



GOVERNMENT GENERAL DEGREE COLLEGE, CHAPRA

**OFFICE OF THE PRINCIPAL
HIGHER EDUCATION DEPARTMENT
GOVERNMENT OF WEST BENGAL**

AT: SHIKRA, P.O. PADMAMALA, DIST: NADIA, PIN CODE: 741123, W.B, INDIA. Email: cgcollege2015ku@gmail.com
(AFFILIATED TO UNIVERSITY OF KALYANI)

Teaching Plan (Prog. & GE course) of Odd Semester (July-December) under CBCS System.

Semester-I (Prog. Course and GE)			
Course Code	Topics	Name of the Lecturer	No. of Lecture
CHEMGT-1	Atomic Structure	Dr. Manan Saha	9L
	Chemical Periodicity		9L
	Acids and Bases		8L
	Redox Reactions		4L
	Fundamentals of Organic Chemistry	Dr. Ayan Bandyopadhyay	5L
	Stereochemistry		5L
	Nucleophilic Substitution and Elimination Reactions		4L
	Aliphatic Hydrocarbons: Alkanes, Alkenes and Alkynes		12L
CHEMGP-1(Practical)	Inorganic Chemistry - I 1. Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture. 2. Estimation of oxalic acid by titrating it with KMnO_4 . 3. Estimation of water of crystallization in Mohr's salt by titrating with KMnO_4 . 4. Estimation of Fe (II) ions by titrating it with $\text{K}_2\text{Cr}_2\text{O}_7$. 5. Estimation of Cu (II) ions iodometrically using $\text{Na}_2\text{S}_2\text{O}_3$.	Dr. Manan Saha	As per requirement
	Qualitative Analysis of Single Solid Organic Compound(s) 1. Detection of special elements (N, Cl, and S) in organic compounds. 2. Solubility and Classification (solvents: H_2O , dil. HCl , dil. NaOH , dil. NaHCO_3) 3. Detection of functional groups: Aromatic- NO_2 , Aromatic- NH_2 , $-\text{COOH}$, carbonyl (no distinction of $-\text{CHO}$ and $>\text{C}=\text{O}$ needed), $-\text{OH}$ (phenolic) in solid organic compounds. Experiments 1 to 3 with unknown (at least	Dr. Ayan Bandyopadhyay	As per requirement

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	6) solid samples containing not more than two of the above types of functional groups should be done.		
Semester-III (Prog. Course and GE)			
CHEMGT-3	Chemical Energetics	Dr. Manan Saha	12L
	Chemical Equilibrium		9L
	Ionic Equilibria		9L
	Aromatic Hydrocarbons	Dr. Ayan Bandyopadhyay	7L
	Organometallic Compounds		4L
	Aryl Halides		4L
	Alcohols, Phenols and Ethers		8L
	Carbonyl Compounds		7L
CHEMGP-3 (Practical)	Physical Chemistry - II Thermochemistry 1. Determination of heat capacity of calorimeter for different volumes 2. Determination of enthalpy of neutralization of hydrochloric acid with sodium hydroxide 3. Determination of enthalpy of ionization of acetic acid 4. Determination of enthalpy of hydration of copper sulphate Ionic Equilibria 1. Measurement of pH of different solutions like aerated drinks, fruit juices, shampoos and soaps (use dilute solutions of soaps and shampoos to prevent damage to the glass electrode) using pH meter and compare it with the indicator	Dr. Manan Saha	As per requirement

(Dr. Subhasis Panigrahi)
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	method 2. Preparation of buffer solutions and find the pH of an unknown buffer solution by colour matching method (using following buffers) a. Sodium acetate-acetic acid b. Ammonium chloride-ammonium hydroxide 3. Study of the solubility of benzoic acid in water.		
CHEMGP-3	1. Organic Chemistry – II Identification of a pure organic compound 1. Solid compounds: oxalic acid, tartaric acid, succinic acid, resorcinol, urea, glucose, benzoic acid and salicylic acid. 2. Liquid Compounds: methyl alcohol, ethyl alcohol, acetone, aniline, dimethylaniline, benzaldehyde, chloroform and nitrobenzene	Dr. Ayan Bandyopadhyay	As per requirement
CHEMGS – 1B (Skill Enhancement Course)	Basic Analytical Chemistry 1. Introduction Strategies of Analytical Chemistry and its interdisciplinary applicability. Protocol of sampling. Variability and validity of analytical measurements. Presentation of experimental data and results, from the point of view of significant figures.	Dr. Manan Saha	2L
	2. Complexometry Complexometric titrations, Chelation, Chelating agents, use of indicators. Estimation of Calcium and Magnesium ions as Calcium carbonate by complexometric titration.		4L

