

Wilbur Wright College

One of the City Colleges of Chicago

Our Mission dedicates us to deliver high-quality, innovative, affordable, and accessible educational opportunities and services that prepare students for a rapidly changing and diverse global economy.

CHEMISTRY 121, Basic Chemistry I, ABCD, Summer 2012

Welcome!

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Office: Room 386

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Office hours: Mon/Wed 11:00 am – 12:00 noon Room L386. Students are encouraged to meet with the instructor during these hours if they need any help or have any concerns.

Class hours: Mon -Thu 8:00 am - 10:50 am Room S314, Lab S320

Length of the Course: 16 weeks

Credit hours: 4 Contact hours: 6 (2 lecture hours, 4 lab hours)

Website: [Blackboard \(http://ccc.blackboard.com\)](http://ccc.blackboard.com)

PLEASE CHECK THE BLACKBOARD REGULARLY FOR IMPORTANT NEW INFORMATIONS, HOMEWORK, CHANGES IN THE SCHEDULE (TENTATIVE COURSE OUTLINE), ETC!

Course Catalog Description

Chemistry 121 - Principles of general inorganic chemistry including properties of matter, dimensional analysis, fundamentals of stoichiometry, interpretation of the periodic table, nomenclature and introduction to solution chemistry and commonly used concentration units. **Prerequisites:** Eligibility of Math 140 or higher or consent of Department Chairperson.

Required materials:

- **Text:** Moris Hein and Susan Arena, Foundations of College Chemistry, 13th edition (Custom Edition for Wright College). John Wiley and Sons, Inc. 2011. ISBN: 978-1-118-01469-1
- **Lab:** Catalyst-Wilbur Wright College Lab Manual for Chemistry 121. Compiled by Dr. Maria Valentino-Physical Sciences Department, 2004
- **Calculator:** A scientific calculator with exponential notation and logarithms is required for exams, quizzes, lab reports, and homework. Using a cell phone instead of an appropriate scientific calculator is not allowed.

Student course is expected to serve:

Chemistry 121 is designed mainly for students who have not had high school chemistry and whose mathematics background precludes their taking of Chemistry 201/203. Students contemplating applying for the Associate Degree Nursing Program and students who wish to improve their science background compose the majority of students in this course. It can also be used as a substitute for physical science in the general education core.

Course objectives: This course seeks to encourage students to learning and understanding basic chemistry principles and its application to everyday life. In order for the student to be successful in this class, students are required to actively participate in lecture, class discussions and activities, laboratory and spend time practicing problems. There will be assignments throughout the semester which require students' understanding of the materials. There will be exit exam at the end of the semester to assess student learning and understanding of the course

Measureable student learning outcomes: Upon the conclusion of the course, students are expected to:

1. Demonstrate familiarity with exponential notation and the proper use of significant figures.
 - a. Express any number in scientific notation (and vice versa).
 - b. Identify number of significant figures in a measurement (recognize non-significant zeroes).
 - c. Round a measurement to a given number of significant figures.

- d. Calculate results considering rules of significant figures in addition/subtraction
 - e. Calculate results considering rules of significant figures in multiplication/division.
2. Show familiarity with metric units, and conversion factors (e.g. volume, temperature, density, etc.).
- a. Interpret Greek prefix multipliers (nano, micro, milli, centi, kilo, mega, etc.).
 - b. Convert one unit into another (e.g. how many kilograms is there in 720 milligrams?).
 - c. Calculate density problems
3. Demonstrate knowledge of Matter
- a. Distinguish between physical and chemical properties/changes of matter.
 - b. Recognize/classify property/change of matter as physical or chemical.
 - c. Identify physical change as melting, freezing, condensation, evaporation, sublimation, or deposition.
 - d. Distinguish pure substances and mixtures
4. Demonstrate knowledge of elements, compounds, atoms, atomic structure and ions.
- a. Interpret formulas of compounds, qualitatively and quantitatively.
 - b. Identify atomic number, atomic mass, and properties of the three basic subatomic particles.
 - c. Define isotopes, its relationship with mass number and atomic mass.
 - d. Determine the number of protons, electrons, neutrons in an isotope (or in ion of an isotope).
 - e. Explain formation of an ion (provide number of electrons added or removed from the atom?).
 - f. Predict the charge on the ions from the main groups elements.
 - g. Write the electron configuration for an atom of the element.
 - h. Identify the element from its electron configuration.
5. Interpret the periodic table, and its relationship to chemical and physical properties of the elements.
- a. Determine the order of increasing/decreasing ionization energy in a given list of elements
 - b. Determine the order of increasing/decreasing atomic radius in a given list of elements

