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-204	**Program: S.Y.B.Sc.**	**Division: A**
Academic year: 2024 - 2025	**Semester: IV**	**Total Lectures: 30**

Course Objectives: : To familiarise the students with the concepts and principles of Thermodynamics, Nuclear Chemistry and Photochemistry.

Expected Course Outcome:

1) Demonstrate foundational understanding of the principles of photochemistry, nuclear chemistry, and thermodynamics, including their theoretical and experimental frameworks.
2) Interpret the laws governing photochemical reactions, nuclear stability, and thermodynamic processes to explain observed phenomena in chemical systems.
3) Apply scientific concepts to solve numerical problems related to quantum yield, reaction kinetics, nuclear binding energy, entropy changes, and Gibbs free energy.
4) Integrate knowledge from photochemistry, nuclear chemistry, and thermodynamics to design experiments, analyze data, and propose innovative solutions to scientific problems.

Student Learning Outcome:

1) Demonstrate foundational understanding of the principles of photochemistry, nuclear chemistry, and thermodynamics, including their theoretical and experimental frameworks.
2) Interpret the laws governing photochemical reactions, nuclear stability, and thermodynamic processes to explain observed phenomena in chemical systems.
3) Apply scientific concepts to solve numerical problems related to quantum yield, reaction kinetics, nuclear binding energy, entropy changes, and Gibbs free energy.
4) Integrate knowledge from photochemistry, nuclear chemistry, and thermodynamics to design experiments, analyze data, and propose innovative solutions to scientific problems.

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
December	09/12/2024	014/12/2024	-	FIP			
December	16/12/2024	21/12/2024	1	**Photochemistry** Introduction	Read about photochemical reaction	Power point presentation/ Smart board	1)Principles of Physical Chemistry by Puri sharma and Pthania, 2)Undergraduate Physical Chemistry, Vol II, J.N. Gurtu, Pragati Prakashan
January	02/01/2025	04/01/2025	2	Absorption and emission of light	Define absorption and emission of light	Power point presentation/ Smart board	1)Principles of Physical Chemistry by Puri sharma and Pthania, 2)Undergraduate Physical Chemistry, Vol II, J.N. Gurtu, Pragati Prakashan
January	06/01/2025	11/01/2025	2	Beer-lamberts law.	Solve problems on Beer-Lamberts law	Power point presentation/ Smart board	1)Principles of Physical Chemistry by Puri sharma and Pthania, 2)Undergraduate Physical Chemistry, Vol II, J.N. Gurtu, Pragati Prakashan
January	13/01/2025	18/01/2025	2	Laws of photochemistry: Grothus-Draper law, Stark-Einstein law. Quantum yield or efficiency, factors affecting quantum efficiency.	Describe the laws of photochemistry	Power point presentation/ Smart board	1)Principles of Physical Chemistry by Puri sharma and Pthania, 2)Undergraduate Physical Chemistry, Vol II, J.N. Gurtu, Pragati Prakashan
January	20/01/2025	25/01/2025	2	Primary and secondary photophysical processes, Jablonski diagram. Kinetics of photochemical reactions of H2 & Br2.	Study kinetics of Photochemical reaction	Power point presentation/ Smart board	1)Principles of Physical Chemistry by Puri sharma and Pthania, 2)Undergraduate Physical Chemistry, Vol II, J.N. Gurtu, Pragati Prakashan

January	27/01/2025	01/02/2025	2	Distinction between luminescence, fluorescence, phosphorescence and chemiluminescence. Introduction to LASER	Discuss different types of laser	Power point presentation/ Smart board	1)Principles of Physical Chemistry by Puri sharma and Pthania, 2)Undergraduate Physical Chemistry, Vol II, J.N. Gurtu, Pragati Prakashan
February	03/02/2025	08/02/2025	2	**Thermodynamics** First law of thermodynamics, definition of internal energy and enthalpy.	Discuss first law of thermodynamics	Power point presentation/ Smart board	1)Principles of Physical Chemistry by Puri sharma and Pthania, 2)Undergraduate Physical Chemistry, Vol II, J.N. Gurtu, Pragati Prakashan
February	10/02/2025	15/02/2025	2	Heat capacity: Heat capacities at constant volume and at constant pressure and their relationship, calculation of w, q, dU & dH for the expansion of ideal gases under isothermal and reversible conditions	Solve problems	Power point presentation/ Smart board	1)Principles of Physical Chemistry by Puri sharma and Pthania, 2)Undergraduate Physical Chemistry, Vol II, J.N. Gurtu, Pragati Prakashan
February	17/02/2025	22/02/2025	2	Second law of thermodynamics: - Statements of second law of thermodynamics. Carnot cycle and its efficiency	Discuss second law of thermodynamics	Power point presentation/ Smart board	1)Principles of Physical Chemistry by Puri sharma and Pthania, 2)Undergraduate Physical Chemistry, Vol II, J.N. Gurtu, Pragati Prakashan
February	24/02/2025	01/03/2025	2	Concept of entropy. Entropy as a state function. Entropy as a function of V & T, P & T, entropy change in physical and chemical processes.	Discuss the entropy of system	Power point presentation/ Smart board	1)Principles of Physical Chemistry by Puri sharma and Pthania, 2)Undergraduate Physical Chemistry, Vol II, J.N. Gurtu, Pragati Prakashan

March	03/03/2025	08/03/2025	2	entropy change in reversible, irreversible and equilibrium conditions. Gibbs free energy and Helmholtz work function.	Problems on Gibbs free energy	Power point presentation/ Smart board	1)Principles of Physical Chemistry by Puri sharma and Pthania, 2)Undergraduate Physical Chemistry, Vol II, J.N. Gurtu, Pragati Prakashan
March	10/03/2025	15/03/2025	2	Third law of thermodynamics and calculation of absolute entropies of substance	Discuss third law of thermodynamics	Power point presentation/ Smart board	1)Principles of Physical Chemistry by Puri sharma and Pthania, 2)Undergraduate Physical Chemistry, Vol II, J.N. Gurtu, Pragati Prakashan
March	17/03/2025	22/03/2025	2	**Nuclear Chemistry** Composition of the nucleus, Mass defect and binding energy, Q – value of nuclear reactions,	Discuss composition of nucleus	Power point presentation/ Smart board	1) U. N. Dash, Nuclear Chemistry, S. Chand & Sons Publications, 2010, New Delhi.
March	24/03/2025	29/03/2025	2	nuclear binding force; Nuclear models – shell model and liquid drop model	Discuss different types of nuclear models	Power point presentation/ Smart board	U. N. Dash, Nuclear Chemistry, S. Chand & Sons Publications, 2010, New Delhi.
April	31/03/2025	05/04/2025	2	radioactive disintegration, decay constant, half-life and average life,	Discuss radioactivity	Power point presentation/ Smart board	U. N. Dash, Nuclear Chemistry, S. Chand & Sons Publications, 2010, New Delhi.

				Group displacement law, units of radioactivity and radiation energy,			
April	07/04/2025	11/04/2025	2	artificial radioactivity, detection and measurement of radioactivity, ionisation chamber, GM counter and proportional counter, Scintillation counter.	Discuss different types of counters	Power point presentation/ Smart board	U. N. Dash, Nuclear Chemistry, S. Chand & Sons Publications, 2010, New Delhi.

***Assessment Rubrics**

Component	Max Marks
ISA 1	7.5
ISA 2	7.5
ISA 3	
Practical	-
Project	-
Semester End Exam	40