

**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: ggcollege2015ku@gmail.com

(AFFILIATED TO UNIVERSITY OF KALYANI)

Teaching Plan (Prog. & GE course) of Even Semester (January-June) under CBCS System.

Semester-II (Prog. Course and GE)			
Course Code	Topics	Name of the Lecturer	No. of Lecture
CHEMGT-2	Physical Chemistry – I 1. Kinetic Theory of Gases and Real Gases	Dr. Manan Saha	12L
	2. Liquids		5L
	3. Solids		5L
	4. Chemical Kinetics		8L
	Inorganic Chemistry - II 1. Chemical Bonding and Molecular Structure	Dr. Ayan Bandyopadhyay	20L
	2. Comparative study of p-block elements		10L
CHEMGP-2 (Practical)	Physical Chemistry – I 1. 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 2. 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 3. 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	Dr. Ayan Bandyopadhyay	As per requirement

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	ii. Compare the strengths of HCl and H ₂ SO ₄ by studying kinetics of hydrolysis of methyl acetate		
	Inorganic Chemistry – II Qualitative semi-micro analysis of mixtures containing three radicals. Emphasis should be given to the understanding of the chemistry of different reactions. Acid Radicals: Cl ⁻ , Br ⁻ , I ⁻ , NO ₂ ⁻ , NO ₃ ⁻ , S ²⁻ , SO ₄ ²⁻ , BO ₃ ³⁻ , H ₃ BO ₃ . Basic Radicals: Na ⁺ , K ⁺ , Ca ²⁺ , Sr ²⁺ , Ba ²⁺ , Cr ³⁺ , Mn ²⁺ , Fe ³⁺ , Ni ²⁺ , Cu ²⁺ , NH ₄ ⁺ .	Dr. Manan Saha	As per requirement
Semester-IV (Prog. Course and GE)			
CHEMGT-4	Physical Chemistry – III 1. Solutions	Dr. Ayan Bandyopadhyay	7L
	2. Phase Equilibria		7L
	3. Conductance		8L
	4. Electromotive force		8L
	Inorganic Chemistry - III 1. Transition Elements (3d series)	Dr. Manan Saha	10L
	2. Coordination Chemistry		10L
	3. Crystal Field Theory (CFT)		10L
CHEMGP-4(Practical)	Physical Chemistry - III (Minimum six experiments to complete) 1. Distribution Law (Any one) a. Study of the equilibrium of one of the following reactions by the distribution method: I ₂ (aq) + I ⁻ (aq) = I ₃ ⁻ (aq) 2. Conductance a. Determination of dissociation constant of a weak acid (cell constant, equivalent conductance are also determined)	Dr. Ayan Bandyopadhyay	As per requirement

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	b. Perform the following conductometric titrations: (Any one) i. Strong acid vs. strong base ii. Weak acid vs. strong base 3. Potentiometry a. Perform the following potentiometric titrations: i. Weak acid vs. strong base ii. Potassium dichromate vs. Mohr's salt.		
	Inorganic Chemistry – III 1. Complexometric estimation of (i) Mg^{2+} or (ii) Zn^{2+} using EDTA. 2. Preparation of any two of the following complexes: a. tetraamminecarbonatocobalt (III) nitrate b. tetraamminecopper(II) sulphate c. potassium trioxalatochromate(III) trihydrate d. potassium bisoxalatocuprate(II) trihydrate	Dr. Manan Saha	As per requirement
CHEMGS – 2A(Skill Enhancement Course)	Pharmaceutical Chemistry 1. Drugs & Pharmaceuticals: Drug discovery, design and development; Basic Retrosynthetic approach. Synthesis of the representative drugs of the following classes: analgesicsagents, antipyretic agents, anti- inflammatory agents (Aspirin,paracetamol, Ibuprofen); antibiotics (Chloramphenicol); antibacterial andantifungal agents (Sulphonamides; Sulphanethoxazol, Sulphacetamide,Trimethoprim); antiviral agents (Acyclovir), Central Nervous System agents (Phenobarbital, Diazepam),Cardiovascular (Glyceryl trinitrate),antilaprosy (Dapsone), HIV-AIDS related drugs (AZT- Zidovudine).	Dr.Ayan Bandyopadhyay	16 L
	2. Fermentation:		6L

