

Philadelphia University	 PHILADELPHIA UNIVERSITY THE WAY TO THE FUTURE	Approval date:
Faculty		Issue:
Department		Credit hours: 3
Academic year		Course Syllabus

Course information

Course#	Course title	Prerequisite
0212109	General Chemistry for Health Science	-----
Course type		Class time
<input type="checkbox"/> University Requirement <input type="checkbox"/> Faculty Requirement <input checked="" type="checkbox"/> Major Requirement <input type="checkbox"/> Elective <input type="checkbox"/> Compulsory		Sun. Tues. 8:15-9:45 12:45-2:15 Mon. Wed 8:15-9:45 11:15-12:30
		Room #

Instructor Information

Name	Office No.	Phone No.	Office Hours	E-mail
Khadeejah Al Abrouni	812	2312	9:30-11 am Sun., Tue 9:30-11 am Mon., Wed,	kabrouni@philadelphia.edu.jo

Course Delivery Method

Course Delivery Method			
<input checked="" type="checkbox"/> Physical	<input type="checkbox"/> Online	<input type="checkbox"/> Blended	
Learning Model			
Precentage	Synchronous	Asynchronous	Physical
			%100

Course Description

This course targets to teach students the basic principles of general chemistry. The first part of the course will cover the fundamental aspects of matter and measurements, stoichiometry, and reactions in aqueous solution. The second part will cover electronic structure of atoms and the periodic table properties, chemical bonding and molecular geometry. The final part will cover the properties of gases and energy relationships in chemical reaction. Also, this course will be illustrating the concept of chemical kinetics, equilibrium and the thermodynamics of chemical reaction

Course Learning Outcomes

Number	Outcomes	Corresponding Program outcomes
Knowledge		
K1	Perform unit analysis problems (involving the metric system, unit conversions, volume, density and temperature) applying significant digits and scientific notation.	K_P3
K2	Know and correctly use the language of chemistry (nomenclature, terminology, symbolic representations).	---
K3	Understand the molar mass and how to find the chemical formula. Use stoichiometry to find the reaction yield.	S_P2
K4	Understand the basics of atomic structure as it applies to assigning quantum numbers to electrons in atomic orbitals as well as writing electron configurations.	----
K5	Identify conjugate acid-base pairs for Bronsted acids and bases, explore the acid-base properties of water using the ion-product constant, K_w .	S_P2
K6	Write ionization constant expressions for weak acids. Calculate pH of weak acids and bases. Find the percent ionization.	K_P3
K7	Represent reactions with rate expressions. Classify the order of a reaction. Calculate rate law of a reaction and Calculate activation energy.	S_P2
K8	Distinguish between one directional and equilibrium reactions. Write equilibrium constant expression for a reaction. and Identify the factors that affect equilibrium.	---
K9	Identify state functions. Demonstrate the First Law of Thermodynamics. Calculate work done. Correlate the Second Law of Thermodynamics with the change in entropy of the universe. Calculate the change in entropy of system & surroundings.	S_P2
K10	Utilize thermochemical equations to calculate the change in enthalpy and calculate Gibbs free energy and standard free- energy changes for reactions.	S_P2
K11	Predict the behavior of gases while undergoing changes in volume, pressure, temperature and quantity.	---
Skills		
S1	Gather and critically evaluate data using the scientific method	S_P2
S2	Analyze, evaluate, and synthesize information	S_P2
S3	Use critical thinking and logic in solving problems	C_P1
S4	Solve quantitative problems using basic mathematical skills	3K_P, S_P2
Competencies		
C1	Develop, interpret, and express ideas through written communication	C_P1
C2	Improve general performance for student through the interaction with each other while solving different chemical problems (social media)	C_P2

Learning Resources

Course textbook	Title: General Chemistry, The Essential Concept, 6 th edition Author: Raymond Chang. Publisher: McGraw Hill 2011 ISBN: 978-007-131368-1
Supporting References	
Supporting websites	https://learn.saylor.org/course/chem101 http://antoine.frostburg.edu/chem/senese/101/slides.shtml https://www.khanacademy.org/science/chemistry
Teaching Environment	<input checked="" type="checkbox"/> Classroom <input type="checkbox"/> laboratory <input type="checkbox"/> Learning platform <input type="checkbox"/> Other

