#### **Lecture Plan**

Name of the college: Government College of Arts, Science and Commerce, Sanquelim- Goa

Name of Faculty: Dr. Amarja Prashant Naik Subject: Chemistry

Paper code: CHC- 105 Physical Chemistry (Practical) Program: TY BSc Division: Batch II and III

Academic year: 2024- 2025 Semester: VI Total Lectures: 60

## **Course Objectives:**

• To understand and develop the problem-solving skills and hands on experience with reference to concepts studied in theory.

### **Expected Course Outcome:**

• To develop skills for performing conductometric and potentiometric titration, adsorption studies.

### **Student Learning Outcome:**

- Understand the concepts of conductance adsorption isotherms and activation energy solubility product.
- Develop skills of working and set up of electrochemical cells and electrodes.
- Solve numericals on and verify the graph of adsorption isotherms.
- Interpret vibrational spectra of HCl and HBr molecule.
- Determine potential with respect to pH.

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
June	28/06/2024	29/06/2024	Nil	Nil			<ol> <li>B.Vishwanathar and P.S.         Raghavan,         Practical         Physical         Chemistry.     </li> </ol>
July	01/07/2024	03/07/2024	08 B-II- (4 hr) B-III (4 hr)	Introduction to physical chemistry practicals: Laboratory safety management	Post Laboratory exercise	Laboratory experiment	2. R. L. Madan, Chemistry for degree students Semester V and VI S. Chand Publication 3. Puri Sharma and Pathania Principles of Chemistry Vishal Publication 4. H. Kaur spectroscopy Pragati edition
	08/07/2024	10/07/2024	08 B-II- (4 hr) B-III (4 hr)	To study the kinetics of iodine clock reactions.	Post Laboratory exercise	Laboratory experiment	
	15/07/2024	17/07/2024	08 B-II- (4 hr) B-III (4 hr)	To study the kinetics of iodine clock reactions.	Post Laboratory exercise	Laboratory experiment	
	22/07/2024	24/07/2024	08 B-II-	To determine the strength of mixture containing			

	29/07/2024	31/07/2024	(4 hr) B-III (4 hr)  08 B-II- (4 hr) B-III (4 hr)	weak acid and salt of weak base by titrating against standard 0.1N NaOH solution conductometrically To determine the dissociation constant of a weak monobasic acid using pH metry.	Post Laboratory exercise	Laboratory experiment
August	05/08/2024	07/08/2024	08 B-II- (4 hr) B-III (4 hr)	To determine the percentage composition and amount of halides from a mixture (any two halide) using standard 0.1N AgNO3 solution.	Post Laboratory exercise	Laboratory experiment
	12/08/2024	14/08/2024	08 B-II- (4 hr) B-III (4 hr)	To study the adsorption of Acetic acid by charcoal and to verify Freundlich adsorption isotherm	Post Laboratory exercise	Laboratory experiment

	19/08/2024	21/08/2024	08	To study the	Post	Laboratory
			B-II-	adsorption of	Laboratory	experiment
			(4 hr)	Acetic acid by	exercise	
			B-III	charcoal and to		
			(4 hr)	verify Freundlich		
				adsorption		
				isotherm		
	26/08/2024	28/08/2024	08	To determine the	Post	Laboratory
			B-II-	energy of	Laboratory	experiment
			(4 hr)	activation of	exercise	
			B-III	hydrolysis of ethyl		
			(4 hr)	acetate (unequal		
				concentration)		
September	02/09/2024	04/09/2024	08	To determine the	Post	Laboratory
			B-II-(4	energy of	Laboratory	experiment
			hr)	activation of	exercise	
			B-III	hydrolysis of ethyl		
			(4 hr)	acetate (unequal		
				concentration)		
			08	To determine the	Post	Laboratory
	9/09/2024	11/09/2024	B-II-	energy of	Laboratory	experiment
			(4 hr)	activation of	exercise	
			B-III	hydrolysis of ethyl		
			(4 hr)	acetate (unequal		
				concentration)		
	9/09/2024	11/09/2024	08	To determine	Post	Laboratory
			B-II-	degree of	Laboratory	experiment
			(4 hr)	hydrolysis and	exercise	
			B-III	hydrolysis		
			(4 hr)			

			constant of CH3COONa/ NH4Cl		
16/09/2024	18/09/2024	08 B-II- (4 hr) B-III (4 hr)	To determine Standard Reduction Potential of Zn++/Zn	Post Laboratory exercise	Laboratory experiment
23/09/2024	25/09/2024	08 B-II- (4 hr) B-III (4 hr)	To determine Standard Reduction Potential of Zn++/Zn	Post Laboratory exercise	Laboratory experiment
23/09/2024	25/09/2024	08 B-II- (4 hr) B-III (4 hr)	Using vibrational- rotational spectra of HCl molecule; (A) Assign the rotational lines to various transitions.	Post Laboratory exercise	Laboratory experiment
30/09/2024	02/10/2024	08 B-II- (4 hr) B-III (4 hr)	(B) Calculate (I) The value of B0 and B1, for R and P branches of spectra. (II) Vibrational frequency and (III) Inter nuclear distance	Post Laboratory exercise	Laboratory experiment

