### Kingdom of Saudi Arabia

**The National Commission for Academic Accreditation & Assessment**

## Chem-652 Specification

**652 Chem.**

**PROF. HASSAN M AL SWAIDAN**

**2012Course Specification**

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| Institution ***King Saud University*** |
| College/Department ***Science / Chemistry*** |

**A Course Identification and General Information**

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| 1. Course title and code: ***Applied Analytical Chemistry (computation by computers) (652 Chem)*** |
| 2. Credit hours ***3 (3+0)*** |
| 3. Program(s) in which the course is offered.(If general elective available in many programs indicate this rather than list programs) |
| 4. Name of faculty member responsible for the course  ***Prof. Hassan Mohammed Al Swaidan*** |
| 5. Level/year at which this course is offered ***1st level in Doctorate Studies*** |
| 6. Pre-requisites for this course (if any ) |
| 7. Co-requisites for this course (if any) |
| 8. Location if not on main campus  ***Chemistry Department, College of Science, KSU*** |

**B Objectives**

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| 1. Summary of the main learning outcomes for students enrolled in the course.   * ***Use of PowerPoint and Excel in Analytical Chemistry.*** * ***Acquisition of basic theoretical and computational knowledge in the field of Analytical Chemistry.*** * ***Solving practical problems from various fields*** |
| 2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field) |

**C. Course Description** (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

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| 1 Topics to be Covered | | |
| Topic | No of  Weeks | Contacthours |
| ***Use of PowerPoint, The topic covers overview, getting started, customize, presentation, working with content, formatting text, adding content, graphics, tables, charts, slide effects, printing and PowerPoint tips.*** | ***1*** | ***3*** |
| ***Use of Excel, The topic covers overview, getting started, customize, workbook, data, modifying a worksheet, calculations, macros, sort and filter, graphics, charts, format worksheet, developing a workbook, page properties and printing, layout.*** | ***1*** | ***3*** |
| ***Mathematic and excel calculations of principles of calculations in analytical chemistry. Topic includes Equivalent Weight, Number of Equivalent, Moles, Molarity, Normality, Percent Concentration, ppt, ppm, ppb for Solid Samples, ppt, ppm, ppb for Liquid Samples, Concentration in (mequiv/L), Density.*** | ***1*** | ***3*** |
| ***Mathematic and excel calculations of statistical calculations in analytical chemistry. Topic includes Accuracy, Precision, Propagation of errors, Confidense limits, Standard test for analytical methods, Linear least squares, Corelation coefficient.*** | ***1*** | ***3*** |
| ***Mathematic and excel calculations of rate and equilibrium of chemical reactions. Topic includes Reaction rate, Equilibrium constant, Common ion effect, Activity and activity coefficient, Diverse ion effect.*** | ***1*** | ***3*** |
| ***Mathematic and excel calculations of gravimetric analysis. Topic includes Solubility product, precipitation and percentage calculations.*** | ***1*** | ***3*** |
| ***Mathematic and excel calculations of acid and base equilibrium. Topic includes Strong acids and bases, pH, Weak acids and bases, Salts of weak acids and bases, Buffer solutions, Polyprotic acids and its salts, Fraction of dissociation species, Salts of polyprotic acids.*** | ***1*** | ***3*** |
| ***Mathematic and excel calculations of acid and base titrations. Topic includes Strong acids and base titrations, weak acids and strong base titrations, Strong acids and weak base titrations, Titration of acid base mixture.*** | ***1*** | ***3*** |
| ***Mathematic and excel calculations of complexometric titrations. Topic includes Complexes and formation constants, EDTA titrations.*** | ***1*** | ***3*** |
| ***Mathematic and excel calculations of oxidation reduction titrations. Topic includes Oxidation reduction process, Electrochemical cells, Nernst equation, Equlibrium constants in oxid reduction reactions, Equivalent point potential, Iodimetry and Iodometry.*** | ***1*** | ***3*** |
| ***Mathematic and excel calculations of potentiometric methods. Topic includes Metallic indicator electrodes, Redox electrodes, Reference electrodes, Analytical potentiometric method applications, Solubility product determination, pH determination, Potentiometric titrations.*** | ***1*** | ***3*** |
| ***Mathematic and excel calculations of spectroscopic methods. Topic includes Introduction of electromagnetic radiation, Beers law, Analysis of mixture, Spectrophotometric methods.*** | ***1*** | ***3*** |
| ***Mathematic and excel calculations of separation methods. Topic includes Distribution coefficient, Distribution ratio, Percent extraction, Solvent extraction of metals.*** | ***1*** | ***3*** |
| ***Mathematic and excel calculations of chromatographic separation methods. Topic includes Chromatographic theory, Van deemter equation, Column efficiency.*** | ***1*** | ***3*** |