- c. Determine the order of increasing/decreasing electronegativity in a given list of elements
 - d. Distinguish between metals, metalloids, nonmetals, and know their properties
 - e. Recognize members of the representative families of elements
 - f. Predict ion symbols of the main-group elements, correctly indicate their charges.
6. Name and give the formulas for simple ionic and covalent compounds.
- a. Formulate the compound for a given name
 - b. Name the compound for a given formula
 - c. Formulate the compound from ions
 - d. List ions that compose a given compound, and correctly label the electrical charge on them.
7. Correctly identify different types of chemical reactions and properly balance chemical equations.
- a. Recognize redox-reaction (combustion, synthesis, decomposition) precipitation and acid-base reactions
 - b. Modify the coefficients for the reactants and the products of an unbalanced chemical equation.
 - c. Calculate the sum of coefficients of a chemical equation.
8. Do calculations using atomic mass and Avogadro's number.
- a. Interconvert number of grams, moles and molecules
 - b. Calculate the % composition of a compound
 - c. Calculate the empirical and molecular formula from % composition and molecular mass.
9. Solve stoichiometry problems (mole/mole, mass/mass).
- a. Given a quantity of one reactant, calculate the quantity of another based on a chemical equation.
 - b. Calculate the quantity of the product based on limiting reagent
 - c. Calculate the theoretical yield of a chemical reaction
 - d. Calculate the percentage yield of a chemical reaction.
10. Demonstrate knowledge on energy and the effect of energy on matter.
- a. To understand energy and how energy flows
 - b. Distinguish between endothermic and exothermic process
 - c. Solve problems incorporating specific heat using the formula $Q = s \times m \times \Delta T$

11. Correctly identify various bonding types and know the properties of ionic and covalent compounds.
 - a. Classify bond type in a given compound or specific bond between two atoms
 - b. Determine the order of increasing/decreasing polarity in a given list of bonds
 - c. Determine orientation of dipole moment in a given bond or a molecule
 - d. Identify ionic, polar covalent and nonpolar covalent bonds of compounds
 - e. Know the differences in properties between covalent and ionic compounds.
 - f. Be able to draw Lewis and molecular structure

12. List or recognize the basic postulates of the kinetic molecular theory and be able to do calculations based on gas laws relating pressure, volume, number of moles and temperature.
 - a. Convert between different temperature scales.
 - b. Convert between different pressure units.
 - c. Given initial conditions (P, V, T), calculate final conditions (P, V, T).
 - d. Calculate the unknown quantity using $PV = nRT$ equation.

13. Demonstrate familiarity with intermolecular forces and the energy requirements for changes of state.
 - a. Identify intermolecular forces that exist between molecules of a given chemical substance.
 - b. Know the difference between hydrogen bond, dipole-dipole, and London dispersion forces.
 - c. Show familiarity with heating/cooling curve of substances.
 - d. Solve problem incorporating molar heat of fusion.
 - e. Solve problem incorporating molar heat of evaporation.

14. Do calculations with solutions of varying concentration units (mass, molarity, and dilution problems).
 - a. Given quantities of a solute and a solution, calculate the percent concentration.
 - b. Calculate the molar concentration (molarity) from the quantity of the solute and the volume of a solution.
 - c. Calculate the amount of the solute contained in the solution based on the molarity and the volume
 - d. Calculate the volume of a solution of a known molarity based on the amount of the solute

- e. Calculate the mass of the solute contained within a solution based on the percent concentration
 - f. Solve a “dilution problem”, that utilizes the dilution formula: $M_1 \times V_1 = M_2 \times V_2$.
15. Recognize and give the properties of acids/bases/salts and solve simple neutralization problems.
- a. Given an acid and a base write equation of the neutralization reaction they undergo.
 - b. Solve a “titration problem”, that utilizes the end point formula:
 $M_{\text{acid}} \times V_{\text{acid}} = M_{\text{base}} \times V_{\text{base}}$; $(n_{\text{H}^+} = n_{\text{OH}^-})$.
 - c. Calculate a pH of a solution, provided concentration of either H^+ or OH^- .
 - d. Given a pH of a solution, calculate the concentration of H^+ and/or OH^- .
 - e. Interconvert between pH and pOH.
 - f. List properties of acids, bases, and salts.

Method of Instruction: Lab experiments, lectures, discussions, audio-visual materials. Labs involve measurements, basic laboratory and safety techniques and reactions. Labs correlated closely with lecture material. Students are encouraged to come into the office during the teacher’s office hours for help of the course. Also tutorial services are made available by the college. Writing is incorporated particularly in lab reports and homework assignments.

Definition / Statement of Active Pursuit of the Course:

In addition to the general policies, active pursuit of this course constitutes participation in:

- * 70% of lectures
- * 70% of homework
- * 70% of quizzes and exercises
- * 70% of Tests
- * 80% of laboratory experiments that must be completed.