Meetings and subjects' timetable

Week	Topic	Learning Methods	Tasks	Learning Material
1,2	Introduction (Chapter 1, Chapter 2) 1.4 Measurement (SI units, Mass and weight, volume, density and temperature scales) 1.5 Handling Numbers (Scientific notations, significant figures and notes on problem solving) 2.3 Atomic Number, Mass Number and Isotopes 2.4 The Periodic Table 2.6 Chemical Formulas (Molecular formula, empirical formula, formula of ionic compounds)	Lecture		Course Syllabus & Chapter 1
3,4	Stoichiometry (Chapter 3) 3.1 Atomic Mass: Average Atomic Mass 3.2 Avogadro's Number and the Molar Mass of an Element 3.3 Molecular Mass 3.5 Percent Composition of Compounds 3.6 Experimental Determination of Empirical Formulas 3.7 Chemical Reactions and Chemical Equations 3.8 Amounts of Reactants and Products 3.9 Limiting Reagents 3.10 Reaction Yield	Lecture	Quiz chapter 1 & 2	Chapter 3
4,5	Reactions in aqueous solutions (Chapter 4) 4.1 General Properties of Aqueous Solutions: Electrolytes versus Non-electrolytes 4.2 Precipitation Reactions (Solubility, molecular equations, ionic equations and net ionic equations) 4.3 Acid-Base Reactions (General Properties of Acids and Bases, Brønsted Acids and Bases, Acid-Base Neutralization, Acid-Base Reactions Leading to Gas Formation) 4.4 Oxidation-Reduction Reactions and Oxidation Number 4.5 Concentration of Solutions and Dilution of Solutions 4.6 Solution Stoichiometry	Lecture	Quiz chapter 3	Chapter 4
6	Gases (Chapter 5) 5.1 Substances That Exist as Gases (SI units of pressure and Atmospheric pressure) 5.2 Pressure of a Gas 5.4 The Ideal Gas Equation (Density and Molar Mass of a Gaseous Substance) 5.5 Dalton's Law of Partial Pressures	Lecture	Mid term Exam	Chapter 5
7	Acids and Bases (Chapter 16)	Lecture		Chapter 16

	<p>16.1 Brønsted Acids and Bases ,Conjugate Acid-Base Pairs</p> <p>16.2 The Acid-Base Properties of Water ,The Ion-Product of Water</p> <p>16.3 pH—A Measure of Acidity</p> <p>16.4 Strength of Acids and Bases</p> <p>16.5 Weak Acids and Acid Ionization Constants</p> <p>16.6 Weak Bases and Base Ionization Constants</p> <p>16.7 The Relationship Between Conjugate Acid-Base Ionization Constants</p> <p>16.8 Molecular Structure and the Strength of Acids (Hydrohalic Acids and Oxoacids)</p> <p>16.9 Acid-Base Properties of Salts</p>			
8	<p>The electronic structure of atoms (Chapter 7 and Chapter 8)</p> <p>7.6 Quantum Numbers (The Principal Quantum Number (n), The Angular Momentum Quantum Number, The Magnetic Quantum Number, The Electron Spin Quantum Number)</p> <p>7.7 Atomic Orbitals</p> <p>7.8 Electron Configuration (The Pauli Exclusion Principle, Diamagnetism and Para magnetism, The Shielding Effect in Many-Electron Atoms, Hund’s Rule, General Rules for Assigning Electrons to Atomic Orbitals and Electron Configurations of Cations and anions)</p> <p>7.9 The Building-Up Principle</p> <p>8.3 Periodic Variation in Physical Properties (Effective Nuclear Charge, Atomic Radius, Ionic Radius)</p> <p>8.4 Ionization Energy</p> <p>8.5 Electron Affinity</p>	Lecture	Quiz chapter 5 & 16	Chapter 7 & chapter 8
9	<p>Chemical bonding I: the covalent bond (Chapter 9)</p> <p>9.1 Lewis Dot Symbols</p> <p>9.2 The Ionic Bond</p> <p>9.4 The Covalent Bond</p> <p>9.5 Electronegativity</p> <p>9.6 Writing Lewis Structures</p> <p>9.7 Formal Charge and Lewis Structure</p> <p>9.8 The Concept of Resonance</p> <p>9.9 Exceptions to the Octet Rule</p>			Chapter 9
10	<p>Molecular geometry hybridization of atomic orbitals and Intermolecular forces and liquids (Chapter 10 & 12)</p> <p>10.1 Molecular Geometry, Guidelines for Applying the VSEPR Model</p> <p>10.2 Dipole Moments</p> <p>10.3 Valence Bond Theory</p> <p>10.4 Hybridization of Atomic Orbitals</p> <p>10.5 Hybridization in Molecules Containing Double and Triple Bonds</p> <p>12.1 The Kinetic Molecular Theory of Liquids and Solids</p>	Lecture		Chapter 10

	12.2 Intermolecular Forces 12.3 Properties of Liquids			
11	Chemical Kinetics (Chapter 14) 14.1 The rate of a reaction 14.2 The rate laws 14.3 Relation between reactant concentrations and time 14.4 Activation energy and temperature dependence of rate constants 14.5 Reaction Mechanisms 14.6 Catalysis	Lecture	Quiz chapter 7,8,9,10	Chapter 14
12	Chemical Equilibrium (Chapter 15) 15.1 The Concept of equilibrium 15.2 Ways of expressing equilibrium constants 15.3 What does the equilibrium constant tell us 15.4 Factors that affect chemical equilibrium	Lecture		Chapter 15
13	Energy Relationships in Chemical Reactions and Thermodynamics of chemical reactions (Chapter 6 & 18) 6.3 Introduction to Thermodynamics (The First Law of Thermodynamics. Work and Heat) 6.4 Enthalpy of Chemical Reactions (Enthalpy, Enthalpy of Reactions, Thermochemical Equations) 18.1 The Three Laws of Thermodynamics 18.2 Spontaneous Processes 18.3 Entropy 18.4 The Second Law of Thermodynamics 18.5 Gibbs Free Energy	Lecture		Chapter 16 & chapter 18
14	Final Exam			

