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| **Course Title: Physical Inorganic & Analytical Chemistry Practical** |
| **Course Code:** NFE 116 | **Credit hours:** 1.0 | **Total Mark:** 100 |
| **Rationale:** This course is designed to provide practical knowledge of Physical Inorganic and Analytical chemistry and allied subjects. This course covers qualitative analysis of the inorganic compounds and quantitative (enthalpy and titrimetric) analysis so that students will be able to know independently using their own hands to determine composition of inorganic compounds and to learn with hand to do titrimetric analysis (acid- base, redox) and enthalpy change of reaction. |
| **Objectives:** The specific objectives of the course are:* to develop necessary skills on analyzing cations and anions present in inorganic compounds.
* to grow indispensable understanding in different titrimetric analysis.
* to provide essential knowledge on how to design, carry out, record and analyse the results of chemical experiments.
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| **Learning Outcomes** | **List of Experiments** | **Teaching Learning Strategy** | **Laboratory Assessment Strategy** |
| Able to execute independently using their own hands how to work in the laboratory.Expected to ascertain all the, cations and anions present in inorganic compounds. | **Laboratory Module A:** Experimentno.1: Identification of Group-1 & Group-2 metal ions: Flame Test.Experiment no.2: Identification of other cations: Tests for cations with NaOH, Na2CO3 & NH4OH solutions (Fe²⁺, Fe3⁺, Cr3⁺, Mn²⁺, Pb²⁺, Ni²⁺, Co²⁺, Al3⁺).Experiment no.3: Identifications of anions: Tests for anions-Cl⁻, Br⁻, I⁻, CO32⁻, HCO3⁻. (Difference between CO32⁻ and HCO3⁻).Experiment no.4:Tests for NH3 (g), HCl (g), NO3⁻, SO4²⁻ & SO3²⁻ (Difference between SO4²⁻ & SO3²⁻). | Lecture, Demonstration,Discussion | Q/A, Viva Voce, Observation |
| Able to improve skills with hand some titrimetric analysis such as acid-base, redox etc.Able to perform titration to determine concentration of some contents in foods,, water and beverages.  | **Laboratory Module B:** Quantitative Analysis(Titrimetric Analysis)Experiment no.5: Standardization of NaOH solution with standard oxalic acid solution.Experiment no.6: Standardization of HCl solution with standard NaOH solution.Experiment no.7: Standardization of Sodium thiosulphate solution with standard Potassium dichromate solution.Experiment no.8:Estimation of Copper contained in a supplied solution by Iodometric method. | Lecture, Demonstration,Discussion | Q/A, Viva Voce, Observation |
| Able to Design, carry out, record and analyse the results of chemical experiments.Able to use instruments and classical techniques to design experiments and to properly record the results of the experiment.Able to improve skills in problem solving, critical thinking and analytical reasoning. | **Laboratory Module C:**Quantitative Analysis(Energetics)Experiment no. 9:Quantitative exercise to find the molar enthalpy change when Ammonium chloride dissolves in water. Experiment no. 10:Quantitative exercise to find the molar enthalpy change when Sodium thiosulphate dissolves in waterExperiment no. 11:a) Find the enthalpy change for the reaction between sodium hydrogen carbonate and the acid.b) Find the enthalpy change for the reaction between sodium carbonate and the acid.c) Calculate the enthalpy change for the conversion of the hydrogen carbonate into carbonate. | Lecture, Demonstration,Discussion | Q/A, Viva Voce, Observation |