



CITY COLLEGES of CHICAGO

Harry S Truman

Education that Works

HARRY S TRUMAN COLLEGE
One of the City Colleges of Chicago
MASTER COURSE SYLLABUS
Semester

Course Title and Section: Chemistry 121: *Basic Chemistry I*

IAI code P1 902L

Length of Course: 16 weeks

Credit Hours: 4

Contact Hours: 6

INSTRUCTOR: TBA

E-MAIL:

PHONE:

OFFICE:

OFFICE HOURS:

COURSE WEBSITE : *ccc.blackboard.com*

Mission Statement:

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.

General Education Goals:

The syllabus needs to indicate which Truman College General Education Goals the course addresses. Cut-and-paste the appropriate goals from below:

- The student exhibits social and ethical responsibility and is aware of her or his place in the global community.
- The student performs effectively in the workplace and has the ability to work and make effective use of a wide variety of current technologies.
- The student communicates effectively in both written and oral formats.
- The student demonstrates the ability to think critically, abstractly, and logically.
- The student gathers interprets and analyzes data.

Course Description and Prerequisites: 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. Writing assignments, as appropriate to the discipline, are part of the course.

Prerequisites:

Eligibility for English 101 and eligibility for Math 118 or higher, or completion of Math 99 with a grade of C or better or Consent of Department Chairperson.

Credit Hours: 4

Required/Recommended Texts and Materials:

Text: Essentials Introductory Chemistry 4th. Ed. by Nivaldo J. Tro, ©2011, 978-0-321-72599-8 (recommended)

Materials: *Scientific Calculator, Laboratory Notebook (recommended)*

Students Course is Expected to Serve: *This course is a pre-requisite for General Chemistry I (Chemistry 201) and it is required for many allied health professions. It is also a general education course in the physical sciences.*



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Course Objectives:

Each course objective is cross referenced to a specific General Education Goal (GEG)

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

- Describe processes and procedures used in the scientific method; GEG3-5
- Differentiate terms such as observation, hypothesis, data, conclusion, theory; GEG3-5
- Explain how the use of the scientific method furthers scientific knowledge; GEG3-5
- Convert numbers in decimal notation to scientific notation and vice versa; GEG 2-5
- Convert temperature data to values in three scales: Celsius, Fahrenheit and Kelvin; GEG 2-5
- Explain why the Kelvin scale does not use negative numbers; GEG 3,4
- Convert quantities using common metric units: liters/milliliters, kilograms/grams/milligrams and meters/centimeters/millimeters; GEG3-5
- Demonstrate the use of significant figures in basic calculations: addition/subtraction, multiplication/division; GEG2-5
- Differentiate between precision and accuracy; GEG3-5
- Calculate one of the three quantities: mass, volume, density given the values for the other two; GEG4,5
- Determine mass by difference; GEG5
- Determine volume by difference; GEG5
- Measure the density of a sample of a solid or a liquid using available laboratory equipment; GEG2,4,5
- List the names and chemical symbols of at least 44 elements including Uranium (92) from the inner transition elements; GEG3,4
- List the names and formulas of common polyatomic ions; GEG3,4
- Given a positive and a negative ion - construct the formula of the ionic compound formed; GEG3,4
- Compare and contrast the difference between covalent and ionic compounds; GEG3,4
- Classify bonds in common compounds along the continuum of purely covalent to purely ionic; GEG3,4
- Differentiate between pure substances (elements and compounds) and mixtures (homogeneous and heterogeneous); GEG3,4
- Define colloid and give examples of colloids: foams, gels, smoke; GEG4
- Classify common elements as metals, non-metals and semi-metals and describe the properties of each class; GEG3,4
- Explain how the arrangement of electrons in an atom affects its bonding and chemical properties; GEG3,4
- Explain how the periodic table is arranged and what is indicated by rows, columns and various sections of the table; GEG3,4
- List electronic configurations for the first thirty-six elements; GEG3,4
- List the number of valence electrons for the first thirty-six elements (main group elements only); GEG4
- Construct simple Lewis Dot structures: water, methane, ammonia, boron trichloride, carbon dioxide, the diatomic molecules; GEG4