Successful completion refers to submission of a report resulting from attendance and full participation in the corresponding laboratory experiment.

A student who is not actively participating in any one of the items listed above can be dropped at the mid-term and receive a grade of ADW.

“No Show” Policy: (If a student registered for the course before the start time of the first class period, but 1) did not attend the first 2 classes, or 2) attended only 1 of the first 3 classes and failed to notify the instructor of his or her intentions to continue the class, the Registrar’s Office will remove the student from the course.)

Academic integrity: The City Colleges of Chicago is committed to the ideals of truth and honesty. In view of this, students are expected to adhere to high standards of honesty in their academic endeavor. Plagiarism and cheating of any kind are serious violations of these standards and will result, minimally, in the grade of "F" by the instructor.

Student Conduct: City Colleges of Chicago students are expected to conduct themselves in a manner which is considerate of the rights of others and which will not impair the educational mission of the College. Misconduct for which students are subject to College Discipline (e.g. expulsion) may include the following: (1) all forms of dishonesty such as stealing, forgery, (2) obstruction or disruption of teaching, research, administration, disciplinary proceeding, (3) physical or verbal abuse, threats, intimidation, harassment, and/or other conduct that threatens or endangers the health or safety of any person, and (4) carrying or possession of weapons, ammunition or other explosives.

Disability Access Center: Please note: Any student with a disability, including a temporary disability, who is eligible for reasonable accommodations should contact the Disability Access Center located in room L135, Learning Resource Center of the Wright North Campus or call (773) 481-8016 as soon as possible.

Classroom Etiquette: Students are expected to conduct themselves in a manner appropriate to a place of study and knowledge. Students must be considerate of the rights of others to fulfill the educational mission of the College. Specifically, all students assume an obligation to conform to Board Rules, the statement of Students Rights and responsibilities. For more rules on student conduct, See VP/Dean of Student Services in A131.

Grading:

The final Grade will be based on the following points

3 out of 4 major exams (3X100)	=	300 points
5 out of 6 quizzes (5X 30)	=	150
5 group discussions (5X30)	=	150
25 Participation (25X2)	=	50
Homework (10 x5)	=	50
Laboratory (10X20)	=	200
Exit exam	=	100
Total	=	1000

Grades will not be curved.

Grading scale,	90% or higher	= A
	> 80%	= B
	> 65%	= C
	> 55%	= D
	<55 %	= F

Grades will be available at <http://ccc.blackboard.com/>. It is the student's responsibility to check his/her grade on blackboard.

Exit Exam: The exit exam is a multiple choice, comprehensive exam that covers the topics covered in Chemistry 121. This is designed to assess student learning outcome. A student needs to answer 50% of the questions to pass the exit exam and receive a passing. A student who fails the exit exam but has a grade of C or better in class qualifies to take the **appeals exam**.

Late Work and Make-up Assignments: Make sure you submit your assignment on or before the deadline.

Additional Notes:

Laboratory Policies

The lab component contributes 20% of the final grade in this course. You must complete at least 80%, do the actual lab works and submit the written reports to pass this course. The following policies will apply in the laboratory.

A. PARTNERS

-You will be working with a partner and sharing an equipment bin.

-You and your partner will submit a joint lab report. Indicate on the top of your report sheets the name of your partner.

B. PREPARATION

You must come to lab prepared; you are required to read your manual's procedure before coming to class.

C. REPORTS

The lab reports are due at the end of the class.

Copying a lab report will be given a grade of "Zero".

Lab report will include the following:

A. Labprep – (see preparation)

B. Data Sheets

C. Selected Post lab problems

D. LABORATORY SAFETY

We take lab safety seriously. Safety will be enforced at all time. Make sure that you have read and understood the Wright College lab safety precautions that apply to each lab. Consult your instructor if you have questions about the lab safety. Glasses or goggles **MUST** be worn at all times. It is your responsibility to bring your own safety glasses.

