Practical Plan

Name of the college: Government College of Arts, Science & Commerce, Sanquelim, Goa		
Name of Faculty: Dr. Dipesh Sakharam Harmalkar	**Subject: Physical Chemistry I**	
Paper code: CHC 204	**Program: S.Y.BSc.**	**Division:**
Academic year: 2024 - 2025	**Semester: IV**	**Total Practical/Labs: 10 (30 h)**
Credits: 1		

Course Objectives:

- To acquire knowledge on the various types of reactions and their order.
- To understand the thermodynamic parameters used in laboratory techniques.
- To study complex formation and determination of stability constant colorimetrically.

Expected Course Outcome:

At the end of the course students will be able to:

CO1. calculate and explain various thermodynamic parameters of chemical reactions.
CO2. differentiate between different nuclear counters.
CO3. estimate quantum yields of photochemical reactions.
CO4. compare the strength of the acids.
CO5. determine graphically order of reaction and estimate the energy of activation.
CO6. estimate the stability constant of various complexes.

Student Learning Outcome:

At the end of the course students will be able to:

1. calculate and articulate key thermodynamic parameters associated with chemical reactions.
2. distinguish among various types of nuclear counters and understand their operational differences.
3. estimate quantum yields in photochemical reactions and understand their significance.
4. evaluate and compare the relative strengths of acids based on scientific principles.
5. analyze reaction kinetics, graphically determine the order of reactions, and estimate activation energies.
6. calculate and interpret stability constants for various chemical complexes.

Month	Practical/Labs Scheduled Date	No. of Practical /Labs planned	List of Experiments	Reference books
December	11-12-2024	1 (Batch I)	1. Compare the strengths of HCl and H2SO4 by studying kinetics of hydrolysis of methyl acetate.	[1-6]
	16-12-2024	1 (Batch I)	2. To determine the rate constant and order of reaction between KI and K2S2O8.	[1-6]
January	06-01-2025	1 (Batch I)	2. To determine the rate constant and order of reaction between KI and K2S2O8.	[1-6]
	13-01-2025	1 (Batch I)	3. Determination of energy of activation for ethyl acetate and NaOH using equal concentration.	[1-6]
	20-01-2025	1 (Batch I)	3. Determination of energy of activation for ethyl acetate and NaOH using equal concentration.	[1-6]
	27-01-2025	1 (Batch I)	4. Determination of enthalpy of ionization of Acetic acid and NaOH.	[1-6]
February	03-02-2025	1 (Batch I)	4. Determination of enthalpy of ionization of Acetic acid and NaOH.	[1-6]
	10-02-2025	1 (Batch I)	5. Determination of enthalpy of neutralization of Acetic acid and NaOH.	[1-6]
	17-02-2025	1 (Batch I)	5. Determination of enthalpy of neutralization of Acetic acid and NaOH.	[1-6]
	24-02-2025	1 (Batch I)	6. To study complex formation between Ni (II) and O phenanthroline by Job's method. (Colorimetry)	[1-6]
March	03-03-2025	1 (Batch I)	7. To study the complex formation between Fe(III) ions and Salicylic acid and to find the formula and stability constant of the complex using colorimetry.	[1-6]

	10-03-2025	1 (Batch I)	7. To study the complex formation between Fe(III) ions and Salicylic acid and to find the formula and stability constant of the complex using colorimetry.	[1-6]
	17-03-2025	1 (Batch I)	8. To measure the Combustion Enthalpies of Coal via Bomb Calorimetry.	[1-6]
	24-03-2025	1 (Batch I)	Repeat Practical	
	31-03-2025	1 (Batch I)	Repeat Practical	
April	07-04-2025	1 (Batch I)	Repeat Practical	

References:

1. S. W. Rajbhoj and T. K. Chondhekar, Systematic Experimental Physical Chemistry, Anjali Publication, 2nd Edition, 2000, Aurangabad.
2. Khosla, B. D.; Garg, V. C. &Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co., New Delhi, 2018, 18 th edition.
3. O. P. Pandey, D. N. Bajpai, S. Giri, Practical Chemistry, S. Chand Publication, 2013, New Delhi, Revised Edition.
4. B. Viswanathan, P. S. Raghavan, Practical Physical Chemistry, Viva Books Private limited, 2012, Mumbai.
5. J. N. Gurtu and A. Gurtu, Advanced Physical Chemistry Experiments, Pragati Prakashan, 2008, Meerut, Revised Edition.
6. A. M. Ranjika and P. Bopegedera, Evaluating the heats of combustion of coals using Bomb calorimetry in the general chemistry laboratory, J. Chem. Educ. 2023, 100, 1, 298 305

*** Assessment Rubrics**	
Component	**Max Marks**
ISA	15
Semester End Exam	60
Practical	25
Total	100