

Name of the Programme: M.Sc. Part-I (Chemistry)

Course Code: CHI-521      Title of the course: Practical course in Inorganic Chemistry-I

Number of Credits: 02

Effective from AY: 2022-23

<b>Prerequisites for the course:</b>	Students should have studied chemistry practical courses at graduate level or must have cleared change of discipline entrance test conducted by Goa University.	
<b>Course Objective:</b>	<ol style="list-style-type: none"><li>1. Students shall acquire skills in synthetic inorganic chemistry.</li><li>2. Students will learn to prepare coordination compounds.</li><li>3. Students will learn to prepare useful potash alum from scrap aluminum.</li><li>4. Students will learn how to grow single crystals.</li><li>5. Students will acquire skills in determination of chromium, oxalate, and aluminum by redox titrations.</li><li>6. Students will be trained to fix the formula of compounds and find lattice water molecules by complexometric, redox &amp; iodometric titrations.</li><li>7. Students shall acquire skills in determination of metal content at very low concentrations (ppm) using colorimetry / spectrophotometry.</li></ol>	
<b>Content</b>	<i>Minimum 13 experiments from the list shall be conducted.</i>  <b>1. Preparations / Synthesis of Inorganic Compounds: (Any Five)</b> <ol style="list-style-type: none"><li>i. Preparation of hexaamminenickel(II) chloride.</li><li>ii. Preparation of Trisethylenediaminecobalt(III) chloride.</li><li>iii. Preparation of potassium trioxalatoaluminate trihydrate.</li><li>iv. Preparation of potassium hexathiocyanato-<math>\kappa N</math>-chromate tetrahydrate.</li><li>v. Preparation of potassium trioxalatochromate trihydrate.</li><li>vi. Preparation of potash alum from scrap aluminum.</li></ol>	No of hours  25
	<b>2. Estimations / Determinations: (Any Eight)</b> <ol style="list-style-type: none"><li>i. Estimation of nickel in <math>[\text{Ni}(\text{NH}_3)_6]\text{Cl}_2</math> by complexometry or Gravimetry.</li><li>ii. Estimation of cobalt in <math>[\text{Co}(\text{en})_3]\text{Cl}_3</math> by complexometry.</li><li>iii. Estimation of oxalate in <math>\text{K}_3[\text{Al}(\text{C}_2\text{O}_4)_3] \cdot x\text{H}_2\text{O}</math> or <math>\text{K}_3[\text{Cr}(\text{C}_2\text{O}_4)_3] \cdot x\text{H}_2\text{O}</math></li><li>iv. Estimation of nitrite by redox titration.</li><li>v. Estimation of calcium from calcite ore.</li><li>vi. Iodometric determination of Copper in gun metal alloy/Devarda's alloy.</li><li>vii. Determination of chromium in chrome alum and <math>\text{K}_3[\text{Cr}(\text{C}_2\text{O}_4)_3] \cdot x\text{H}_2\text{O}</math> and to determine degree of hydration.</li><li>viii. Colorimetric/Spectrophotometric determination of nickel or chromium.</li><li>ix. Estimation of manganese by colorimetric / spectrophotometry method.</li></ol>	35

<b>Pedagogy</b>	Students will be given pre-lab and post-lab assignments on theoretical aspects of laboratory experiments prior to the conduct of each experiment. Exams will be in the form of ISA, SEA which will involve performing given experiments and conduct of viva, systematic reporting of experiments, results and observations in laboratory report. Sessions should be interactive in nature to enable peer group learning.
<b>References / Readings</b>	<ol style="list-style-type: none"> <li>1. G. Brauer, Handbook of Preparative Inorganic Chemistry, Vol. 1 &amp; 2, 1963.</li> <li>2. G. Pass &amp; H. Sutcliffe, Practical Inorganic Chemistry, Preparations, Reactions and Instrumental Methods, 2<sup>nd</sup> Ed.; Chapman &amp; Hall, 1974.</li> <li>3. S. De Meo, J. Chem. Ed., Vol 80, Pg.No.796-798, 2003.</li> <li>4. W. L. Jolly, The Synthesis &amp; Characterization of Inorganic Compounds, Prentice-Hall, INC, 1970.</li> <li>5. A. J. Elias, General Chemistry Experiments, Revised Ed.; University Press, 2008.</li> <li>6. J. Mendham, R.C. Denney, J.D. Barnes, M.J. K. Thomas, Vogel's Text Book of Quantitative Chemical Analysis, 6<sup>th</sup> Ed.; Pearson, 2002.</li> <li>7. G. Svehla, Vogel's Text Book of Qualitative Inorganic Analysis, 7<sup>th</sup> Ed, Pearson, 2011.</li> <li>8. G. Marr, B. W. Rockett, Practical Inorganic Chemistry, Van Nostrnad Reinhold London, 1972.</li> </ol>
<b>Course outcomes:</b>	<ol style="list-style-type: none"> <li>1. Students will be in a position to synthesis coordination compounds with different metals and ligands.</li> <li>2. Students will be able to grow single crystal.</li> <li>3. Students will be able to prepare potash alum compound from waste scrap Al source.</li> <li>4. Students will be able to determine metal content in the synthesised inorganic compounds.</li> <li>5. Students will be able to fix the formula of compounds.</li> <li>6. Students will be able to use and explain the diverse methods available for estimation of the metals including colorimeters and spectrometers.</li> </ol>