SHAHID MATANGINI HAZRA GOVT. COLLEGE FOR WOMEN

Teaching Assignment and Lesson Plan

Academic Session: 2023-24 (2nd, 4th, 6th Semester) (Even)

Department of Chemistry

2nd Semester (Hons)-NEP

Name of the Teacher	Title of the Teaching Assignment	Dividing the Assignment into Number of Units along with detailed lesson plan as per the University Syllabus	Date of Commencement of the Assignment	Number of classes required for each unit	Total number of classes required
Sachinath Bera	**MJ2T: INORGANIC CHEMISTRY-I**	Extra nuclear Structure of atom		14	45
		Chemical periodicity		05	
Basudev Mandal		Acid-Base reactions		12	
		Redox Reactions and precipitation reactions		14	
Sachinath Bera And Basudev Mandal	**MJ2P INORGANIC CHEMISTRY LAB-I**	Acid and Base Titrations: 1. Estimation of carbonate and hydroxide present in mixture 2. Estimation of carbonate and bicarbonate present in a mixture 3. Estimation of free alkali present in soaps/detergents. Oxidation-Reduction Titrimetric: 1. Estimation of Fe(II) using standardized $KMnO_4$ solution 2. Estimation of oxalic acid and sodium oxalate in a mixture 3. Estimation of Fe(II) and Fe(III) in a mixture using $K_2Cr_2O_7$ 4. Estimation of Fe(III) and Mn(II) in a mixture using standardized $KMnO_4$ solution. 5. Estimation of Fe(III) and Cu(II) in a mixture using $K_2Cr_2O_7$. 6. Estimation of Fe(III) and Cr(III) in a mixture using $K_2Cr_2O_7$		30	30
Sayanwita Panja	**SEC 2P: Medicinal & Pharmaceutical Chemistry**	**Part-A: Extraction** i) Extraction of eucalyptus leaf ingredient ii) Extraction of eugenol from clove iii) Extraction of nicotine from tobacco. iv) Curumine from turmeric v) Extraction of caffeine from tea/coffee		**30**	**45**
Sayanwita Panja		**Part-B: A project:** Collection and brief introduction of at least 10 herbal plants		**15**	**15**

2nd Semester (Minor)-NEP

Name of the Teacher	Title of the Teaching Assignment	Dividing the Assignment into Number of Units along with detailed lesson plan as per the University Syllabus	Date of Commencement of the Assignment	Number of classes required for each unit	Total number of classes required
Basudev Mandal	**MI-2T: STATES OF MATTER & CHEMICAL KINETICS**	Physical Chemistry-I Kinetic Theory of Gases and Real gases		**15**	**45**
		Liquids		**10**	
Sachinath Bera		Solids		**08**	
		Chemical Kinetics		**12**	
Mitali Dewan **Rathin Jana**	**MI 2P: Physical Chemistry-LAB**	(I) Surface tension measurement (excluded organic solvents) a) Determination of the surface tension of a liquid or a dilute solution using a Stalagmometer b) Study of the variation of surface tension of a detergent solution with concentration (II) Viscosity measurement (organic solvents excluded) a) Determination of the relative and absolute viscosity of a liquid or dilute solution using an Ostwald's viscometer b) Study of the variation of viscosity of an aqueous solution with concentration of solute (III) Study the kinetics of the following reactions a) Initial rate method: Iodide-persulphate reaction b) Integrated rate method: (i) Acid hydrolysis of methyl acetate with hydrochloric acid (ii) Compare the strengths of HCl and H2SO4 by studying kinetics of hydrolysis of methyl acetate		**30**	**30**

2nd Semester (Multidisciplinary)-NEP

Name of the Teacher	Title of the Teaching Assignment		Dividing the Assignment into Number of Units along with detailed lesson plan as per the University Syllabus	Date of Commencement of the Assignment	Number of classes required to complete each unit	Number of classes required to complete the assignment
Sachinath Bera	**MJA1/B1T (CEMP MJ101)**	Section A: Inorganic Chemistry-1	Atomic Structure		10	20
Basudev Mandal			Redox Reactions and precipitation reactions		10	
Mitali Dewan		Section B: Organic Chemistry-1	Fundamentals of Organic Chemistry		05	25
Sayanwita Panja			Stereochemistry		10	
Rathin Jana			Aliphatic Hydrocarbons: Alkanes, alkenes, alkynes		10	
Sachinath Bera And Basudev Mandal	**MJA1/B1P**	Section A: Inorganic Chemistry-Volumetric Analysis	1. Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture. 2. Estimation of oxalic acid by titrating with $KMnO_4$. 3. Estimation of water of crystallization in Mohr's salt by titrating with KMnO4. 4. Estimation of Fe (II) ions by titrating it with K2Cr2O7 using internal indicator. 5. Estimation of Cu (II) ions iodometrically using Na2S2O3.		15	15
Mitali Dewan		Section B: Organic Chemistry	1. Detection of extra elements (N, S, Cl, Br, I) in organic compounds 2.Septaration of mixtures by Chromatography: Measure the Rf value in each case (combination of two compounds) (a) Identify and Separate the components of a given mixture of 2 amino acids (glycine, aspartic acid, glutamic acid, tyrosine) by paper chromatography (b) Identify and Separate the sugars present in the given mixture by paper chromatography.		15	15

