



COURSE OUTLINE: CHM180 - CHEMISTRY I

Prepared: Christine Giardino

Approved: Bob Chapman, Chair, Health

Course Code: Title	CHM180: CHEMISTRY I FOR PCD
Program Number: Name	3060: PRE-HEALTH CERT DIPL
Department:	PRE-HEALTH
Semesters/Terms:	19F
Course Description:	In this course, students will examine the fundamental concepts, procedures, and calculations of chemistry. Course work will include examples and problems that relate to health and the human body. Topics in this course include physical and chemical properties of matter, chemical bonding, nomenclature, chemical quantities, chemical reactions, and stoichiometry. Laboratory investigations in this course will focus on safety, measurement, and common practices and procedures. The purpose of the lab work is to develop practical skills while gaining a better understanding of the theoretical concepts and calculations.
Total Credits:	4
Hours/Week:	4
Total Hours:	60
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
This course is a pre-requisite for:	CHM181
Vocational Learning Outcomes (VLO's) addressed in this course: Please refer to program web page for a complete listing of program outcomes where applicable.	3060 - PRE-HEALTH CERT DIPL VLO 2 Examine fundamental concepts, processes and systems of chemistry, including matter and chemical bonding; quantities in chemical reactions; solutions and solubility; acids and bases; as well as nomenclature, structure and properties of organic compounds in relation to health and the human body. VLO 6 Investigate health sciences and science-related questions, problems and evidence using the scientific method.
Essential Employability Skills (EES) addressed in this course:	EES 3 Execute mathematical operations accurately. EES 4 Apply a systematic approach to solve problems. EES 5 Use a variety of thinking skills to anticipate and solve problems. EES 6 Locate, select, organize, and document information using appropriate technology and information systems. EES 7 Analyze, evaluate, and apply relevant information from a variety of sources. EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others. EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.



