionization energy and electron affinity.
30. The student will be able to understand the basic concepts of chemical bonding including electronegativity, valence electrons and electrostatic forces.
31. The student will be able to define ionic and covalent bonds and distinguish between ionic and covalent (molecular) compounds.
32. The student will learn the concept of resonance.
33. The student will be able to understand the concept of bond dipoles and determine polarity of molecules.

34. The student will learn how to predict molecular geometry using valence shell electron-pair repulsion theory (VSEPR).
35. The student will be able to distinguish between sigma and pi bonds.
36. The student will be able to understand the concept of orbital hybridization.
37. The student will be able to understand molecular orbital theory, including bonding and antibonding orbitals.
38. The student will learn the basic properties of liquids and solids.
39. The student will be able to differentiate between intramolecular and intermolecular forces.
40. The student will learn the difference between hydrogen bonds, dipole-dipole forces, ion-dipole forces and dispersion forces.
41. The student will be able to understand phase changes and phase diagrams.
42. The student will learn the basics of crystal structure.
43. The student will learn the properties of solutions, including solution terminology and electrolyte behavior.
44. The student will learn how to use the dilution equation ( $M_i V_i = M_f V_f$ ) to prepare various solutions.
45. The student will be able to define colligative properties.
46. The student will learn how to calculate freezing point depression and boiling point elevation.
47. The student will be able to define the term colloid and understand the different types of colloids.
48. The student will be able to understand the concept of real vs. ideal solutions and Raoult's law.

CHE\*K121 General Chemistry I- Tentative Academic Schedule FA18

30090 Lecture: MW 11:00 a.m.-12:15 p.m. D128

30092 Lab: F 8:00 a.m.-10:55 a.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

W-8/29 Ch 1: Introduction: Matter and Measurement.

F-8/31 Ch 1: Introduction: Matter and Measurement. LAB: Orientation/Safety.

Chapter 1 problems: 1, 4, 10, 11, 17, 18, 24, 32, 38, 42, 47, 49, 55, 72, 86.

### WEEK 2

M- 9/03 LABOR DAY- College closed.

W- 9/05 Ch 2: Atoms, Molecules and Ions.

F- 9/07 LAB: #1 Measurements and Density.

Chapter 2 problems: 2, 4, 6, 8, 9, 12, 13, 20, 26, 27, 29, 40, 45, 47, 53, 55, 59, 61, 71, 73, 75, 77, 78, 105, 106.

### WEEK 3

M- 9/10 Ch 2: Atoms, Molecules and Ions.

W- 9/12 Ch 3: Chemical Reactions and Reaction Stoichiometry.

F- 9/14 LAB: #2 Formula of a Hydrate.

Chapter 3 problems: 1, 2, 3, 11, 15, 19, 20, 21, 27, 31, 35, 43, 47, 49, 53, 57, 63, 83, 97.

### WEEK 4

M- 9/17 Ch 3: Chemical Reactions and Reaction Stoichiometry.

W- 9/19 Ch 4: Reactions in Aqueous Solution.

F- 9/21 LAB: #3 Stoichiometry.

Chapter 4 problems: 1, 2, 5, 6, 7, 17, 19, 23, 39, 41, 47, 51, 55, 59, 62, 64, 73, 75, 81, 83, 87, 102.

### WEEK 5

M- 9/24 **UNIT TEST 1 (Ch 1-3)**

W- 9/26 Ch 4: Reactions in Aqueous Solution.

F- 9/28 LAB: #4 Acid-Base Titration (part one).

WEEK 6

M- 10/01 Ch 10: Gases.

W- 10/03 Ch 10: Gases.

F- 10/05 LAB: #4 Acid-Base Titration (part two).

Chapter 10 problems: 10, 11, 12, 22, 23, 25, 26, 27, 34, 35, 39, 41, 43, 49, 50, 56, 57, 63, 70, 83, 102.

WEEK 7

M- 10/08 Ch 5: Thermochemistry.

W- 10/10 Ch 5: Thermochemistry.

F- 10/12 LAB: #5 Gas Stoichiometry.

Chapter 5 problems: 2, 4, 9, 10, 17, 25, 37, 39, 43, 44, 50, 55, 57, 65, 69, 81, 83.

WEEK 8

M- 10/15 Ch 6: Electronic Structure of Atoms.

W- 10/17 Ch 6: Electronic Structure of Atoms.

F- 10/19 LAB: #6 Calorimetry.

Chapter 6 problems: 5, 7, 11, 12, 17, 18, 19, 25, 39, 55, 74, 75, 77, 83.

WEEK 9**M- 10/22 UNIT TEST 2 (Ch 4, 10, 5)**

W- 10/24 Ch 7: Periodic Properties of the Elements.

**F- 10/26 LAB MIDTERM (Exp. 1-6 including lab safety)**WEEK 10

M- 10/29 Ch 7: Periodic Properties of the Elements.

W- 10/31 Ch 8: Basic concepts of Chemical Bonding.

F- 11/02 LAB: #7 Qualitative Analysis.

Chapter 7 problems: 1, 2, 3, 6, 14, 17, 25, 28, 29, 30, 37, 43, 45, 61, 62, 67, 69.

WEEK 11

M- 11/05 Ch 8: Basic concepts of Chemical Bonding.

W- 11/07 Ch 9: Molecular Geometry and Bonding Theories

F- 11/09 LAB: #10 Determination of Molar Mass by Vapor Density.

Chapter 8 problems: 1, 4, 5, 7, 15, 19, 29, 41, 47, 55, 68, 73, 99.



WEEK 12

M- 11/12 Ch 9: Molecular Geometry and Bonding Theories

W- 11/14 Ch 9: Molecular Geometry and Bonding Theories

F- 11/16 LAB: #9 Molecular Models and Lewis Structures I.

Chapter 9 problems: 7, 8, 9, 12, 19, 25, 29, 44, 61.

WEEK 13

**M- 11/19 UNIT TEST 3 (Ch 6, 7, 8, 9)**

W- 11/21 Classes not in session.

F- 11/23 THANKSGIVING BREAK- College closed.

Chapter 11 problems: 2, 4, 5, 6, 7, 14, 21, 23, 26, 37, 44, 52.

WEEK 14

M- 11/26 Ch 11: Liquids and Intermolecular Forces.

W- 11/28 Ch 12: Solids and Modern Materials.

F- 11/30 LAB: #8 The Chemistry of Copper.

Chapter 12 problems: 3, 6, 7, 8, 10, 11, 17, 35, 40, 69, 73, 77, 89.

WEEK 15

M- 12/03 Ch 12: Solids and Modern Materials.

W- 12/05 Ch 13: Properties of Solutions.

F- 12/07 LAB- #11 Determination of Molar Mass by Freezing Point Depression.

Chapter 13 problems: 15, 17, 18, 23, 31, 39, 43, 45, 55, 56, 65, 71, 75, 76.

WEEK 16

M- 12/10 Ch 13: Properties of Solutions.

**W- 12/12 UNIT TEST 4 (Ch 11, 12, 13)**

**F- 12/14 LAB FINAL (Exp. 7-11)**