**Analytical Chemistry 2001 -Dr Rupnik (Harris 8th edition QCA)**

**Part 1: Introduction to analytical chemistry: (Chapters 0-2, 26, 27)**

1. **Introduction to the Analytical Process (HPLC and gravimetric analysis examples) – *What is analytical chemistry, what do analytical chemists do, qualitative and quantitative aspects***

**2. Chemical measurements: a review of quantitative issues – *units and basic calculations***

1. **Tools of the trade – *hardware and labs safety***
2. **Sample preparation**

**RECITATIONS**

**Part 2: Data Analysis and Presentation: (Chapters 3- 5).**

1. **Measurements, uncertainties in measurement process- *propagation of uncertainty (general), precision, accuracy***
2. **Statistics *– distributions, tests and criteria***
3. **QA and calibration methods –*linear calibration, standard addition, internal standard***

 **Introduction to computer applications in AC: electronic spreadsheet (Excel) and Mathematica**

**RECITATIONS**

***EXAM 1***

**Part 3.  Spectroscopy – spectrophotometry: (Chapters 17- 21)**

**1. Introduction: Physics, Instruments, Methods**

**2. Molecular spectroscopy**

**1. UV/VIS**

**2. FTIR**

**3. Luminescence (fluorescence and phosphorescence)**

**4. Scattering (introduction)**

**3. Atomic spectroscopies**

 **4. Mass spectroscopy/separation**

**LAB VISIT**

**RECITATIONS**

**4. Equilibrium based methods (Chapters 6-13)**

**1. Introduction –*Thermodinamics, kinetics, equillibrium***

**2. Common ion effects (solubility)**

**3. Acid/base**

**1.Water, Strong acids/bases** , **Weak acids/bases –*quantitative and qualitative aspects***

**2.Polyprotic acids/bases *– quantitative aspects***

**3.Titrations – *quantitative aspects of all steps, polyprotic***

**4.Buffers**

 **5. Activity, charge and mass balance**

**6. Applications and examples**

**LAB VISIT**

**RECITATIONS**

***EXAM 2***

**5. Analytical Separations, Chromatography (Chapters 22-25)**

**1. Introduction (precipitation, distillation, solvent extraction, chelators..)**

**2. Basic principles of chromatography (plates, rates, resolutions)**

 **3. Gas Chromatography**

**4. Liquid Chromatography**

**5. Electrophoresis (introduction)**

**LAB VISIT**

**RECITATIONS**

**5. (Short) Electrochemistry: (Chapters 13- 16)**

**1   Introduction**

**2   Electrodes and potentiometry**

**3   Redox titration**

**4   Electroanalytical techniques**(introduction)

**6. Advanced methods: TBA**

**RECITATIONS**

***EXAM 3 - FINAL EXAM***