Lecture Plan

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

Name of Faculty: Ankita M. Vernekar	**Subject:** Chemistry	
Paper code: CHC-105	**Program:** T Y BSc	**Division:** A
Academic year: 2024 - 2025	**Semester:** V	**Total Lectures: 30**

Course Objectives: : To enable the students to acquire basic knowledge in Electrochemistry and Nuclear chemistry.

Expected Course Outcome:

1. To classify different nuclides. Binding energy and nuclear forces.
2. To describe nuclear models, radioactivity, decomposition potential, overvoltage and factors affecting them.
3. Derive and use the equation to solve the numerical in Electrochemistry and Nuclear Chemistry.
4. To study counters used in measurement of radioactivity.

Student Learning Outcome:

1. To classify different nuclides. Binding energy and nuclear forces.
2. To describe nuclear models, radioactivity, decomposition potential, overvoltage and factors affecting them.
3. Derive and use the equation to solve the numerical in Electrochemistry and Nuclear Chemistry.
4. Describe counters used in measurement of radioactivity.

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	1	**ELECTROCHEMISTRY** Introduction to electrochemistry	Study polarisation	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition. 2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan
July	01/07/2024	06/07/2024	2	Daniel cell -construction and working, Polarization, Decomposition potential,	Explain different types of galvanic cell	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition. 2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan
July	08/07/2024	13/07/2024	2	Experimental determination of decomposition potential. Application of decomposition potential,	Explain decomposition potential	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition. 2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan
July	15/07/2024	20/07/2024	2	Overvoltage and overpotential, Experimental determination of overvoltage,	Determine factors affecting overvoltage	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition. 2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan

July	22/07/2024	27/07/2024	2	Hydrogen overvoltage, oxygen overvoltage, metal overvoltage Factors affecting overvoltage Theory of overvoltage	Discuss theories of overvoltage Describe, Determine and write different types of overvoltage	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition. 2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan
July/ August	29/07/2024	03/08/2024	2	Fuel cells; H2-O2, Molten carbonate fuel cell, proton exchange membrane fuel cell, solid oxide fuel cell	Describe fuel cells	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition. 2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan
August	05/08/2024	10/08/2024	2	Electrochemical sensors, principle, advantages and applications Ion-selective electrodes: Fixed-site membrane, mobile-site membrane, site-free membrane,	Describe Electrochemical sensors	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition. 2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan

August	12/08/2024	17/08/2024	2	construction of ion selective electrodes, applications of ion selective electrodes	Describe ion selective electrodes	Power point presentation/ Smart board	1. J.N. Gurtu, Physical Chemistry Vol-III, A pragati edition. 2. N. B. Laxmeshwar, S. M. Malushte, A. S. Mulye, V. N. Kulkarni, Concepts of Physical Chemistry, Chetana Prakashan
August	19/08/2024	24/08/2024	2	**NUCLEAR CHEMISTRY** Composition of the nucleus. nuclear binding forces and energy	Describe composition of nucleus	Power point presentation/ Smart board	1.U. N. Dash, Nuclear Chemistry, S. Chand Publication 2.H. J. Arnikar, Essentials of Nuclear Chemistry, New Age International Publishers, 4th Revised Edition
August	26/08/2024	31/08/2024	2	nuclear stability, nucleon – nucleon forces and their equality. .		Power point presentation/ Smart board	1.U. N. Dash, Nuclear Chemistry, S. Chand Publication 2.H. J. Arnikar, Essentials of Nuclear Chemistry, New Age International Publishers, 4th Revised Edition
September	02/09/2024	07/09/2024	2	characteristics and theory of nuclear forces		Power point presentation/ Smart board	1.U. N. Dash, Nuclear Chemistry, S. Chand Publication 2.H. J. Arnikar, Essentials of Nuclear Chemistry, New Age International Publishers, 4th Revised Edition