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- Identify the alkali metals, alkaline earth metals, transition elements, halogens and noble gases on the periodic table; GEG3,4
- Convert between mass and moles; GEG3,4
- Convert between number of moles and number of formula units, molecules or atoms; GEG3,4
- Solve empirical formula problems; GEG4
- Classify chemical reactions into types: combination (synthesis), decomposition, single displacement (replacement) and double displacement (replacement) and combustion; GEG4
- Determine if a metal/metal ion in a reaction is being oxidized or reduced; GEG4
- Balance simple chemical reactions; GEG4
- Paraphrase the chemical properties of common ionic compounds and common covalent molecules; GEG3,4
- Recognize the formation of a precipitate or the evolution of a gas or heat during a chemical reaction performed in the laboratory; GEG5
- Construct chemical formulas for common compounds given the compound's name; GEG3
- Identify the name of compounds from its formula; GEG3
- Perform basic stoichiometric calculations to determine the quantity of products given various quantities of reactants; GEG4
- Solve limiting reactant problems; GEG4
- Solve percent yield problems; GEG4
- Compare and contrast the properties of the three basic states of matter: gas, liquid and solid; GEG3,4
- Explain the Kinetic Molecular Theory of Gases and list the assumptions of this theory; GEG3,4
- Calculate volume, temperature or pressure of a gas sample that undergoes changes in its initial conditions using the combined gas law; GEG4,5
- Apply the ideal gas law in solving chemical problems; GEG4
- Compare the solubility of various common compounds; GEG3,4
- Define the terms: solution, solute, solvent and solubility; GEG3
- Calculate the molarity of solutions; GEG4
- Identify and classify strong acids, hydroxide bases and neutral salts given the formula e.g. HCl is an acid, KOH is a base, NaCl is a neutral salt; GEG4,5
- Perform laboratory experiments that illustrate basic chemical principles; GEG1,2,4,5
- Demonstrate the careful recording of observations and data in the laboratory; GEG1-5
- Demonstrate a knowledge of laboratory safety; GEG1,2
- Demonstrate effective laboratory procedures such as transfer of solids, weighing of solids, pouring of liquids, measurement of liquid volume; GEG1,2
- Collect, organize and graph experimental data; GEG2-5
- Interpret experimental data and draw inferences from the data; GEG4,5
- Summarize the results of experimental observations and data; GEG4,5
- Give the names of common laboratory glassware: beakers, erlenmeyer flasks, graduated cylinders, test tubes. GEG3



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Measureable Student Learning Outcomes: At the completion of this course, the successful student will be able to:

- Compare and contrast the chemical behavior and physical properties of common substances.
- Predict and explain the electronic and molecular structures of common substances using models.
- Determine the qualitative and quantitative relationships between matter and energy involved in chemical or physical processes.
- Classify matter by its state and bonding behavior using the Periodic Table as a reference.
- Solve quantitative problems (stoichiometric) involving chemical formulas and equations.
- Formulate and test hypotheses.
- Perform laboratory experiments demonstrating safe and proper use of standard chemistry glassware and equipment.
- Record, graph, chart and interpret data obtained from experimentation.

Method of Instruction: *Lecture, laboratory, demonstrations and problem solving.*

Definition / Statement of Active Pursuit of the Course: *Students who do not meet basic, instructor-defined criteria for active pursuit may receive an ADW (administrative withdrawal) at midterm. District and College attendance policies are listed in the college catalog and the Student Policy Manual: http://ccc.edu/Student/files/Student_Policy_Manual_8.25.09.pdf.*

Active Pursuit is defined as consistent attendance, communication with the instructor in person or by email about any absences, compliance with all policies, completion of assignments on time, communication with the instructor about any difficulties completing assignments on time, participating in class, taking quizzes and exams and performing laboratory experiments as assigned. Any student who misses two consecutive classes is at risk for being considered as not actively pursuing the class. The best strategy to handle any unforeseen circumstances is to communicate as soon as possible with the instructor.

