Syllabus

CHE\*K121 General Chemistry I

Three Rivers Community College

Norwich, CT 06360

Instructor: Kristina Sabilia

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Office hours:  D-207 by appointment

Course Description: CHE\* K121 - General Chemistry I

**4 CREDIT HOURS**
Prerequisites: [***ENG\* K101***](https://catalog.threerivers.edu/content.php?catoid=6&catoid=6&navoid=310&filter%5Bitem_type%5D=3&filter%5Bonly_active%5D=1&filter%5B3%5D=1&filter%5Bcpage%5D=2#tt695) or [***ENG\* K101S***](https://catalog.threerivers.edu/content.php?catoid=6&catoid=6&navoid=310&filter%5Bitem_type%5D=3&filter%5Bonly_active%5D=1&filter%5B3%5D=1&filter%5Bcpage%5D=2#tt5076) placement∞ or completion of [***ENG\* K096***](https://catalog.threerivers.edu/content.php?catoid=6&catoid=6&navoid=310&filter%5Bitem_type%5D=3&filter%5Bonly_active%5D=1&filter%5B3%5D=1&filter%5Bcpage%5D=2#tt3533) with a “C#” grade or better; a passing grade in a high school or college-level chemistry course.
Corequisite: [***MAT\* K172***](https://catalog.threerivers.edu/content.php?catoid=6&catoid=6&navoid=310&filter%5Bitem_type%5D=3&filter%5Bonly_active%5D=1&filter%5B3%5D=1&filter%5Bcpage%5D=2#tt821) .
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 33620): W 6:00-8:45 p.m. Room B125

Lab (CRN 33621): M 6:00-8:55 p.m. Room B216

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

*Mastering Chemistry* Course ID: **SABILIACHE121FALL19**

Lab Manual: *CHE 121 General Chemistry I Laboratory Exercises*, 3rd 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:

Students with a documented disability are provided supportive service and accommodations to assist them with their academic objectives. Services are strictly confidential. Disability services may include individualized accommodations, advising, advocacy, counseling, technical assistant and referral information. For questions regarding disability support services, please go to: https://www.trcc.commnet.edu/student-services/disability-services

Sexual misconduct policy:

Three Rivers Community College strongly encourages all students to report any incidents of sexual misconduct, which includes, but is not limited to, sexual harassment, intimate partner violence, and sexual assault. Students have the right to the prompt and fair resolution of all claims, and the College will preserve the confidentiality of all who report to the fullest extent possible and allowed by law. College employees will explain the limits of confidentially before information about the incident is revealed. To report sexual misconduct, or to learn more about your options, please contact the Title IX Coordinator. **If you need immediate, confidential assistance, please call the Sexual Assault Crisis Center of Eastern Connecticut hotline at 860-437-7766.**

**Sexual Assault Crisis Center of Eastern Connecticut** **Maria Krug, Title IX Coordinator** Hotline: (860) 437-7766 Three Rivers Community College

Office: (860) 442-0604 (860) 215-9208

78 Howard Street, 2nd Floor 574 New London Turnpike

New London, CT 06320 Norwich, CT 06360

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 records. The following person has been designated to handle inquiries regarding the non-discrimination policies: Kenneth Saad Three Rivers Community College 574 New London Turnpike Norwich, CT 06360 (860) 215-9319

Academic Integrity:

Plagiarism; using information without their source citations; and failure to cite the sources in the use of information, video, audio and image files for class papers, electronic submissions, class projects etc.; are considered to be academic dishonesty. Specifically the following are covered under Three Rivers Community College's policy.

(a) making false statements to community partners about the student’s skills, credentials and accomplishments

(b) making false statements to community partners or the instructor about progress in the work the student has agreed to do in the community, including supplying false documentation of work

(c) failing to abide by the rules and policies of the community partners that the student agreed to accept as a condition of entrance into the community setting

(d) failing to return materials belonging to the community partner or instructor

(e) violating the ethical principles common to professional researchers, including violation of confidentiality or anonymity agreements with research subjects, deceiving or harming research subjects, or coercing participation in research.

For more information consult the College's [**General Academic Information**](http://www.trcc.commnet.edu/President/Policies/Academic_standards.pdf).

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 affected 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 may be 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@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:

Unit Tests (60%)

Homework Assignments (20%)

Lab Tests and Lab Reports (20%)

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 (MiVi = MfVf) 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

33620 Lecture: W 6:00-8:45 p.m. B125

33621 Lab: M 6:00-8:55 p.m. B216

WEEK 1

W- 8/28 Ch 1: Introduction: Matter and Measurement.

WEEK 2

W- 9/04 Ch 2: Atoms, Molecules and Ions.

WEEK 3

M 9/9 *LAB: Orientation/Safety* *Experiment #1 Measurements and Density.*

W- 9/11 Ch 3: Chemical Reactions and Reaction Stoichiometry.

WEEK 4

M- 9/16 *LAB: Experiment #2 Formula of a Hydrate experiment.*

W- 9/18 **UNIT TEST 1** (Ch 1-3)

WEEK 5

M- 9/23 *LAB: Experiment #3 Stoichiometry.*

W- 9/25 Ch 4: Reactions in Aqueous Solution.

WEEK 6

M- 9/30 *LAB: experiment #4 Acid-Base Titration (part one).*

W- 10/02 Ch 5: Thermochemistry

WEEK 7

M- 10/7 *LAB: : experiment #4 Acid-Base Titration (part two).*

W- 10/9 Ch 10: Gases.

WEEK 8

M- 10/14 *LAB: Experiment #5 Gas Stoichiometry.*

W- 10/16 **UNIT TEST 2** (Ch 4, 5, 10)

WEEK 9

M- 10/21 **LAB MIDTERM** (Exp. 1-6 including lab safety)

W- 10/23 Ch 6: Electronic Structure of Atoms Ch 7: Periodic Properties of the Elements.

WEEK 10

M- 10/28 *LAB: Experiment #6 Calorimetry.*

W- 10/30 Ch 8: Basic concepts of Chemical Bonding.

WEEK 11

M- 11/04 *LAB: Experiment #7 Qualitative Analysis.*

W- 11/06 Ch 9: Molecular Geometry and Bonding Theories *LAB: Experiment #9 Molecular Models and Lewis Structures I.*

WEEK 12

M- 11/11 *LAB: Experiment #10 Determination of Molar Mass by Vapor Density.*

W- 11/13 **UNIT TEST 3** (Ch 6, 7, 8, 9)

WEEK 13

M- 11/18 *LAB: Experiment #8 The Chemistry of Copper.*

W- 11/20 Ch 11: Liquids and Intermolecular Forces.

WEEK 14

M- 11/25 Ch 12: Solids and Modern Materials.

R- 11/27 THANKSGIVING BREAK

WEEK 15

M- 12/02 *LAB- Experiment #11 Determination of Molar Mass by Freezing Point Depression.*

W- 12/04 Ch 13: Properties of Solutions.

WEEK 16

M- 12/9 **LAB FINAL** (Exp. 7-11)

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