Additional Instructions for the Laboratory

1. No eating, drinking, chewing gum, or smoking in the room.
2. Study the experiment carefully before coming to class so that you don't waste time going through the procedure during the lab. **NO MAKE UP LABS.**
3. You must do your own work unless you are told to work in pairs for an experiment. If you need guidance, let the instructor know.
4. **RECORD ALL DATA IN INK IN YOUR LAB DATA SHEET WHILE YOU WORK.** Do not write data, even temporarily, on scraps or other pieces of paper. Pay attention to significant figures and units. If you make a mistake, delete entries by crossing them out neatly with a single line. Do not erase or "white out" mistakes. **BEFORE LEAVING THE LABORATORY, HAVE THE LABORATORY INSTRUCTOR SIGN YOUR REPORT SHEET.**
5. **ALWAYS WEAR YOUR SAFETY GLASSES.** Failure to wear your safety glasses will lead to dismissal from lab and a lowered grade for that experiment.
6. **WEAR SENSIBLE CLOTHING** as discussed during the safety lecture. If you wear shorts, sandals, or other clothing that is not consistent with safety, you will not be admitted to the laboratory. Wearing a lab apron or a lab coat is recommended.
7. Do not take reagent bottles to your bench. Use test tubes, beakers, or weighing boats to obtain chemicals from the dispensing area. Take small quantities of reagents. You can always get more if you run short.
8. Check carefully the label on each reagent bottle to be sure you have the correct reagent. The names or chemical formulas of many substances appear similar at first glance.
9. To avoid possible contamination, never return unused chemicals to the reagent bottles.
10. Do not insert your medicine droppers into reagent bottles. Instead pour a little of the liquid into a small beaker or small test tube.

11. Be neat in your work; if you spill something, clean it up immediately.
12. Wash your hands anytime you get chemicals on them and at the end of the laboratory period.
13. After completing the experiment, clean and put away your glassware and equipment. Clean your work area and make sure the gas and water are turned off. A clean lab is a safe lab.
14. Dispose solid waste such as filter paper and litmus paper in the wastebasket, not in the sink. Dispose broken glass in the broken glass waste boxes. Dispose all other solid chemicals as directed by your instructor. Pour all the toxic liquids into the waste bottles provided or as directed by instructor.
15. Keep the mass balances and the area around them clean. Follow the directions given by the instructor on the proper weighing technique to use. Do not place chemicals directly on the balance pans; place a piece of weighing paper or a small container on the pan first, and then weigh your material. Never weigh an object while it is hot.
16. Do not heat graduate cylinders, burettes, pipets, or bottles with a burner flame.
17. Do not look down into the open end of a test tube in which the contents are being heated or in which a reaction is being conducted.
18. Do not perform unauthorized experiments.

Correspondence with Instructor: FERPA (Family Educational Rights and Privacy Act) is a federal law that protects the privacy of student educational records. See the following webpage: www.ed.gov/policy/gen/guid/fpco/ferpa/index.html. Faculty cannot reveal information about students, or discuss student records over the phone or unsecured e-mail. CCC student e-mail meets FERPA requirements and must be used when communicating with the instructor after hours.

Academic Support Services: Wright College is committed to your success! Below you will find a list of offices you may wish to contact during the semester for assistance:

Academic Support Center (Tutoring)	Room A-245
Center for Academic Success (Advising)	Room A-120
Writing Center (for help with papers)	Room L-212
Wright in Your Corner (Student Center)	Room S-100
Financial Aid	Room A-128
Business Services	Room A-138
Math Tutoring	Room L-125 or L-300

SUMMER 2012 - CHEMISTRY 121
LECTURE AND LABORATORY SCHEDULE

WEEK	<i>MON.</i> Lab. S-320	WEEKLY LAB ACTIVITIES & EXPERIMENTS (Points opportunity)	<i>TUES</i> <i>Lec</i> S-314	WEEKLY LECTURE TOPICS & ACTIVITIES (Points opportunity)	<i>WED</i> Lab S-314	WEEKLY LAB ACTIVITIES & EXPERIMENTS (Points opportunity)	<i>THURS</i> <i>Lec</i> S-320	WEEKLY LECTURE TOPICS & ACTIVITIES (Points opportunity)
1					6/6	Course Policies Lab Safety Video and Check in	6/7	<i>Lecture 1</i>
2	6/11	Experiment 1	6/12	Lecture 2	6/13	Lecture 3	6/14	Exam 1 100 points
3	6/18	Experiment 2	6/19	Lecture 4	6/20	Experiment 3	6/21	Lecture 5
4	6/25	Experiment 4	6/26	<i>Lecture 6</i>	6/27	EXAM 2 100 points	6/28	Lecture 7
5	7/2	Experiment 5	7/3	Lecture 7	7/4	Holiday (No class)	7/5	Lecture 8
6	7/9	Experiment 6	7/10	Lecture 9	7/11	Exam 3 100 points	7/12	Lecture 10
7	7/16	Experiment 7	7/17	Lecture 11	7/18	<i>Experiment 8</i>	7/19	Lecture 11
8	7/23	Experiment 10	7/24	EXAM 4 100 points	7/25	EXIT EXAM (1:00-3:00PM)	7/26	APPEALS EXAM (1:00-3:00PM)

THIS IS A TENTATIVE SCHEDULE AND IS SUBJECT TO CHANGE AT THE DISCRETION OF THE FACULTY