* includes: Lecture, flipped Class, project- based learning, problem solving based learning, collaborative learning

Assessment Methods and Grade Distribution

Assessment Methods	Grade Weight	Assessment Time (Week No.)	Link to Course Outcomes
Mid Term Exam	% 30	5	K1, K2, K3, K5, K11
Various Assessments *	% 30	Continuous	C1, C2, K1, K2, K3, K4, K5, K6
Final Exam	% 40	9	S3, S4, K7, K8, K9, K10, K5, K6
Total	%100		

* includes: quiz, in class and out of class assignment, presentations , reports, videotaped assignment, group or individual projects.

Alignment of Course Outcomes with Learning and Assessment Methods

Number	Learning Outcomes	Learning Method*	Assessment Method**
Knowledge			
K1	Perform unit analysis problems (involving the metric system, unit conversions, volume, density and temperature) applying significant digits and scientific notation.	Lecture	Exam
K2	Know and correctly use the language of chemistry (nomenclature, terminology, and symbolic representations).	Lecture	Exam
K3	Understand the molar mass and how to find the chemical formula. Use stoichiometry to find the reaction yield.	Lecture	Exam
K4	Understand the basics of atomic structure as it applies to assigning quantum numbers to electrons in atomic orbitals as well as writing electron configurations	Lecture	Exam
K5	Identify conjugate acid-base pairs for Bronsted acids and bases, explore the acid-base properties of water using the ion-product constant, K_w	Lecture	Exam
K6	Write ionization constant expressions for weak acids. Calculate pH of weak acids and bases. Find the percent ionization	Lecture	Exam
K7	Represent reactions with rate expressions. Classify the order of a reaction. Calculate the rate law of a reaction and Calculate activation energy.	Lecture	Exam
K8	Distinguish between one directional and equilibrium reactions. Write the equilibrium constant expression for a reaction. and Identify the factors that affect equilibrium.	Lecture	Exam
K9	Identify state functions. Demonstrate the First Law of Thermodynamics. Calculate work done. Correlate the Second Law of Thermodynamics with the change in entropy of the universe. Calculate the change in entropy of system & surroundings.	Lecture	Exam
K10	Utilize thermochemical equations to calculate the change in enthalpy and calculate Gibbs free energy and standard free- energy changes for reactions	Lecture	Exam
K11	Predict the behavior of gases while undergoing changes in volume, pressure, temperature and quantity.	Lecture	Exam
Skills			
S1	Gather and critically evaluate data using the scientific method	Homework	Quiz
S2	Analyze, evaluate, and synthesize information	Discussion	Quiz
S3	Use critical thinking and logic in solving problems	Lecture	Exam
S4	Solve quantitative problems using basic mathematical skills	Homework	Quiz
Competencies			
C1	Develop, interpret, and express ideas through written communication	Homework	Quiz
C2	Improve general performance for student through the interaction with each other in solving different chemical problems	Teams	Discussion

* includes: Lecture, flipped Class, project- based learning, problem solving based learning, collaborative learning

** includes: quiz, in class and out of class assignment , presentations , reports, videotaped assignment, group or individual projects.

Course Polices

Policy	Policy Requirements
Passing Grade	The minimum passing grade for the course is (50%) and the minimum final mark recorded on transcript is (35%).
Missing Exams	<ul style="list-style-type: none"> • Missing an exam without a valid excuse will result in a zero grade to be assigned to the exam or assessment. • A Student who misses an exam or scheduled assessment, for a legitimate reason, must submit an official written excuse within a week from the an exam or assessment due date. • A student who has an excuse for missing a final exam should submit the excuse to the dean within three days of the missed exam date.
Attendance	The student is not allowed to be absent more than (15%) of the total hours prescribed for the course, which equates to six lectures days (M, W) and seven lectures (S,T,R). If the student misses more than (15%) of the total hours prescribed for the course without a satisfactory excuse accepted by the dean of the faculty, s/he will be prohibited from taking the final exam and the grade in that course is considered (zero), but if the absence is due to illness or a compulsive excuse accepted by the dean of the college, then withdrawal grade will be recorded.
Academic Honesty	Philadelphia University pays special attention to the issue of academic integrity, and the penalties stipulated in the university's instructions are applied to those who are proven to have committed an act that violates academic integrity, such as: cheating, plagiarism (academic theft), collusion, and violating intellectual property rights.

Program Learning Outcomes to be Assessed in this Course

Number	Learning Outcome	Course Title	Assessment Method	Target Performance level
Kp3	Using mathematical and statistical methods and scientific research mechanisms to address applied issues	General Chemistry for Health Science	Exam	100% of the students get 60% or more

Description of Program Learning Outcome Assessment Method

Number	Detailed Description of Assessment
Kp3	Find number of moles, molar mass, balance equations, and solve amount of reactant and product. Find the concentration of solution, energy of forming bonds and determine the rate of reaction