"No Show" Policy: *If a student registered for the course before the start time of the first class period, but did not attend either of the first two classes (or the first class only for once-a-week courses), the instructor will report it on the Day 10 class lists and 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. Check out the Student Policy Manual, page 44, for the District's policy on academic honesty: <http://www.ccc.edu/departments/Documents/studentpolicymanual.pdf>.*

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. Check out the Student Policy Manual, above, for more information.*

Disability Access Center: *Any student with a disability, including a temporary disability, is eligible for reasonable accommodations should contact the Disability Access Center located in the Larry McKeon building, room 162 as soon as possible. Instructors can only honor accommodation requests from the DAC.*



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Classroom Etiquette:

Laboratory Work: You are expected to maintain a detailed laboratory notebook with observations, data, analysis and discussion of each demonstration and experiment. All data entries should be made in ink NOT pencil while you are in class. You will also be required to write a formal laboratory report for one of the experiments.

Preparation: Laboratory handouts are on the website. You will need to print copies of these for yourself. Please prepare for laboratory work ahead of time by carefully reading all instructions and taking notes in your laboratory notebook.

Attire: Please do NOT wear sandals or shorts to class. We carry out demonstrations and laboratory activities frequently. Some of my past students have elected to carry a second pair of shoes so that they could wear sandals for the rest of the day. That's fine. This rule is for your safety and you will NOT be permitted to carry out laboratory activities if you are not properly dressed.

Food and Drink are not permitted in a chemistry laboratory. Cell phone use is limited to usage permitted by the instructor such as photographing chemical demonstrations.

The Grade will be based on work during laboratory (see details of this below)(30%), projects, examinations (best three of four) (30%), quizzes (best five) (20%), the course final exam / exit exam (15%) and class participation & homework (5%). You must score at least 17/30 on the exit exam to receive a C or better in the course.

DETAILS OF LABORATORY GRADING

Table with 2 columns: Component, Percentage. Rows include Laboratory (30%), Laboratory Notebook (60%), Laboratory Activities (10%), Formal Laboratory Report (20%), Laboratory Performance (10%).

GRADING SCALE

Table with 2 columns: Letter Grade, Percentage. Rows include A (90%), B (80%), C (70%), D (60%), F (below 60%), I (*Incomplete), ADW (**Administrative Withdrawal), NSW (**No Show Withdrawal).

*I (Incomplete) is a non-grade received by students who have actively pursued the course and are



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doing passing work at the end of the course, but who have not completed the course's final examination and/or other specific course assignments.

****ADW (Administrative Withdrawal)** is given to any student who is not **actively pursuing** the course objectives will be administratively withdrawn from the course at mid-term. An ADW will be given if a student does not complete at least 70% of all assignments; homework, exams, laboratories, quizzes due prior to mid-term by the mid-term date. Since make up work is NOT permitted this means that attendance is extremely important and excessive absences will most likely result in an ADW.

*****NSW (No Show Withdrawal)** is given to any student who misses the first two classes and does not discuss with me the circumstances of these absences will be given an NSW after the second class. A student who attends the first class and then fails to attend the next two classes and fails to discuss with me the circumstances of these absences will be given an NSW. Any student who misses more than half of the classes in the first two weeks of the term will also be given an NSW if we do not discuss the circumstances of these absences. In my discussion with you I will determine if it is feasible for you to successfully pursue the course objectives under whatever circumstances are causing you to miss class. Your success is very important to me and I know, from years of experience, that your success depends on your commitment and ability to attend the class and participate in all activities.

Late Work and Make-up Assignments:

Make-Up work is not permitted under any circumstances. This includes but is not limited to hospitalization, deaths in the family, illness, family emergencies. Life happens to everyone. This is why some quizzes and one exam are dropped from your grade with no penalties.

