

**DEPARTMENT OF CHEMISTRY (UG & PG), JHARGRAM RAJ COLLEGE****LESSON PLAN (SESSION: 2022-2023)****TEACHER: DR. NABAKUMAR BERA (PHYSICAL CHEMISTRY)****UG SEMESTER-III****PAPER: CC-5T (PHYSICAL CHEMISTRY-II), Foundation Quantum Mechanics (25 Lectures)**

PERIOD	TOPIC(S) TO BE COVERED
August 2023	Beginning of Quantum Mechanics
September 2023	Postulates of Quantum Mechanics: Wave functions and operators
October 2023	Applications of QM to simple systems such as PIAB and LSHO
November 2023	Class test

**PAPER: GE-2P (PHYSICAL CHEMISTRY LAB-II) [jointly with Dr. Nabakumar Bera]**

PERIOD	TOPIC(S) TO BE COVERED
September 2023	Experiments on thermochemistry (Experiment 1, Experiment 2, Experiment 3)
October 2023	Experiments on ionic equilibria (Experiment 4, Experiment 5)
November 2023	Practice sessions

**UG SEMESTER-IV****PAPER: CC-8T (PHYSICAL CHEMISTRY-III), Quantum Chemistry (20 Lectures)**

PERIOD	TOPIC(S) TO BE COVERED
February 2024	Angular Momentum and Rigid Rotor
March 2024	Hydrogen Atom
April 2024	Variation Principle
May 2024	Polyelectron atoms and molecules

**PAPER: CC-8P (PHYSICAL CHEMISTRY LAB-III) (With Dr. Pradipta Ghosh)**

PERIOD	TOPIC(S) TO BE COVERED
February 2024	Experiment 1, Experiment 2
March 2024	Experiment 3, Experiment 4
April 2024	Experiment 5, Experiment 6
May 2024	Practice sessions

**UG SEMESTER-V****PAPER: DSE-1T (ADVANCED PHYSICAL CHEMISTRY): Statistical Thermodynamics (20 Lectures)**

PERIOD	TOPIC(S) TO BE COVERED
July 2023	Basic principle of Statistical Thermodynamics
August 2023	Lattice heat capacity
September 2023	Nernst heat theorem and third law of thermodynamics
October 2023	Class tests

**UG SEMESTER-VI****PAPER: CC-14T (PHYSICAL CHEMISTRY-V): Molecular Spectroscopy and Photochemistry (30 Lectures)**

PERIOD	TOPIC(S) TO BE COVERED
January 2024	Introduction, rotational and vibrational spectroscopy
February 2024	Electronic and Raman Spectroscopy
March 2024	NMR, EPR and Photochemistry
April 2024	Class Test

**PAPER: CC-14P (PHYSICAL CHEMISTRY LAB-V): SURFACE PHENOMENON (10 Lectures) (With Dr. Pradipta Ghosh)**

PERIOD	TOPIC(S) TO BE COVERED
January 2024	Experiment 1, Experiment 2, practice sessions
February 2024	Experiment 3, Experiment 4, practice sessions



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PERIOD	TOPIC(S) TO BE COVERED
March 2024	Experiment 5, Experiment 6, practice sessions

**PG SEMESTER-I**

**PAPER: CEM 101 (PHYSICAL CHEMISTRY):**

PERIOD	TOPIC(S) TO BE COVERED
October 2023	Mathematical Preliminaries
November 2023	Quantum Mechanics
December 2023	Statistical Mechanics

**PG SEMESTER-II**

**PAPER: CEM 201 (PHYSICAL CHEMISTRY):**

PERIOD	TOPIC(S) TO BE COVERED
February 2024	Quantum Mechanics-2
March 2024	Chemical Kinetics
April 2024	Surface Chemistry

**PG SEMESTER-II**

**PAPER: CEM 204 (PHYSICAL CHEMISTRY): Experiments**

PERIOD	TOPIC(S) TO BE COVERED
February 2024	Conductometry and Potentiometry
March 2024	pH-metry and Spectrophotometry
April 2024	Polarimetry and Thermometry

**PG SEMESTER-III**

**PAPER: CEM 302 (PHYSICAL CHEMISTRY SPECIALIZATION):**

PERIOD	TOPIC(S) TO BE COVERED
September 2023	Matrix mechanics
October 2023	Group Theory
November 2023	Group Theory

**PAPER: CEM 303 (PHYSICAL CHEMISTRY SPECIALIZATION):**

PERIOD	TOPIC(S) TO BE COVERED
September 2023	Statistical Mechanics-2
October 2023	Statistical Mechanics-3
October 2023	Non-equilibrium Thermodynamics

**PAPER: CEM 395 (PHYSICAL CHEMISTRY SPECIALIZATION):**

PERIOD	TOPIC(S) TO BE COVERED
September 2023 – December 2023 (16 weeks)	Review work in an area of contemporary interest; research work to be performed; seminar Lecture has to be delivered on the total work carried out.

**PG SEMESTER-IV**

**PAPER: CEM 402 (PHYSICAL CHEMISTRY SPECIALIZATION):**

PERIOD	TOPIC(S) TO BE COVERED
February 2024	Atomic Spectroscopy
March 2024	Atomic Spectroscopy
April 2024	Atomic Spectroscopy

**PAPER: CEM 403 (PHYSICAL CHEMISTRY SPECIALIZATION):**

PERIOD	TOPIC(S) TO BE COVERED
February 2024	Chemical Kinetics-1



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PERIOD	TOPIC(S) TO BE COVERED
March 2024	Chemical Kinetics-2
April 2024	Advanced electrochemistry

**PAPER: CEM 495 (PHYSICAL CHEMISTRY SPECIALIZATION):**

PERIOD	TOPIC(S) TO BE COVERED
February 2024 – May 2024 (16 weeks)	Review work in an area of contemporary interest; research work to be performed; seminar Lecture has to be delivered on the total work carried out.