B-II- (4 hr) B-III	October	7/10/2024	9/10/2024	08	Using vibrational-	Post	Laboratory
(4 hr) B-III (5 hr) B-III (6 hr) B-III (1 hr) B-III (1 hr) B-III (2 hr) B-III (3 hr) B-III (4 hr) B-III (4 hr) B-III (5 hr) B-III (6 hr) B-III (6 hr) B-III (7 hr) B-III (8 hr) B-III (9 hr) B-III (1 hr) B-III (1 hr) B-III (1 hr) B-III (2 hr) B-III (3 hr) B-III (4 hr) B-III (4 hr) B-III (5 hr) B-III (6 hr) B-III (1 hr) B-III (1 hr) B-III (2 hr) B-III (4 hr) B-III (4 hr) B-III (5 hr) B-III (6 hr) B-III (1 hr) B-III (1 hr) B-III (1 hr) B-III (2 hr) B-III (2 hr) B-III (3 hr) B-III (4 hr) B-III (4 hr) B-III (5 hr) B-III (6 hr) B-III (8 hr) B-III (9 hr) B-III (1 hr) B-III (1 hr) B-III (1 hr) B-III (2 hr) B-III (2 hr) B-III (3 hr) B-III (4 hr) B-III (4 hr) B-III (5 hr) B-III (6 hr) B-III (8 hr) B-III (9 hr) B-III (1 hr) B-III (1 hr) B-III (1 hr) B-III (2 hr) B-III (3 hr) B-III (4 hr) B-III (4 hr) B-III (5 hr) B-III (6 hr) B-III (1 hr) B-III (1 hr) B-III (2 hr) B-III (3 hr) B-III (4 hr) B-III (4 hr) B-III (5 hr) B-III (6 hr) B-III (7 hr) B-III (8 hr) B-III (9 hr) B-III (1 hr) B-III (1 hr) B-III (1 hr) B-III (1 hr) B-III (2 hr) B-III (3 hr) B-III (4 hr) B-III (5 hr) B-III (6 hr) B-III (7 hr) B-III (8 hr) B-III (9 hr) B-III (1 hr) B-III (2 hr) B-III (3 hr) B-III (4 hr) B-III (4 hr) B-III (5 hr) B-III (6 hr) B-III (7 hr) B-III (8 hr) B-III (8 hr) B-III (8 hr) B-III (9 hr) B-III (1 hr) B-III (2 hr) B-III (2 hr) B-III (3 hr) B-III (4 hr) B-III (4 hr) B-III (5 hr) B-III (6 hr) B-III (7 hr) B-III (8 hr) B-III (8 hr) B-III (9 hr) B-III (1 hr	2 300 0 0 1	,, = 0, = 0 = .	3, 23, 232 1		_		
B-III (4 hr) rotational lines to various transitions.  14/10/2024 16/10/2024 08 B-II- (1) The value of BO and B1, for R and P branches of spectra. (II) Vibrational frequency and (III) Inter nuclear distance  21/10/2024 22/10/2024 08 B-II- (4 hr) B-III compilation and certification exercise  B-III (A) Assign the rotational lines to various transitions.  Post Laboratory experiment  Eaboratory experiment distance  Post Laboratory experiment exercise							37.00
(4 hr)   rotational lines to various transitions.   14/10/2024   16/10/2024   08   B-II- (I) The value of BO and B1, for R and P branches of spectra. (II) Vibrational frequency and (III) Inter nuclear distance   21/10/2024   22/10/2024   08   B-II- (4 hr)   B-III   Certification   B-III   Certification   Evercise   Eaboratory experiment						exercise	
various transitions.  14/10/2024  16/10/2024  08 B-II- (I) The value of BO and B1, for R and P branches of spectra. (II) Vibrational frequency and (III) Inter nuclear distance  21/10/2024  22/10/2024  22/10/2024  08 B-II- (4 hr) B-III  compilation and certification  various transitions.  Post Laboratory experiment  exercise  21/10/2024  Laboratory experiment  post Laboratory experiment  Laboratory experiment  exercise							
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Inter nuclear distance  21/10/2024  22/10/2024  08  B-II- compilation and Laboratory experiment  (4 hr) B-III  Inter nuclear distance  Post Laboratory experiment  exercise							
21/10/2024 22/10/2024 08 Journal Post Laboratory experiment (4 hr) B-III certification exercise							
21/10/2024 22/10/2024 08 Journal Post Laboratory experiment (4 hr) B-III exercise							
B-II- compilation and Laboratory experiment (4 hr) certification exercise					distance		
B-II- compilation and Laboratory experiment certification B-III		21/10/2024	22/10/2024	08	Journal	Post	Laboratory
(4 hr) certification exercise		,,					
B-III							
					Certification	exercise	
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# \*Assessment Rubrics

Component	Max Marks
ISA 1	10
ISA 2	10
Practical	50
Project	
Semester End	
Exam	80