

**DEPARTMENT OF CHEMISTRY (UG & PG), JHARGRAM RAJ COLLEGE****LESSON PLAN (SESSION: 2024-2025)****TEACHER: DR. PRADIPTA GHOSH (PHYSICAL CHEMISTRY)****UG SEMESTER-I****PAPER: CEMMI-01T (MINOR, UNDER CCFUP PROGRAM] PART-B: PHYSICAL CHEMISTRY**

PERIOD	TOPIC(S) TO BE COVERED
October 2024	Kinetic Theory of Gases and Real gases (Part-A)
November 2024	Kinetic Theory of Gases and Real gases (Part-B)
December 2024	Solution of numerical problems and exercises
January 2024	Class test

**PAPER: CEMMI-01T (MINOR, UNDER CCFUP PROGRAM] PART-B: PHYSICAL CHEMISTRY**

PERIOD	TOPIC(S) TO BE COVERED
November 2024	Surface tension related experiments (two experiments)
December 2024	Viscosity coefficient related experiments (two experiments)
January 2024	Practice sessions

**UG SEMESTER-II**

No teaching assignment

**UG SEMESTER-III**

The syllabus for the CCFUP not yet published by Vidyasagar University.

**UG SEMESTER-IV****PAPER: CC-8T (PHYSICAL CHEMISTRY-III), Applications of Thermodynamics – II (25 Lectures)**

PERIOD	TOPIC(S) TO BE COVERED
February 2025	Colligative properties: thermodynamic treatment, applications, abnormalities
March 2025	Phase rule: thermodynamic derivation, one- and multi-component systems
April 2025	First order phase transition and Clapeyron equation
May 2025	Binary solutions; Class tests

**PAPER: CC-8T (PHYSICAL CHEMISTRY-III), Electrical Properties of molecules (Part) (20 Lectures)**

PERIOD	TOPIC(S) TO BE COVERED
February 2025	Electromotive force: detailed treatment, applications of EMF measurements
March 2025	Concentration cells with and without transference; potentiometric titrations
April 2025	Class tests

**PAPER: CC-8T (PHYSICAL CHEMISTRY-III), Quantum Chemistry (Part) (05 Lectures)**

PERIOD	TOPIC(S) TO BE COVERED
May 2025	LCAO and HF-SCF: principles of chemical bonding (qualitative ideas)

**PAPER: CC-8P (PHYSICAL CHEMISTRY LAB-III)**

PERIOD	TOPIC(S) TO BE COVERED
February 2025	Experiment 1, Experiment 2
March 2025	Experiment 3, Experiment 4
April 2025	Experiment 5, Experiment 6
May 2025	Practice sessions

**PAPER: GE-4T (PHYSICAL CHEMISTRY-III) (60 Lectures)**

PERIOD	TOPIC(S) TO BE COVERED
February 2025	Solutions
March 2025	Phase equilibria; Class tests
April 2025	Conductance
May 2025	Electromotive force; Class tests

**PAPER: GE-4P (PHYSICAL CHEMISTRY LAB-III)**

PERIOD	TOPIC(S) TO BE COVERED
February 2025	Experiments based on Nernst's distribution law (two experiments)



**DEPARTMENT OF CHEMISTRY (UG & PG), JHARGRAM RAJ COLLEGE**  
**LESSON PLAN (SESSION: 2024-2025)**

PERIOD	TOPIC(S) TO BE COVERED
March 2025	Experiments based on phase equilibria (two experiments)
April 2025	Experiments based on electrolytic conductance (two experiments)
May 2025	Experiments based on electromotive force (potentiometry) (two experiments)

**PAPER: DSC-1DT (CC-4) [FOR THE GENERAL COURSE]**

PERIOD	TOPIC(S) TO BE COVERED
February 2025	Kinetic theory of gases
March 2025	Liquids
April 2025	Solids
May 2025	Chemical kinetics

**PAPER: DSC-1DP (CC-4 LAB) [FOR THE GENERAL COURSE]**

PERIOD	TOPIC(S) TO BE COVERED
February 2025	Experiments based on surface chemistry (two experiments); practice sessions
March 2025	Experiments based on viscosity (two experiments); practice sessions
April 2025	Experiments based on chemical kinetics (four experiments); practice sessions

