

**THE COLLEGE OF THE BAHAMAS
SCHOOL OF NATURAL SCIENCES & ENVIRONMENTAL STUDIES
CHEMISTRY DEPARTMENT**

COLLEGE CHEMISTRY II – CHEM 225

COURSE OUTLINE

1. Reaction Kinetics

Rate of reaction expressed as the change in concentration of a reactant or product in unit time.

Factors which affect the rate of a reaction.

Order of reaction with respect to a given reactant, overall order of a reaction and rate laws.

Derivation of rate laws from experimental data involving changes in the concentration of reactants.

Factors necessary for each reaction to take place—collision, proper orientation, activation energy (energy profile diagrams necessary).

Catalysts as substances which provide an alternative pathway with a lower activation energy.

2. Chemical Equilibria

(a) General

The dynamic nature of the equilibrium state. Equilibrium law. K_c and K_p values. The relationship between K_c and K_p values. Effect of changes in concentration of a reactant or a product, temperature, pressure, volume or addition of a catalyst on equilibrium systems including graphical interpretations.

(b) Acid-base Equilibria

Brown-Lowry definition of acids and bases. Strong and weak acids and bases. K_a and K_b values. pH, pOH, pK_a , pK_b values.

Relationship between chemical structure and acid or base strength. Salt Hydrolysis.

Simple theory of the action of indicators. Titration curve--strong acid/strong base, strong acid/weak base, weak acid/strong base, weak acid/weak base, Polyprotic acids. Choice of indicators. Buffer solutions and their uses.

Acid-base reactions in non-aqueous media e.g. in ammonia and ethanoic acid.

(c) Complexion Equilibria

Stability constants. Replacements of ligands

(d) Solubility Products

Solubility products. Prediction of precipitate. Dissolving precipitates. The common effect.

3. Redox Reactions and Electrochemistry

Review oxidation numbers. Balancing redox reactions in acidic and basic media. Electrochemical cells. Standard redox potentials. Cell diagrams. Use of the electrochemical series to predict possible reactions and to calculate the e.m.f. of cells. Effect of concentration on electrode potential values—the Nernst equation. Use of the Nernst equation to show the relationship between E^0 value and equilibrium constants.

4. Organic Chemistry

Identification of the main functional groups of organic compounds.

Introduction to the IUPAC principles of nomenclature.

ASSESSMENT

Homework	5%
Tests	10%
Mid Term Exam	15%
Laboratory	20%
Final Exam	50%

TEXT BOOK

Ramsden E.N., "A-Level Chemistry", Stanley Thornes Ltd. 1985