4th Semester (Hons)

Name of the Teacher	Title of the Teaching Assignment	Dividing the Assignment into Number of Units along with detailed lesson plan as per the University Syllabus	Date of Commencement of the Assignment	Number of classes required to complete each unit	Total number of classes required to complete the assignment
Mitali Dewan	**(C8T) Physical Chemistry-III**	Application of Thermodynamics – II	2nd April, 2024	15	48
Rathin Jana		Electrical Properties of molecules		15	
Basudev Mandal		Quantum Chemistry		18	
Basudev Mandal And Mitali Dewan	**C8P**	1: Determination of solubility of sparingly soluble salt in water, in electrolyte with common ions and in neutral electrolyte (using common indicator) 2: Potentiometric titration of Mohr's salt solution against standard $K_2Cr_2O_7$ solution 3: Determination of K_{sp} for AgCl by potentiometric titration of $AgNO_3$ solution against standard KCl solution 4: Study of phenol-water phase diagram 5: pH-metric titration of acid (mono- and di-basic) against strong base		30	30
Basudev Mandal	**(C9T) Inorganic Chemistry-III**	Inorganic Polymers	2nd April, 2024	04	48
		Coordination Chemistry-I		14	
Sachinath Bera		General Principles of Metallurgy		05	
		Chemistry of *s* and *p* Block Elements		22	
		Noble Gases		03	
Sachinath Bera and **Basudev Mandal**	**C9P**	Complexometric titration 1. Zn(II) 2. Ca(II) and Mg(II) in a mixture. 3. Hardness of water. Inorganic preparations 1. Potassium diaquadioxalatochromate(III) 2. Tetraamminecarbonatocobalt (III) ion 3. Potassium tris(oxalato)ferrate(III) 4. Tris-(ethylenediamine) nickel(II) chloride. 5. $[Mn(acac)_3]$ and $Fe(acac)_3]$		48	48

Rathin Jana	**(C10T) Organic Chemistry-IV**	Nitrogen compounds	2nd April, 2024	10	54
		Rearrangements		10	
Sayanwita Panja		The Logic of Organic Synthesis		16	
Mitali Dewan		Organic Spectroscopy		18	
Rathin Jana **Mitali Dewan**	**(C10P)**	Quantitative Estimations: 1. Estimation of glycine by Sörensen's formol method 2. Estimation of glucose by titration using Fehling's solution 3. Estimation of sucrose by titration using Fehling's solution 4. Estimation of vitamin-C (reduced) 5. Estimation of aromatic amine (aniline) by bromination (Bromate-Bromide) method 6. Estimation of phenol by bromination (Bromate-Bromide) method 7. Estimation of formaldehyde (Formalin) 8. Estimation of acetic acid in commercial vinegar 9. Estimation of urea (hypobromite method) 10. Estimation of saponification value of oil/fat/ester		60	60
Basudev Mandal	**Skill Enhancement Course SEC 2T**	Pesticide Chemistry	2nd April, 2024	30	30
Basudev Mandal and Rathin Jana	**SEC2P**	1. To calculate acidity/alkalinity in given sample of pesticide formulations as per BIS specifications. 2.Preparation of simple organophosphates, phosphonates and thiophosphates		15	15

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Mitali Dewan	**GE4 T**	**Section A: Physical Chemistry-III**	Solutions	2nd April, 2024	10	26
			Phase Equilibria		06	
			Conductance		06	
			Electromotive force		04	
Sayanwita Panja		**Section-B: Analytical and Environmental Chemistry**	Chemical Analysis		10	24
			Environmental Chemistry		14	
Mitali Dewan Sayanwita Panja	**GE4 P**	**Section A: Physical Chemistry**	a) Construction of the phase diagram of a binary system (simple eutectic) using cooling curves b) Determination of the critical solution temperature and composition of the phenol water system and study of the effect of impurities on it c) Determination of dissociation constant of a weak acid (cell constant, equivalent conductance are also determined) d) Perform the following conductometric titrations: Strong acid vs. strong base e) Potentiometric titrations of: (i) Weak acid vs. strong base (ii) Potassium dichromate vs. Mohr's salt		30	30
		Section B: Analytical and Environmental Chemistry	1. Total hardness of water by EDTA titration. 2. PH of an unknown solution by comparing color of a series of HCl solutions + 1 drop of methyl orange, and a similar series of NaOH solutions + 1 drop of phenolphthalein. 3. To determine the rate constant for the acid catalysed hydrolysis of an ester. 4. Determination of the strength of the H_2O_2.		24	24

