



# COURSE OUTLINE

## CHM180

1

Prepared: Christine Giardino Approved: Bob Chapman

<b>Course Code: Title</b>	CHM180: CHEMISTRY I FOR PCD
<b>Program Number: Name</b>	3060: PRE-HEALTH CERT DIPL
<b>Department:</b>	PRE-HEALTH
<b>Semester/Term:</b>	17F
<b>Course Description:</b>	<p>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.</p> <p>Topics in this course include physical and chemical properties of matter, chemical bonding, nomenclature, chemical quantities, chemical reactions, and stoichiometry.</p> <p>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.</p>
<b>Total Credits:</b>	4
<b>Hours/Week:</b>	4
<b>Total Hours:</b>	60
<b>This course is a pre-requisite for:</b>	CHM181
<b>Vocational Learning Outcomes (VLO's):</b>	<p>#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.</p> <p>#6. Investigate health sciences and science-related questions, problems and evidence using the scientific method.</p>
<b>Essential Employability Skills (EES):</b>	<p>#4. Apply a systematic approach to solve problems.</p> <p>#5. Use a variety of thinking skills to anticipate and solve problems.</p> <p>#7. Analyze, evaluate, and apply relevant information from a variety of sources.</p> <p>#8. Show respect for the diverse opinions, values, belief systems, and contributions of others.</p> <p>#10. Manage the use of time and other resources to complete projects.</p> <p>#11. Take responsibility for ones own actions, decisions, and consequences.</p>

Please refer to program web page for a complete listing of program outcomes where applicable.



Prepared: Christine Giardino Approved: Bob Chapman

**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.

**Evaluation Process and Grading System:**

Evaluation Type	Evaluation Weight
Final Exam	20%
Labs (5 x 6% each)	30%
Tests (5 x 10% each)	50%

**Books and Required Resources:**

Chemistry: An Introduction to General, Organic, and Biological Chemistry by Karen C. Timberlake  
Publisher: Pearson Edition: 13  
ISBN: 9780134421353

**Course Outcomes and Learning Objectives:**

**Course Outcome 1.**

Report measurements and calculations that are accurate and precise.

**Learning Objectives 1.**

Identify a number as measured or exact.  
Indicate the uncertainty associated with a particular measurement.  
Use appropriate metric or SI units, especially when recording measurements of length, mass, volume, temperature, and time.  
Describe three commonly used temperature scales and perform conversions from one to the other.  
Express a measured or calculated value using scientific notation.  
Round off the results of a calculation to the appropriate number of significant digits.

**Course Outcome 2.**



# COURSE OUTLINE

## CHM180

3

Prepared: Christine Giardino Approved: Bob Chapman

Classify matter and describe its characteristics.

### **Learning Objectives 2.**

Classify matter based upon its state (solid, liquid, or gas) and composition (type of pure substance or mixture).

Differentiate between a pure substance and a mixture.

Differentiate between a homogeneous and heterogeneous mixture.

Distinguish between physical and chemical properties of matter.

Describe the structure of an atom and the subatomic particles it contains.

Define isotope and explain the effect that isotopes have on the atomic mass of an element.

Represent an isotope using its atomic number and mass number.

Recognize the important properties of elements in the subdivisions of the periodic table: periods, groups, metals, and non-metals.

Compare the characteristics of metals and non-metals

Determine the number of valence electrons in an atom.

Use the octet rule to determine the charge of ions.

Describe periodic trends with respect to atomic size, electronegativity, energy levels, and number of valence electrons.

### **Course Outcome 3.**

Describe the bonding and properties of ionic and molecular compounds.

### **Learning Objectives 3.**

Classify compounds as ionic or molecular.

Compare the characteristics of ionic and covalent bonds and ionic and covalent compounds.

Use the octet rule to predict the formulae of binary ionic and molecular compounds.

Determine the polar character of bonds using the concept of electronegativity.

Determine the type of intermolecular bonding that exists in a substance based on polarity and molecular shape.

### **Course Outcome 4.**

Represent compounds by name and chemical formula.



# COURSE OUTLINE

## CHM180

4

Prepared: Christine Giardino Approved: Bob Chapman

### **Learning Objectives 4.**

Predict and write the chemical formulae of binary and polyatomic ionic compounds.  
Use the chemical formula of an ionic (binary and polyatomic) compound to determine its IUPAC name.  
Name simple molecular compounds.  
Determine the empirical and molecular formulae of a compound.

### **Course Outcome 5.**

Perform calculations and conversions involving the quantity of a substance.

### **Learning Objectives 5.**

Define formula mass, molar mass, mole, and Avogadro's number.  
Calculate moles, mass, and number of particles of a pure substance.  
Calculate the formula weight and molar mass of a pure substance, given its chemical formula.  
Calculate the percent composition of a compound or mixture.

### **Course Outcome 6.**

Describe the characteristics of a chemical reaction and the nature of a balanced chemical equation.

### **Learning Objectives 6.**

Identify physical and chemical properties.  
Characterize and distinguish between physical and chemical changes.  
Describe the parts of a chemical equation representing a reaction.  
Balance chemical equations given the identity of the products and reactants.  
Classify chemical reactions by type: redox, combination, decomposition, replacement, or combustion.  
Interpret chemical equations with energy terms and state whether a physical change or chemical reaction is endothermic or exothermic.  
State the factors that affect reaction rate and explain each factor by applying the collision theory.



# COURSE OUTLINE

## CHM180

5

Prepared: Christine Giardino Approved: Bob Chapman

Sketch and interpret potential energy diagrams and use them to explain the effect that a catalyst (such as an enzyme) would have on reaction rate.  
Differentiate between a reversible and irreversible reaction.

### **Course Outcome 7.**

Perform stoichiometric calculations.

### **Learning Objectives 7.**

Identify the stoichiometric relationships among all of the chemical species involved in a balanced chemical reaction.

Explain how the following variables are related: coefficients in a balanced chemical equation, quantity in moles, mass and number of particles.

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.

Given the mass in grams of a substance in a reaction, calculate the mass in grams of another substance in the reaction.

For a given chemical reaction, calculate percent yield of a product when provided with the identity of the limiting reagent.

### **Course Outcome 8.**

Conduct laboratory investigations using appropriate scientific techniques.

### **Learning Objectives 8.**

Determine proper measurement techniques for the precise and accurate collection of quantitative data.

Portray scientific data using graphs, charts, and tables.

Use scientific reasoning to draw conclusions that explain investigation results.

**Date:**

Wednesday, August 30, 2017

Please refer to the course outline addendum on the Learning Management System for further information.