September	09/09/2024	14/09/2024	**GANESH CHATURTHI BREAK**				
September	16/09/2024	21/09/2024	2	nuclear models	Discuss on nuclear models	Power point presentation/ Smart board	1.U. N. Dash, Nuclear Chemistry, S. Chand Publication 2.H. J. Arnikar, Essentials of Nuclear Chemistry, New Age International Publishers, 4th Revised Edition
September	23/09/2024	28/09/2024	2	Radioactive disintegration, decay constant, half- life and average life, units of radioactivity		Power point presentation/ Smart board	1.U. N. Dash, Nuclear Chemistry, S. Chand Publication 2.H. J. Arnikar, Essentials of Nuclear Chemistry, New Age International Publishers, 4th Revised Edition
September/ October	30/09/2024	05/10/2024	2	artificial radioactivity, Q value , square well potential	Problems on radioactivity	Power point presentation/ Smart board	1.U. N. Dash, Nuclear Chemistry, S. Chand Publication 2.H. J. Arnikar, Essentials of Nuclear Chemistry, New Age International Publishers, 4th Revised Edition
October	07/10/2024	12/10/2024	2	Detection and measurement of radioactivity, GM counter		Power point presentation/ Smart board	1.U. N. Dash, Nuclear Chemistry, S. Chand Publication 2.H. J. Arnikar, Essentials of Nuclear Chemistry, New Age International Publishers, 4th Revised Edition

October	14/10/2024	19/10/2024	2	semiconductor counter, proportional counter		Power point presentation/ Smart board	1.U. N. Dash, Nuclear Chemistry, S. Chand Publication 2.H. J. Arnikar, Essentials of Nuclear Chemistry, New Age International Publishers, 4th Revised Edition
October	21/10/2024	21/10/2024	2	Scintillation counter, characteristics of suitable scintillator	Assignment on different types of counters.	Power point presentation/ Smart board	1.U. N. Dash, Nuclear Chemistry, S. Chand Publication 2.H. J. Arnikar, Essentials of Nuclear Chemistry, New Age International Publishers, 4th Revised Edition

Practical Plan

Name of the college: Government college of Arts Science and commerce Sanquelim Goa.

Name of Faculty: Ms. Ankita M. Vernekar	**Subject:** Chemistry	
Paper code: CHC-105	**Program: T.Y.B.Sc**	**Division: A**
Academic year: 2024 - 2025	**Semester: V**	**Total Practicals/Labs: 22 (120 hours)**

Credits: 2

Course Objectives:- To understand and develop the problem solving skills and hands on experience with reference to concepts studied in theory (potentiometry, Conductometry, pH metry, solubility, chemical kinetics.)

Expected Course Outcome:

1) **Understand the concepts of adsorption isotherms and activation energy, solubility product.**
2) **Develops skills of working and set up of electrochemical cells (potentiometry, pH metry and conductometry)**
3) **Solve numerical on standard electrode potential and verify the graph of adsorption isotherms.**

Student Learning Outcome:

1) **Understand the concepts of adsorption isotherms and activation energy, solubility product.**
2) **Develops skills of working and set up of electrochemical cells (potentiometry, Ph metry and conductometry)**
3) **Solve numerical on standard electrode potential and verify the graph of adsorption isotherms.**

Month	Practicals/Labs Scheduled Date	No. of Practical's/Labs planned	List of Experiments	Reference books
June	28/06/2024-29/06/2024		Practical's not started	-

July	01/07/2024-06/07/2024	2	To determine the strength of mixture containing weak acid and salt of weak base by titrating against standard 0.1N NaOH solution conductometrically.	1)Systematic experimental Physical Chemistry by W. Rajbhoj, T.K. Chondhekar, Anjali publication. 2)Senior Practical Physical chemistry by B.D. Khosla, V.C. Garg, Adarsh Gulati, published by R. Chand and Co
July	08/07/2024-13/07/2024	2	To determine degree of hydrolysis and hydrolysis constant of CH_3COONa	1)Systematic experimental Physical Chemistry by W. Rajbhoj, T.K. Chondhekar, Anjali publication. 2)Senior Practical Physical chemistry by B.D. Khosla, V.C. Garg, Adarsh Gulati, published by R. Chand and Co
July	15/07/2024-20/07/2024	2	To determine degree of hydrolysis and hydrolysis constant of NH_4Cl.	1)Systematic experimental Physical Chemistry by W. Rajbhoj, T.K. Chondhekar, Anjali publication. 2)Senior Practical Physical chemistry by B.D. Khosla, V.C. Garg, Adarsh Gulati, published by R. Chand and Co
July	22/07/2024-27/07/2024	2	To determine the dissociation constant of a weak monobasic acid using pH metry.	1)Systematic experimental Physical Chemistry by W. Rajbhoj, T.K. Chondhekar, Anjali publication. 2)Senior Practical Physical chemistry by B.D. Khosla, V.C. Garg, Adarsh Gulati, published by R. Chand and Co
July /August	29/07/2024-03/08/2024	2	To determine the solubility product of AgCl.	1)Systematic experimental Physical Chemistry by W. Rajbhoj, T.K. Chondhekar, Anjali publication. 2)Senior Practical Physical chemistry by B.D. Khosla, V.C. Garg, Adarsh Gulati, published by R. Chand and Co
August	05/08/2024-10/08/2024	2	To determine the percentage composition and amount of halides from a mixture (any two halide) using standard 0.1N $AgNO_3$ solution	1)Systematic experimental Physical Chemistry by W. Rajbhoj, T.K. Chondhekar, Anjali publication. 2)Senior Practical Physical chemistry by B.D. Khosla, V.C. Garg, Adarsh Gulati, published by R. Chand and Co
August	12/08/2024-17/08/2024	2	To determine Standard Reduction Potential of Zn^{++}/Zn and Cu^{++}/Cu.	1)Systematic experimental Physical Chemistry by W. Rajbhoj, T.K. Chondhekar, Anjali publication. 2)Senior Practical Physical chemistry by B.D. Khosla, V.C. Garg, Adarsh Gulati, published by R. Chand and Co