If circumstances arise that prevent you from actively participating in all aspects of this course please let me know. There is no substitute for attending classes regularly and on time. Please choose someone else in the class that will be able to exchange notes with you in the event either of you misses class. You are responsible for all missed announcements, assignments and class work. Please do not use the phrase "I didn't know" to excuse any missed work. Check the website often. Announcements and assignments are posted and updated regularly.

Exit Assessment: *An exit exam is given to all students in Basic Chemistry One. The exam is written and approved by the full-time members of the chemistry faculty. It is multiple choice. A student must answer 17 out of 30 questions correctly to receive a C or better in the course*



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Date	Topic	Text Reference
Week 1	An Introduction to Chemistry: Scientific Method, Classifying Matter	Chapter 1 and Chapter 3 (to 3.4)
Week 1	Measurement: Metric System, Significant Figures	Chapter 2
Week 2	Measurement: Scientific Notation	Chapters 2
	LAB: Equipment Inventory; Getting Started in the Laboratory; Drawing Laboratory Apparatus;	
Week 2	Dimensional Analysis: Metric to Metric conversions, Metric to English conversions, English to Metric conversions, Temperature	Chapter 2
	LAB: Measurement; Temperature;	
Week 3	Elements and Compounds: Symbols and Names, Periodic Table	Chapter 4
	LAB: Accuracy and Precision;	
Week 3	Density: Calculating Density, Interpreting Density Values, Mass by Difference, Volume by Difference, Difference between Mass and Weight	Chapter 2
	LAB: Density;	
Week 4	Properties of Matter: Physical and Chemical Changes Energy and Heat	Chapter 4
	LAB: Separation of Salt and Sand	
Week 4	Problem Solving and Review	Chapters 1,2,4
	LAB: Chocolate Mousse and Carbonated Water; Observing Chemical and Physical Changes ACTIVITY: Element Business Cards	
Week 5	Energy: Heat Transfer and Specific Heat	Chapter 3
	LAB: Caloric Energy of a Cheeto	
Week 5	Energy: Heat Transfer Problems	Chapter 3
	LAB: Identification of an Unknown Metal	
Week 6	Exam One (1-4)	Chapters 1,2,3,4
Week 6	Nomenclature of Inorganic Compounds: Polyatomic Ions, Binary compounds, Acids, Covalent Compounds	Chapter 5
	Formal Lab Report Due and Lab Notebooks will be collected.	
Week 7	Modern Atomic Theory: Quantum Mechanics and Periodic Trends	Chapter 9
Week 7	Chemical Bonding Lewis Structures, Covalent Bonds, Molecular Structure	Chapter 10
Week 8	Molecular Geometry	Chapter 10
	LAB: Molecular Geometry and Shape	
Week 8	Review and Preparation for Exam Two	
	LAB: Hydrates	



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Week 9	Exam Two (5,9,10) Quantitative Composition of Compounds: Mole, Molar Mass, Percent Composition	Chapter 6
Week 9	Reactions: Single Replacement Reactions	Chapter 7
	LAB: Single Replacement Reactions	
Week 10	Quantitative Calculations: Mole, Molar Mass	Chapter 8
Week 10	Stoichiometry: Mole-Mole, Mole-Mass, Mass-Mass	Chapter 8
	LAB: Metathesis Reactions	
Week 11	Stoichiometry: Mole-Mole Mole-Mass Mass-Mass Percent Yield Limiting Reactants Stoichiometry Problem Solving	
	LAB: Stoichiometric Determination of the Formation of Copper (II) Oxide	
Week 11	Exam Three (6-8)	
Week 12	Gases Kinetic Molecular Theory of Gases, Combined Gas Law, Ideal Gas Law	Chapter 11
Week 12	LAB: Preparation and Properties of Carbon Dioxide	
Week 13	Gases Gas Law Problem Solving Practice	Chapter 11
Week 13	Solutions	Chapter 13
Week 15	Acid and Bases	Chapter 14
Week 14	Thanksgiving Holiday	
Week 15	Exam Four (11, 13, 14)	
Week 15	Laboratory Notebooks Due! All assignments are due!	
Week 16	Comprehensive Exit Exam	
Week 16	Final Grade Conferences	