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

Course Code: CHP-521 **Title of the course:** Practical course in Physical Chemistry-I

Number of Credits: 02

Effective from AY: 2022-23

Prerequisites for the course:	Students should have studied chemistry courses at graduate level or must have cleared change of discipline entrance test conducted by Goa University.	
Course Objective:	1. To develop experimental skills on basic lab techniques in physical chemistry 2. To acquire skills for data analysis and interpretation 3. To help the students to develop research skills	
Content	Minimum 13 Experiments to be performed per Semester Non-instrumental Experiments (any 7) 1. To study the kinetics of hydrolysis of ethyl acetate and to determine a) Energy of activation b) Entropy of activation and c) Free energy change. 2. To determine the order of reaction between potassium persulphate and potassium iodide by graphical, fractional change and differential methods. 3. To study the three-component system such as acetic acid, chloroform; and water and obtain tie line. 4. To determine the molecular weight of polyvinyl alcohol by viscosity measurement. 5. To study the electro-kinetics of rapid reaction between SO_4^{2-} and I^- in an aqueous solution. 6. To determine the buffer capacity of acidic buffer solution. 7. To determine the partial molal volume of ethanol-water mixture at a given temperature. 8. To measure energy content of various types of plastics using bomb calorimetry 9. To determine number average molecular weight of a polymer sample with an indirect titration method. 10. To investigate basic hydrolysis of ethyl acetate at four different temperatures and find out energy of activation	No of hours 30
	Instrumental Experiments (any 6) 11. To determine the degree of hydrolysis of salt of weak base and strong acid using conductometer.	30

	12. To determine the dissociation constants of a tribasic acid (Phosphoric acid obtain derivative plot to get equivalence point. 13. To determine formal redox potential of Fe^{2+}/Fe^{3+} and Ce^{3+}/Ce^{4+} system obtain derivative plot to get equivalence point. 14. To study spectrophotometric titration of ferrous ammonium sulphate with potassium permanganate (or dichromate vs permanganate) 15. To determine Avogadro's number by improved electroplating. 16. To determine the zeta potential of colloidal system and investigate the effect of different surfactants on stability of the colloids 17. To verify the Kohlrausch's law for weak electrolyte by conductometry 18. To determine the transport numbers of Cu^{2+} and SO_4^{2-} ions in $CuSO_4$ solution by Hittorf's method.	
Pedagogy	Mainly pre-laboratory exercises Seminars / term papers /assignments / presentations / lab hand-out /self-study or a combination of some of these can also be used. ICT mode should be preferred. Sessions should be interactive in nature to enable peer group learning.	
References / Readings	1. A. Finlay & J.A. Kitchener, Practical Physical Chemistry, Longman. 2. F. Daniels & J.H. Mathews, Experimental Physical Chemistry, Longman. 3. A. M. James, Practical Physical Chemistry, Longman. 4. D.P. Shoemaker & C.W. Garland, Experimental Physical Chemistry, McGraw-Hill.	
Course outcomes:	1. Students will able to explain various fundamental lab techniques. 2. Students should be in a position to apply the knowledge for their dissertation and research work. 3. Students will be able to use spectrophotometric titrations for appropriate analysis. 4. Students will be able to determine molecular weight of some polymers.	