August	19/08/2024-24/08/2024	2	To study the adsorption of Acetic acid by charcoal and to verify Freundlich adsorption isotherm	1)Systematic experimental Physical Chemistry by W. Rajbhoj, T.K. Chondhekar, Anjali publication. 2)Senior Practical Physical chemistry by B.D. Khosla, V.C. Garg, Adarsh Gulati, published by R. Chand and Co
August	26/08/2024-31/08/2024	2	To determine the energy of activation of hydrolysis of ethyl acetate (unequal concentration)	1)Systematic experimental Physical Chemistry by W. Rajbhoj, T.K. Chondhekar, Anjali publication. 2)Senior Practical Physical chemistry by B.D. Khosla, V.C. Garg, Adarsh Gulati, published by R. Chand and Co
September	02/09/2024-07/09/2024	2	Using vibrational-rotational spectra of HCl molecules; a. Assign the rotational lines to various transitions. b. Calculate i) the value of B0 and B1, for R and P branches of spectra. ii) Vibrational frequency and iii) Inter nuclear distance c. Draw the vibrational-rotational energy levels and show the various transitions of R and P branches	1)Systematic experimental Physical Chemistry by W. Rajbhoj, T.K. Chondhekar, Anjali publication. 2)Senior Practical Physical chemistry by B.D. Khosla, V.C. Garg, Adarsh Gulati, published by R. Chand and Co
September	09/09/2024-14/09/2024	**CHATURTHI BREAK**		
September	16/09/2024-21/09/2024		Using vibrational-rotational spectra of HBr molecules a. Assign the rotational lines to various transitions. b. Calculate i) the value of B0 and B1, for R and P branches of spectra. ii) Vibrational frequency and iii) Inter nuclear distance	1)Systematic experimental Physical Chemistry by W. Rajbhoj, T.K. Chondhekar, Anjali publication. 2)Senior Practical Physical chemistry by B.D. Khosla, V.C. Garg, Adarsh Gulati, published by R. Chand and Co

			c. Draw the vibrational-rotational energy levels and show the various transitions of R and P branches	
September	23/09/2024-28/09/2024	2	Repetitions	1)Systematic experimental Physical Chemistry by W. Rajbhoj, T.K. Chondhekar, Anjali publication. 2)Senior Practical Physical chemistry by B.D. Khosla, V.C. Garg, Adarsh Gulati, published by R. Chand and Co
September/October	30/09/2024-05/10/2024	2	Repetitions	1)Systematic experimental Physical Chemistry by W. Rajbhoj, T.K. Chondhekar, Anjali publication.
October	07/10/2024-12/10/2024	2	Revision	1)Systematic experimental Physical Chemistry by W. Rajbhoj, T.K. Chondhekar, Anjali publication.
October	14/10/2024-19/10/2024	2	Revision	
October	21/10/2024-22/10/2024	2	Journal certification	

***Assessment Rubrics**

Component	Max Marks
ISA 1	
ISA 2	10
Practical	50
Project	-
Semester End Exam	40