4th Semester (Gen)

Name of the Teacher	Title of the Teaching Assignment		Dividing the Assignment into Number of Units along with detailed lesson plan as per the University Syllabus	Date of Commencement of the Assignment	Number of classes required to complete each unit	Total number of classes required to complete the assignment
Sachinath Bera	**Core-10 (DSC-1D)**	**Section A: Inorganic Chemistry**	Transition Elements (3d series) and f-block	2nd April, 2024	15	50
Basudev Mandal			Coordination Chemistry		10	
			Crystal field theory		05	
		Section B: Physical Chemistry	Kinetic Theory of Gases		08	
Basudev Mandal			Liquids		03	
Sachinath Bera			Solids		03	
			Chemical Kinetics		06	
Sachinath Bera	**DSC-1DP**	**Section A: Inorganic Chemistry**	Qualitative semimicro analysis of mixtures containing four radicals. Basic radicals: Pb^{2+},Cu^{2+}, Cd^{2+}, Bi^{3+}, $As^{3+/5+}$, $Sb^{3+/5+}$, $Sn^{2+/4+}$,$Fe^{2+/3+}$, Al^{3+}, Cr^{3+}, Ni^{2+}, $Co^{2+/3+}$, $Mn^{2+/4+}$, Zn^{2+},Ba^{2+}, Sr^{2+}, Ca^{2+}, Na^{+}, K^{+}, NH_4^{+}, Mg^{2+} Acid radicals:F^{-}, Cl^{-}, Br^{-}, I^{-}, BrO_3^{-}, IO_3^{-}, S^{2-}, SO_3^{2-}, SO_4^{2-}, $S_2O_3^{2-}$, SCN^{-}, $[Fe(CN)_6]^{3-}$, $[Fe(CN)_6]^{4-}$, NO_3^{-}, NO_2^{-}, CrO_4^{-}, BO_3^{3-},PO_4^{3-}, AsO_4^{3-} 1. Estimate the amount of nickel present in a given solution as bis (dimethylglyoximato) nickel(II) in a given solution gravimetrically. 2. Draw calibration curve (absorbance at λmax vs. concentration) for various concentrations of a given coloured compound KMnO4 and estimate the concentration of the same in a given solution. 4. Estimation of Mg^{2+} by complexometric titrations using EDTA. 5. Estimation of total hardness of a given sample of water by complexometric titration.		40	40

Basudev Mandal		**Section B: Physical Chemistry**	(I) Surface tension measurement (use of organic solvents excluded). a) Determination of the surface tension of a liquid or a dilute solution using a stalagmometer. b) Study of the variation of surface tension of a detergent solution with concentration. (II) Viscosity measurement (use of organic solvents excluded). a) Determination of the relative and absolute viscosity of a liquid or dilute solution using an Ostwald's viscometer. b) Study of the variation of viscosity of an aqueous solution with concentration of solute. (III) Chemical Kinetics Study the kinetics of the following reactions. 1. Initial rate method: Iodide-persulphate reaction 2. Integrated rate method: a. Acid hydrolysis of methyl acetate with hydrochloric acid. b. Saponification of ethyl acetate.		**42**	**42**
Sachinath Bera	**Skill Enhancement Course SEC 2**	**Analytical Clinical Biochemistry**	Carbohydrate, Proteins, Enzymes, Lipids, Hormone, Structure of DNA, Blood, Urine	2nd April, 2024	**30**	**30**
Sachinath Bera And Rathin Jana	**SEC2P**		1. Carbohydrates – qualitative and quantitative. 2. Lipids – qualitative. 3. Determination of the iodine number of oil. 4. Determination of saponification number of oil. 5. Proteins – qualitative. 6. Determination of protein by the Biuret reaction. 7. Determination of nucleic acids		**28**	**28**

6th Semester (Hons)