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	Aerobic and anaerobic fermentation. Production of (i) Ethyl alcohol and citric acid, (ii) Antibiotics; Penicillin, Cephalosporin, Chloromycetin and Streptomycin, (iii) Lysine, Glutamic acid, Vitamin B2, Vitamin B12 and Vitamin C.		
	3.Hands On Practical: Preparation of Aspirin and its analysis. Preparation of magnesium bisilicate (Antacid)		8L
Semester-VI (Prog. Course)			
CHEMGTDSE-2	Advanced Organic Chemistry Functional group approach for the following reactions (preparations & reactions) to be studied in context to their structures. 1. Carboxylic Acids and Their Derivatives 2. Amines and Diazonium Salts	Dr. Manan Saha	20L
	3. Amino Acids and Carbohydrates		10L
	Industrial Chemistry 1. Polymers 2. Paints 3. Varnishes 4. Synthetic dyes 5. Drugs and pharmaceuticals	Dr.Ayan Bandyopadhyay	14L
	Industrial Chemistry 6. Fermentation chemical 7. Fats and oils 8. Soaps and detergents 9. Pesticides 10. Food additives		16L
CHEMGPDSE-2 (Practical)	Advanced Organic Chemistry 1. The following reactions are to be performed, noting the yield of the crude product: a. Nitration of aromatic compounds	Dr.Ayan Bandyopadhyay	As per requirement

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	equation in different forms). Roots of quadratic equations analytically and iteratively (e.g. pH of a weak acid). Numerical methods of finding roots (Newton Raphson, binary –bisection, e.g. pH of a weak acid not ignoring the ionization of water, volume of a van der Waals gas, equilibrium constant expressions). v. Differential calculus: The tangent line and the derivative of a function, numerical differentiation (e.g., change in pressure for small change in volume of a van der Waals gas, potentiometric titrations). vi. Numerical integration (Trapezoidal and Simpson's rule, e.g. entropy/enthalpy change from heat capacity data). 2. Computer programming Constants, variables, bits, bytes, binary and ASCII formats, arithmetic expressions, hierarchy of operations, inbuilt functions. Elements of the BASIC language. BASIC keywords and commands. Logical and relative operators. Strings and graphics. Compiled versus interpreted languages. Debugging. Simple programs using these concepts. Matrix addition and multiplication. Statistical analysis. BASIC programs for curve fitting, numerical differentiation and integration (Trapezoidal rule, Simpson's rule), finding roots (quadratic formula, iterative, Newton-Raphson method). 3. Hands On i. Introductory writing activities: Introduction to word processor and structure drawing (ChemSketch) software. Incorporating chemical structures, chemical equations, and expressions from chemistry (e.g. Maxwell-Boltzmann distribution law, Bragg's law, van der Waals		
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	equation, etc.) into word processing documents. ii. Handling numeric data: Spreadsheet software (Excel), creating a spreadsheet, entering and formatting information, basic functions and formulae, creating charts, tables and graphs. Incorporating tables and graphs into word processing documents. Simple calculations, plotting graphs using spreadsheet (Planck's distribution law, radial distribution curves for hydrogenic orbitals, gas kinetic theory-Maxwell-Boltzmann distribution curves as function of temperature and molecular weight), spectral data, pressure-volume curves of van der Waals gas (van der Waals isotherms), data from phase equilibria studies. Graphical solution of equations. iii. Numeric modelling: Simulation of pH metric titration curves. Excel functions LINEST and Least Squares. Numerical curve fitting, linear regression (rate constants from concentration- time data, molar extinction coefficients from absorbance data), numerical differentiation (e.g. handling data from potentiometric and pH metric titrations, pKa of weak acid), integration (e.g. entropy/enthalpy change from heat capacity data). iv. Statistical analysis: Gaussian distribution and Errors in measurements and their effect on data sets. Descriptive statistics using Excel. Statistical significance testing: The t test. The F test. v. Presentation: Presentation graphics		
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