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| **SUGGESTED CHEM 101 SYLLABUS**  |
| **Text book: Raymond Chang, Chemistry, 10th edition, 2010** |
| **Topics** | **Text book pages** | Number of Lecture |
| ***Matter and Measurements*** |
| **1.4** Classifications of Matter: substances and mixtures, elements and compounds. *How to right symbols of Elements (the table and the explanation (P 12)***1.5** The Three States of Matter**1.6** Physical and Chemical properties of Matter: intensive and extensive properties**1.7** Measurement: SI units, mass and weight, volume, density, temperature scales**1.9** Dimensional Analysis in Solving Problems: conversion factors, a note on problem solving | **10 - 22****27- 31** | **4** |
| ***Review and Exercises*** |
| ***Atoms, Molecules and Ions*** |
| **2.2** The Structure of the Atoms: the electron, the proton and the neutron. *only definitions, masses, and charges*[Radioactivity is excluded]**2.3** Atomic Number, Mass Number and Isotopes**2.4** The Periodic Table*Periods and groups 1 to 18 - Metals and nonmetals - Alkaline, alkaline earth, halogens, and noble gases.***2.5** Molecules and Ions: molecules, ions.*Diatomic molecules and polyatomic molecules - Homonuclear monatomic molecules, homonuclearmultiatomic molecules, and heteronuclear molecules (= Covalent compounds) - Ions (monatomic ions and polyatomic ions)***2.7** Naming Compounds: ionic compound, molecular compound, acids and bases, familiar inorganic compound | **43 - 54****59 - 68** | **5** |
| ***Review and Exercises*** |
| ***Quantum Theory and the Electonic Structure of Atoms*** |
| **7.6** Quantum numbers.**7.7** Atomic Orbitals.**7.8** Electron Configuration. | **294 - 307** | **3** |
| ***Review and Exercises*** |
| ***Periodic Relationships Among the Elements*** |
| **8.2** Periodic Classification of the elements.**8.3** Periodic Variation in Physical Properties (only atomic radius).**8.4** Ionization Energy*.***8.5** Electron Affinity.(sections **8.4** and **8.5** can be confined only in properties without more details) | **326 – 332****337 - 343** | **3** |

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| ***Review and Exercises*** |

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| ***First Exam*** |
| ***Stoichiometry and Chemical Equations*** |
| **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: determination of molecular formulas**3.7** Chemical Reactions and Chemical Equations: writing chemical equations, balancing chemical equations**3.8** Amounts of reactants and products**3.9** Limiting Reagents**3.10** Reaction Yield | **80 – 87****88 – 107** | **6** |
| ***Review and Exercises*** |
| ***Gases*** |
| **5.1** Substances That Exist as Gases**5.2** Pressure of a Gas: SI units of pressure, atmospheric pressure.[Manometer is excluded]**5.3** 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**5.4** The Ideal Gas Equation: density calculation, the molar mass of a gaseous substance**5.5** Gas Stoichiometry**5.6** Dalton's law of Partial Pressures**5.7** The Kinetic Molecular Theory of Gases**5.8** Deviation from Ideal Behavior | **174 - 213** | **7** |
| ***Review and Exercises*** |
| ***Thermochemistry*** |
| **6.3** Introduction to Thermodynamics: the first law of thermodynamics, work and heat**6.4** Enthalpy of Chemical Reactions: enthalpy of reactions, thermochemical equations, a comparison of ∆H and ∆E.**6.5** Calorimetry: **Only** specific heat and heat capacity**6.6** Standard Enthalpy of Formation and Reaction: the direct method, the indirect method.*The direct method (use of enthalpies of formation to calculate enthalpies of other reaction). The indirect method (Hess’s law and its use to calculate enthalpies of other reaction)* | **233 - 238****241 - 246****252 - 258** | **5** |
| ***Review and Exercises*** |
| ***Second Exam*** |
| ***Solutions*** |
| **12.1** Types of Solutions[Supersaturated solution is excluded]**12.2** A Molecular View of the Solution Process**4.5** Concentration of solution**12.3** Concentration Units: types of concentration units, comparison of concentration units*Molarity and dilution of solutions****,*** *Percent by mass, mole fraction, molarity***12.4** The Effect of Temperature od Solubility: solid solubility and temperature, gas solubility and temperature[Fractional crystallization is excluded]**12.5** The Effect of Pressure on the Solubility of Gases**12.6** 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[Fractional distillation is excluded] | **514, 515****147 – 150****517 - 521****521 - 525****527, 528****530 - 538** | **7** |
| ***Review and Exercises*** |
| **TOTAL HOURS** | **42** |

**Practical**

**1.8** Handling Numbers: scientific notation, significant figures, accuracy and precision p22-27