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Basudev Mandal	**(C13T) Inorganic chemistry-V**	Bioinorganic Chemistry	27th February,2024	**20**	**60**
		Catalysis by Organometallic Compounds		**10**	
		Organometallic Chemistry		**18**	
Sachinath Bera		Reaction Kinetics and Mechanism		**12**	
Sachinath Bera And Basudev Mandal	**C13P**	Qualitative semimicro analysis of mixtures containing four radicals. Basic radicals: Pb^{2+}, Cu^{2+}, Cd^{2+}, Bi^{3+}, $As^{3+/5+}$, $Sb^{3+/5+}$, $Sn^{2+/4+}$, $Fe^{2+/3+}$, Al^{3+}, Cr^{3+}, Ni^{2+}, $Co^{2+/3+}$, $Mn^{2+/4+}$, Zn^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, Na^{+}, K^{+}, NH_4^{+}, Mg^{2+} Acid radicals: F^{-}, Cl^{-}, Br^{-}, I^{-}, BrO_3^{-}, IO_3^{-}, S^{2-}, SO_3^{2-}, SO_4^{2-}, $S_2O_3^{2-}$, SCN^{-}, $[Fe(CN)_6]^{3-}$, $[Fe(CN)_6]^{4-}$, NO_3^{-}, NO_2^{-}, CrO_4^{-}, BO_3^{3-},PO_4^{3-}, AsO_4^{3-} Insoluble Materials: Al_2O_3(ig), Fe_2O_3(ig), Cr_2O_3(ig), SnO_2, $SrSO_4$, $BaSO_4$, CaF_2, $PbSO_4$.		**60**	**60**
Rathin Jana	**(C14T) Physical Chemistry-V**	Molecular Spectroscopy	27th February,2024	**24**	**52**
Rathin Jana		Photochemistry		**12**	
Sachinath Bera		Surface phenomenon		**16**	
Sachinath Bera And Rathin Jana	**C14P**	1: Determination of surface tension of a liquid using Stalagmometer 2: Determination of CMC from surface tension measurements 3: Verification of Beer and Lambert's Law for $KMnO_4$ and $K_2Cr_2O_7$ solution 4: Study of kinetics of $K_2S_2O_8$ + KI reaction,		**30**	**30**

		spectrophotometrically 5: Determination of pH of unknown buffer, spectrophotometrically			
Sayanwita Panja	**DSE -3: Green Chemistry**	Introduction to Green Chemistry Principles of Green Chemistry and Designing a Chemical synthesis Examples of Green Synthesis/ Reactions and some real-world cases Future Trends in Green Chemistry	27thFebruary,2024	**48**	**48**
Sayanwita Panja And Mitali Dewan	**DSE3P**	1. Preparation of propene by two methods Triethylamine ion + OH- → propene + trimethyl propene + water 1-propanol $\xrightarrow{H2SO4,\ \Delta}$propene + water 2. Benzoin condensation using Thiamine Hydrochloride as a catalyst instead of cyanide**.** 3. Solvent free, microwave assisted one pot synthesis of phthalocyanine complex of copper (II). 4. Photoreduction of benzophenone to benzopinacol in the presence of sunlight.		**36**	**36**
Mitali Dewan	**DSE-4T: Polymer Chemistry**	a) Introduction and history of polymeric materials b)Functionality and its importance c)Kinetics of Polymerization d)Crystallization and crystallinity e)Nature and structure of polymers f)Determination of molecular weight of polymers g)Glass transition temperature (Tg) and determination of Tg h)Polymer Solution i)Properties of Polymer	27thFebruary,2024	**54**	**54**

Mitali Dewan And Rathin Jana	**DSE4P**	1. Free radical solution polymerization of styrene (St) / Methyl Methacrylate (MMA) / Methyl Acrylate (MA) / Acrylic acid (AA). 2. Preparation of nylon 66/6 3.Redox polymerization of acrylamide 4. Precipitation polymerization of acrylonitrile 5. Preparation of urea-formaldehyde resin 6. Preparations of novalac resin/ resold resin. 7. IR studies of polymers		**42**	**42**

6th Semester (Gen)

Name of the Teacher	Title of the Teaching Assignment		Dividing the Assignment into Number of Units along with detailed lesson plan as per the University Syllabus	Date of Commencement of the Assignment	Number of classes required to complete each unit	Total number of classes required to complete the assignment
Sayanwita Panja	**DSE 1B/2B/3B**	**Green Chemistry**	Introduction to Green Chemistry Principles of Green Chemistry and Designing a Chemical synthesis Examples of Green Synthesis/ Reactions and some real-world cases Future Trends in Green Chemistry	27thFebruary,2024	**42**	**42**
Sayanwita Panja and Mitali Dewan	**DSE1BP**		1. Preparation of propene by two methods Triethylamine ion + OH- → propene + trimethyl propene + water 1-propanol $\xrightarrow{H2SO4,\ \Delta}$ propene + water 2. Benzoin condensation using Thiamine Hydrochloride as a catalyst instead of cyanide. 3. Solvent free, microwave assisted one pot synthesis of phthalocyanine complex of copper (II). 4. Photoreduction of benzophenone to benzopinacol in the presence of sunlight.		**36**	**36**
Rathin Jana	**Skill Enhancement Course SEC 4T**	**Pesticide Chemistry**		27thFebruary,2024	**24**	**24**
Rathin Jana and Basudev Mandal	**SEC4P**		1. To calculate acidity/alkalinity in given sample of pesticide formulations as per BIS specifications. 2. Preparation of simple organophosphates, phosphonates and thiophosphates		**18**	**18**