**UG SEMESTER-V**

**PAPER: DSE-1T (ADVANCED PHYSICAL CHEMISTRY): CRYSTAL STRUCTURE (10 Lectures)**

PERIOD	TOPIC(S) TO BE COVERED
July 2024	Bravais Lattice and Laws of Crystallography
August 2024	Crystal planes
September 2024	Determination of crystal structure
October 2024	Class tests

**PAPER: DSE-1T (ADVANCED PHYSICAL CHEMISTRY): SPECIAL SELECTED TOPICS (05 Lectures)**

PERIOD	TOPIC(S) TO BE COVERED
July 2024	Polymers: classification, reaction mechanisms, properties, molecular weights

**PAPER: DSE-1P (ADVANCED PHYSICAL CHEMISTRY LAB): Computer programs based on numerical methods for**

PERIOD	TOPIC(S) TO BE COVERED
July 2024	Programming 1: Roots of equations; practice sessions
August 2024	Programming 2: Numerical differentiation; practice sessions
September 2024	Programming 3: Numerical integration; practice sessions
October 2024	Programming 4: Matrix operations; practice sessions
November 2024	Programming 5: Simple exercises using molecular visualization software

**UG SEMESTER-VI**

**PAPER: CC-14T (PHYSICAL CHEMISTRY-V): SURFACE PHENOMENON (10 Lectures)**

PERIOD	TOPIC(S) TO BE COVERED
January 2025	Surface tension and energy
February 2025	Adsorption
March 2025	Colloids; class tests

**PAPER: CC-14P (PHYSICAL CHEMISTRY LAB-V): SURFACE PHENOMENON (10 Lectures)**

PERIOD	TOPIC(S) TO BE COVERED
January 2025	Experiment 1, Experiment 2, practice sessions
February 2025	Experiment 3, Experiment 4, practice sessions
March 2025	Experiment 5, Experiment 6, practice sessions

**PAPER: DSE-4T (POLYMER CHEMISTRY):**

PERIOD	TOPIC(S) TO BE COVERED
January 2025	Introduction and history of polymeric materials (02 lectures)



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**LESSON PLAN (SESSION: 2024-2025)**

PERIOD	TOPIC(S) TO BE COVERED
February 2025	Kinetics of polymerization; crystallization and crystallinity (04 lectures)
March 2025	Determination of molecular weight of polymers; polymer solution (04 lectures)
April 2025	Glass transition temperature, numerical problems (02 lectures)

**PG SEMESTER-I**

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

PERIOD	TOPIC(S) TO BE COVERED
October 2024	Unit-2: Thermodynamics
November 2024	Unit-4: Rotational Spectroscopy
December 2024	Unit-5: Vibrational Spectroscopy

**PG SEMESTER-II**

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

PERIOD	TOPIC(S) TO BE COVERED
February 2025	Unit-3: Electronic Spectroscopy
March 2025	Unit-4: Raman Scattering

**PG SEMESTER-III**

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

PERIOD	TOPIC(S) TO BE COVERED
September 2024	Unit-2: Perturbation theory
October 2024	Unit-3: Semi-classical treatment of radiation-matter interaction
November 2024	Unit-4: Semiempirical methods of Quantum Chemistry

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

PERIOD	TOPIC(S) TO BE COVERED
September 2024	Unit-1: Solid state chemistry- I
October 2024	Unit-2: Solid state chemistry- II

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

PERIOD	TOPIC(S) TO BE COVERED
September 2024 – December 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.

**PG SEMESTER-IV**

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

PERIOD	TOPIC(S) TO BE COVERED
February 2025	Unit-1: Quantum mechanics of many-electron systems-I
March 2025	Unit-3: Applications of perturbation theory
April 2025	Unit-4: Computational Chemistry-I

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

PERIOD	TOPIC(S) TO BE COVERED
February 2025	Unit-5: Advanced electrochemistry
March 2025	

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

PERIOD	TOPIC(S) TO BE COVERED
February 2025 – May 2025 (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.