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	3. Analysis of water Definition of pure water, sources responsible for contaminating water, water sampling methods, water purification methods. Determination of pH, acidity and alkalinity of a water sample. Determination of Biological Oxygen Demand (BOD).	Dr. Ayan Bandyopadhyay	4L
	4. Analysis of food products Nutritional value of foods, ideas about food processing and food preservation and adulteration. Identification of adulterants in some common food items like coffee powder, asafoetida, chili powder, turmeric powder, coriander powder, and pulses, etc. Analysis of preservatives and coloring matter		4L
	5. Chromatography: Definition, general introduction on principles of chromatography, paper chromatography, TLC etc. Paper chromatographic separation of a mixture of metal ions (Fe^{3+} and Al^{3+}). To compare paint samples by TLC method.		4L
	6. Ion-exchange: Column, ion-exchange chromatography etc. Determination of ion exchange capacity of anion/cation exchange resin (using batch procedure if use of column is not feasible)		4L
	7. Analysis of cosmetics Major and minor constituents and their function. Analysis of deodorants and antiperspirants, Al, Zn, boric acid, chloride, sulfate. Determination of constituents of talcum powder:		3L

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	Magnesium oxide, Calciumoxide, Zinc oxide, and Calcium carbonate by complexometric titration.		
	8. Suggested Applications (Any one) To study the use of phenolphthalein in trap cases. To analyse arson accelerant. To carry out analysis of gasoline.		2L
	9. Suggested Instrumental demonstrations Estimation of macro nutrients: Potassium, Calcium, Magnesium in soil samples by flame photometry. Spectrophotometric determination of Iron in Vitamin / Dietary Tablets. Spectrophotometric Identification and Determination of Caffeine and Benzoic Acid in Soft Drinks.		3L
Semester-V (Prog. Course)			
CHEMGTDSE-1	1. Chemical Analysis	Dr. Manan Saha	14L
	2. Environmental Chemistry		16L
	Error Analysis and Computer Applications	Dr. Ayan Bandyopadhyay	12L
	Industrial Chemistry		18L
CHEMGPDSE-1 (Practical)	Analytical and Environmental Chemistry 1. To find the total hardness of water by EDTA titration. 2. To find the pH of an unknown solution by comparing color of a series of HCl solutions + 1 drop of methyl orange, and	Dr. Manan Saha	As per requirement

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	<p>a similar series of NaOH solutions + 1 drop of phenolphthalein.</p> <p>3. To determine the rate constant for the acid catalyzed hydrolysis of an ester.</p> <p>4. Determination of the strength of the H_2O_2 sample.</p> <p>5. To determine the solubility of a sparingly soluble salt, e.g. KHTa (one bottle)</p>		
	<p>Analytical and Industrial Chemistry</p> <p>1. Titration of Na_2CO_3 and $NaHCO_3$ mixture vs HCl using phenolphthalein and methyl orange indicators.</p> <p>2. Titration of HCl and CH_3COOH mixture vs NaOH using two different indicators to find the concentration.</p> <p>3. Estimation of available oxygen in pyrolusite</p>	Dr. Ayan Bandyopadhyay	As per requirement
CHEMGS – 2B (Skill Enhancement Course)	<p>1. Review of Concepts from Core Course</p> <p>Carbohydrates: Biological importance of carbohydrates, Metabolism, Cellular currency of energy (ATP), Glycolysis, Alcoholic and Lactic acid fermentations, Krebs cycle. Isolation and characterization of polysachharides.</p> <p>Proteins: Classification, biological importance; Primary and secondary and tertiary structures of proteins: α-helix and β-pleated sheets, Isolation, characterization, denaturation of proteins.</p> <p>Enzymes: Nomenclature, Characteristics (mention of Ribozymes), and Classification; Active site, Mechanism of enzyme</p>	Dr. Ayan Bandyopadhyay	8L

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	<p>action, Stereospecificity of enzymes, Coenzymes and cofactors, Enzyme inhibitors, Introduction to Biocatalysis: Importance in “Green Chemistry” and Chemical Industry. Lipids: Classification. Biological importance of triglycerides and phosphoglycerides and cholesterol; Lipid membrane, Liposomes and their biological functions and underlying applications. Lipoproteins. Properties, functions and biochemical functions of steroid hormones. Biochemistry of peptide hormones.</p>		
	<p>2. Biochemistry of disease: A diagnostic approach by blood/ urine analysis</p> <p>Blood: Composition and functions of blood, blood coagulation. Blood collection and preservation of samples. Anaemia, Regulation, estimation and interpretation of data for blood sugar, urea, creatinine, cholesterol and bilirubin. Urine: Sampling and preservation, composition and estimation of constituents of normal and pathological urine.</p>		12L
	<p>3. Hands On Practical</p> <p>Identification and estimation of the following:</p> <ul style="list-style-type: none"> i. Carbohydrates – qualitative and quantitative. ii. Lipids – qualitative. iii. Determination of the iodine number of oil. iv. Determination of the saponification number of oil. v. Determination of cholesterol using 	Dr. Manan Saha	10L


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	Liebermann- Burchard reaction. vi. Proteins – qualitative. vii. Isolation of protein. viii. Determination of protein by the Biuret reaction. ix. Determination of nucleic acids		
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