

| CHEM 101 SYLLABUS  |                  |                   |
|--|------------------|-------------------|
| Text book: Raymond Chang, Chemistry, 10 <sup>th</sup> edition, 2010  |                  |                   |
| Topics   | Text book pages  | Number of Lecture |
| <b>Chapter 1: Chemistry: The Study of Change</b>   |                  |                   |
| <b>1.4</b> Classifications of Matter: substances and mixtures, elements and compounds<br><b>1.5</b> The Three States of Matter<br><b>1.6</b> Physical and Chemical properties of Matter: intensive and extensive properties<br><b>1.7</b> Measurement: SI units, mass and weight, volume, density, temperature scales<br><b>1.8</b> Handling Numbers: scientific notation, significant figures, accuracy and precision<br><b>1.9</b> Dimensional Analysis in Solving Problems: conversion factors, a note on problem solving | <b>10 - 30</b>   | <b>9</b>          |
| <b>Review and Exercises</b>  |                  |                   |
| <b>Chapter 2: Atoms, Molecules and Ions</b>  |                  |                   |
| <b>2.2</b> The Structure of the Atoms: the electron, radioactivity, the proton and the nucleus, the neutron<br><b>2.3</b> Atomic Number, Mass Number and Isotopes<br><b>2.4</b> The Periodic Table<br><b>2.5</b> Molecules and Ions: molecules, ions<br><b>2.6</b> Chemical Formulas: molecular formulas, empirical formulas, formula of ionic compound<br><b>2.7</b> Naming Compounds: ionic compound, molecular compound, acids and bases, familiar inorganic compound   | <b>43 - 68</b>   | <b>7</b>          |
| <b>Review and Exercises</b>  |                  |                   |
| <b>FIRST MIDTERM EXAM</b>  |                  |                   |
| <b>Chapter 3: Mass Relationships in Chemical Reactions</b>   |                  |                   |
| <b>3.1</b> Atomic Mass: average atomic mass<br><b>3.2</b> Avogadro's Number and the Molar Mass of an Element<br><b>3.3</b> Molecular Mass  | <b>80 - 87</b>   | <b>8</b>          |
| <b>3.5</b> Percent Composition of Compounds<br><b>3.6</b> Experimental Determination of Empirical Formulas: determination of molecular formulas<br><b>3.7</b> Chemical Reactions and Chemical Equations: writing chemical equations, balancing chemical equations<br><b>3.8</b> Amounts of reactants and products<br><b>3.9</b> Limiting Reagents<br><b>3.10</b> Reaction Yield  | <b>88 - 107</b>  |                   |
| <b>Review and Exercises</b>  |                  |                   |
| <b>Chapter 4: Reactions in Aqueous Solutions</b>   |                  |                   |
| <b>4.4</b> <u>Only</u> combination reactions, decomposition reactions, combustion reactions  | <b>139 - 141</b> | <b>1</b>          |
| <b>4.5</b> Concentration of solution   | <b>147 - 149</b> |                   |
| <b>Review and Exercises</b>  |                  |                   |

| <i>Chapter 5: Gases</i>  |                  |           |
|--|------------------|-----------|
| <b>5.1</b> Substances That Exist as Gases<br><b>5.2</b> Pressure of a Gas: SI units of pressure, atmospheric pressure,<br><b>5.3</b> The Gas Laws: the pressure-volume relationship: Boyle's Law, the temperature-volume relationship: Charles's and Gay-Lussac's law, the volume-amount relationship: Avogadro's Law<br><b>5.4</b> The Ideal Gas Equation: density calculation, the molar mass of a gaseous substance<br><b>5.5</b> Gas Stoichiometry<br><b>5.6</b> Dalton's law of Partial Pressures   | <b>174 - 201</b> | <b>5</b>  |
| <i>Review and Exercises</i>  |                  |           |
| <b>SECOND MIDTERM EXAM</b>   |                  |           |
| <i>Chapter 6: Thermochemistry</i>  |                  |           |
| <b>6.1</b> The Nature of Energy and Types of Energy<br><b>6.2</b> Energy Changes in Chemical Reactions<br><b>6.3</b> Introduction to Thermodynamics: the first law of thermodynamics, work and heat<br><b>6.4</b> Enthalpy of Chemical Reactions: enthalpy, enthalpy of reactions, thermochemical equations, a comparison of $\Delta H$ and $\Delta E$<br><b>6.5</b> Calorimetry: <b>Only</b> specific heat and heat capacity  | <b>230 - 246</b> | <b>5</b>  |
| <b>6.6</b> Standard Enthalpy of Formation and Reaction: the direct method, the indirect method (Hess's law)  | <b>252 - 258</b> |           |
| <i>Review and Exercises</i>  |                  |           |
| <i>Chapter 12: Physical Properties of Solutions</i>  |                  |           |
| <b>12.1</b> Types of Solutions<br><b>12.2</b> A Molecular View of the Solution Process<br><b>12.3</b> Concentration Units: types of concentration units, comparison of concentration units<br><b>12.4</b> The Effect of Temperature od Solubility: solid solubility and temperature, gas solubility and temperature<br><b>12.5</b> The Effect of Pressure on the Solubility of Gases<br><b>12.6</b> Colligative Properties of Nonelectrolyte Solutions: vapor-pressure lowering (Raoult's Law), boiling-point elevation, freezing-point depression, osmotic pressure, using colligative properties to determine molar mass | <b>514 - 539</b> | <b>7</b>  |
| <i>Review and Exercises</i>  |                  |           |
| <b>TOTAL HOURS</b>   |                  | <b>42</b> |

**Distribution of the 100 grades over semester:**

|                               |           | <b>Grades</b> |
|-------------------------------|-----------|---------------|
| <b>Practical</b>              |           | <b>30</b>     |
| <b>1<sup>st</sup> midterm</b> | <b>15</b> | <b>30</b>     |
| <b>2<sup>nd</sup> midterm</b> | <b>15</b> |               |
| <b>Final exam</b>             |           | <b>40</b>     |
| <b>Total</b>                  |           | <b>100</b>    |

**FINAL EXAM WILL BE IN ALL TOPICS**

الإختبار النهائي سيكون في جميع مواضيع المقرر