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	EES 10 Manage the use of time and other resources to complete projects. EES 11 Take responsibility for ones own actions, decisions, and consequences.												
General Education Themes:	Science and Technology												
Course Evaluation:	Passing Grade: 50%, D												
Other Course Evaluation & Assessment Requirements:	Students must achieve an average of 50% on test and exam material, independent of other components, to obtain a passing grade in this course. Students must achieve an average of 50% on lab material, independent of other components, to obtain a passing grade in this course.												
Books and Required Resources:	Chemistry: An Introduction to General, Organic, and Biological Chemistry by Karen C. Timberlake Publisher: Pearson Edition: 13 ISBN: 9780134421353 or 9780134564586												
Course Outcomes and Learning Objectives:	<table border="1"> <thead> <tr> <th>Course Outcome 1</th><th>Learning Objectives for Course Outcome 1</th></tr> </thead> <tbody> <tr> <td>1. Perform measurements and calculations that are accurate and precise.</td><td>1.1 Identify a number as measured or exact. 1.2 Indicate the uncertainty associated with a particular measurement. 1.3 Use appropriate metric or SI units, especially when recording measurements of length, mass, volume, temperature, and time. 1.4 Express a measured or calculated value using scientific notation. 1.5 Round off the results of a calculation to the appropriate number of significant digits.</td></tr> <tr> <th>Course Outcome 2</th><th>Learning Objectives for Course Outcome 2</th></tr> <tr> <td>2. Classify matter and describe its structure, organization, and properties.</td><td>2.1 Classify matter based on its state (solid, liquid, or gas) and composition (type of pure substance or mixture). 2.2 Distinguish between physical and chemical properties. 2.3 Describe the structure of an atom and the subatomic particles it contains. 2.4 Define isotope and explain the effect that isotopes have on the atomic mass of an element. 2.5 Represent an isotope using its atomic and mass numbers. 2.6 Use the octet rule to determine the charge of an ion. 2.7 Recognize and compare the properties of elements in subdivisions of the periodic table: periods, groups, metals, non-metals, and metalloids. 2.8 Identify periodic patterns and trends with respect to atomic size, electronegativity, number of energy levels, number of valence electrons, and reactivity.</td></tr> <tr> <th>Course Outcome 3</th><th>Learning Objectives for Course Outcome 3</th></tr> <tr> <td>3. Describe the bonding and properties of ionic and molecular compounds.</td><td>3.1 Classify compounds as ionic or molecular. 3.2 Compare the characteristics of ionic and covalent bonds and ionic and covalent compounds. 3.3 Determine the polar character of bonds using the concept</td></tr> </tbody> </table>	Course Outcome 1	Learning Objectives for Course Outcome 1	1. Perform measurements and calculations that are accurate and precise.	1.1 Identify a number as measured or exact. 1.2 Indicate the uncertainty associated with a particular measurement. 1.3 Use appropriate metric or SI units, especially when recording measurements of length, mass, volume, temperature, and time. 1.4 Express a measured or calculated value using scientific notation. 1.5 Round off the results of a calculation to the appropriate number of significant digits.	Course Outcome 2	Learning Objectives for Course Outcome 2	2. Classify matter and describe its structure, organization, and properties.	2.1 Classify matter based on its state (solid, liquid, or gas) and composition (type of pure substance or mixture). 2.2 Distinguish between physical and chemical properties. 2.3 Describe the structure of an atom and the subatomic particles it contains. 2.4 Define isotope and explain the effect that isotopes have on the atomic mass of an element. 2.5 Represent an isotope using its atomic and mass numbers. 2.6 Use the octet rule to determine the charge of an ion. 2.7 Recognize and compare the properties of elements in subdivisions of the periodic table: periods, groups, metals, non-metals, and metalloids. 2.8 Identify periodic patterns and trends with respect to atomic size, electronegativity, number of energy levels, number of valence electrons, and reactivity.	Course Outcome 3	Learning Objectives for Course Outcome 3	3. Describe the bonding and properties of ionic and molecular compounds.	3.1 Classify compounds as ionic or molecular. 3.2 Compare the characteristics of ionic and covalent bonds and ionic and covalent compounds. 3.3 Determine the polar character of bonds using the concept
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	of electronegativity. 3.4 Determine the type of intermolecular bonding that occurs in a molecular compound based on polarity and the shape of its molecules.
Course Outcome 4	Learning Objectives for Course Outcome 4
4. Represent ions, diatomic molecules, and compounds by name and chemical formula.	4.1 Use the octet rule to predict ion symbols and chemical formulae. 4.2 Use the chemical formula of a compound to determine its IUPAC name. 4.3 Use the IUPAC name of a compound to determine its chemical formula.
Course Outcome 5	Learning Objectives for Course Outcome 5
5. Perform calculations and conversions involving chemical quantities, temperature, and energy.	5.1 Define and determine the mass, volume, density, or specific gravity of a substance. 5.2 Define and explain the meaning of moles, mass, molar mass, and Avogadro's number. 5.3 Calculate moles, mass, molar mass, and number of particles for a pure substance. 5.4 Determine the percent composition of a compound or mixture. 5.5 Describe three commonly used temperature scales and perform conversions from one to another. 5.6 State commonly used energy units and perform conversions from one to another.
Course Outcome 6	Learning Objectives for Course Outcome 6
6. Write, interpret, and analyze a balanced chemical equation representing a reaction.	6.1 Distinguish between physical and chemical changes. 6.2 Describe the parts of a chemical equation representing a reaction. 6.3 Balance a chemical equation given the identity of the products and reactants. 6.4 Classify chemical reactions by type: combination, decomposition, single replacement, double replacement, or combustion. 6.5 Identify a redox reaction and determine which reactant is oxidized and which reactant is reduced. 6.6 Interpret equations with energy terms and state whether a physical change or chemical reaction is endothermic or exothermic. 6.7 Explain the factors that affect the rate of a chemical reaction through the use and application of the collision theory and potential energy diagrams.
Course Outcome 7	Learning Objectives for Course Outcome 7
7. Perform stoichiometric calculations.	7.1 Identify the stoichiometric relationships among all of the chemical species involved in a balanced chemical reaction. 7.2 Explain how the following are related: coefficients in a balanced chemical equation, quantity in moles, mass, and number of particles. 7.3 Given a quantity in moles of reactant or product, use a mole-mole factor from the balanced equation to calculate the moles of another substance in the reaction. 7.4 Given the mass in grams of a substance in a reaction,



		calculate the mass in grams of another substance in the reaction. 7.5 For a given chemical reaction, calculate percent yield of a product when provided with the identity of the limiting reactant. 7.6 Relate the quantity of reactants to energy change using the energy value from a thermochemical equation. 7.7 Compare and calculate energy changes in endothermic and exothermic processes.								
	Course Outcome 8	Learning Objectives for Course Outcome 8								
	8. Conduct laboratory investigations using appropriate scientific techniques.	8.1 Follow a provided lab procedure safely, accurately and efficiently. 8.2 Select the most appropriate equipment for performing a particular measurement. 8.3 Use proper measurement techniques for the precise and accurate collection of quantitative data. 8.4 Make clear and concise qualitative observations. 8.5 Record data using tables. 8.6 Use scientific reasoning to draw conclusions that explain investigation results.								
Evaluation Process and Grading System:	<table><tr><th>Evaluation Type</th><th>Evaluation Weight</th></tr><tr><td>Final Exam</td><td>20%</td></tr><tr><td>Labs</td><td>30%</td></tr><tr><td>Unit Tests</td><td>50%</td></tr></table>		Evaluation Type	Evaluation Weight	Final Exam	20%	Labs	30%	Unit Tests	50%
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Date:	August 7, 2019									
Addendum:	Please refer to the course outline addendum on the Learning Management System for further information.									

