



Syllabus Module

Department of Chemistry
Khatra Adibasi Mahavidyalaya

Session 2023-2024

<u>Faculty Name</u>	<u>1st Semester</u> (NEP Major & Minor)	<u>3rd Semester</u> (CBCS New)	<u>5th Semester</u> (CBCS Old)
Dr. Swarup Kumar Maji	<p style="text-align: center;"><u>Major (MJC-1)</u></p> <p>1. Core T-1-Fundamentals of Chemistry I (3 Credits)</p> <ul style="list-style-type: none"> • Extra Nuclear Structure of Atom (8 Lectures) • Chemical Periodicity (6 Lectures) • Acids and bases (6 Lectures) • Redox and Precipitation Reactions (10 Lectures) <p>Core P-1-Chemical Analysis Lab (1 Credit)</p> <ul style="list-style-type: none"> • Acid-Base Titrations (10 Lectures) • Oxidation-Reduction Titrimetry (10 Lectures) <p style="text-align: center;"><u>Minor (MN - 1)</u></p> <p>1. Core T-1-Fundamentals of Chemistry I (3 Credits)</p> <ul style="list-style-type: none"> • Extra Nuclear Structure of Atom (8 Lectures) • Chemical Periodicity (6 Lectures) • Acids and bases (6 Lectures) • Redox and Precipitation Reactions (10 Lectures) <p>P-1-Chemical Analysis Lab (1 Credit)</p> <ul style="list-style-type: none"> • Acid-Base Titrations (10 Lectures) 	<p>Core T6-Inorganic Chemistry II (4 Credits) Chemical Bonding-I Chemical Bonding-II Radioactivity</p> <p>Core C6 - P6 - Inorganic Chemistry II Lab (2 Credits) Iodo / Iodimetric Titrations Estimation of metal content in some selective samples</p> <p>Total Lectures (T6+C6): 90</p>	<p>Core C11 - T11 - Inorganic Chemistry IV Coordination Chemistry-II</p> <p>Core C11 - P11 - Inorganic Chemistry IV Lab Gravimetry</p> <p>Total Lectures (C11): 60</p>

	<ul style="list-style-type: none"> • Oxidation-Reduction Titrimetry (10 Lectures) <p>Total Lectures: 50 (Major) Total Lectures: 50 (Minor)</p>		
Dr. Ramakanta Mondal	<p>Multidisciplinary (MD - 1)</p> <p>Basic Chemistry (3 Credits)</p> <p>Total Lectures: 45</p>	<p>Core C5 - T5 - Physical Chemistry II (4 Credits) Transport processes Thermodynamics II Applications of Thermodynamics I Foundation of Quantum Mechanics</p> <p>GE T3 – Physical Chemistry-II (2 Credits) Chemical Energetics Chemical Equilibrium Conductance</p> <p>Core C5 - P5 - Physical Chemistry II Lab (2 Credits)</p> <p>GE P3 – Physical Chemistry-II Lab. (1 Credits) Thermochemistry Conductance Total Lectures (T5+P5): 60 Total Lectures (GE T3+P3): 30</p>	<p>DSE1 - T1 – Advanced Physical Chemistry Crystal Structure Statistical Thermodynamics Special selected topics</p> <p>SEC3 - T3 - IT Skills for Chemists Mathematics Computer programming Hands On Practical</p> <p>DSE1 - P1 – Advanced Physical Chemistry Lab Computer Programming based on numerical methods</p> <p>Total Lectures (SEC3): 40 Total Lectures (DSE1): 80</p>
Sri Soumen Rakshit	<p>Skill Enhancement Course (SEC - 1)</p> <p>Basic Analytical Chemistry (3 Credits)</p> <ul style="list-style-type: none"> • Analysis of Soil • Analysis of Water • Analysis of Food Products • Analysis of Cosmetics • Suggested Applications • Suggested Instrumental Demonstrations <p>Total Lectures (SEC1): 45</p>	<p>SEC T1 – Basic Analytical Chemistry (2 Credits) Introduction Analysis of soil Analysis of water Analysis of food products Chromatography Ion-exchange Analysis of cosmetics Suggested Applications Suggested Instrumental demonstrations</p> <p>Total Lectures (SEC1): 40</p>	<p>Core C11 - T11 - Inorganic Chemistry IV Chemistry of d- and f- block elements Transition Elements Lanthanoids and Actinoids</p> <p>DSE2 - T2 - 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</p> <p>Core C11 - P11 - Inorganic Chemistry IV Lab Chromatography of metal ions</p>

			DSE2 - P2 - Green Chemistry Lab Safer starting materials Using renewable resources Avoiding waste Use of enzymes as catalysts Alternative Green solvents Alternative sources of energy Total Lectures (C11): 20 Total Lectures (DSE2): 80
Sri Saroj Modak	Core T-1-Fundamentals of Chemistry I (3 Credits) <ul style="list-style-type: none"> Bonding and Physical Properties of Organic Compounds Stereochemistry I (15 Lectures) Core P-1-Chemical Analysis Lab (1 Credit) <ul style="list-style-type: none"> Estimation of Organic Compounds (30 Lectures) Total Lectures: 45	Core T7 - Organic Chemistry III (4 Credits) Chemistry of alkenes and alkynes Aromatic Substitution Carbonyl and Related Compounds Organometallics Core P7 - Organic Chemistry III Lab (2 Credits) Qualitative Analysis of Single Solid Organic Compounds GE T3 –Organic Chemistry-II (2 Credits) Aromatic Hydrocarbons Organometallic Compounds Aryl Halides Alcohols, Phenols and Ethers Carbonyl Compounds GE P3 – Physical Chemistry-II & Organic Chemistry-II Lab. (1 Credits) Identification of a pure organic compound Total Lectures (T7+P7): 60 Total Lectures (GE T3+P3): 30	Core C12 - T12 - Organic Chemistry V Carbocycles and Heterocycles Cyclic Stereochemistry Pericyclic reactions Carbohydrates Biomolecules Core C12 - P12 - Organic Chemistry V Lab Chromatographic Separations Spectroscopic Analysis of Organic Compounds Total Lectures (C12): 80

Tentative date of internal assessment: Mid of December 2023

Session 2023-2024

<u>Faculty Name</u>	<u>2nd Semester (NEP Major & Minor)</u>	<u>4th Semester (CBCS New)</u>	<u>6th Semester (CBCS Old)</u>
Dr. Swarup Kumar Maji	<p>Multidisciplinary (MD - 2)</p> <p>Chemistry in Daily Life (3 Credits)</p> <p>Total Lectures: 45</p>	<p>Core T9 - Inorganic Chemistry III (3 Credits) General Principles of Metallurgy Chemistry of s and p Block Elements Inorganic Polymers</p> <p>Core P9 - Inorganic Chemistry III Lab. (1 Credits) Inorganic preparations</p> <p>GE T4: Inorganic Chemistry-III, Analytical, Industrial Chemistry (2 Credits) Inorganic Chemistry-III Analytical and Industrial Chemistry</p> <p>GE P4 – Inorganic Chemistry-III, Analytical, Industrial Chemistry Lab (1 Credits) Inorganic Chemistry-III</p> <p>Total Lectures (T9+P9): 40 Total Lectures (GE T4+P4): 20</p>	<p>Core C13 - T13 - Inorganic Chemistry V Bioinorganic Chemistry Organometallic Chemistry Catalysis by Organometallic Compounds Reaction Kinetics and Mechanism</p> <p>Core C13 - P13 - Inorganic Chemistry V Lab Qualitative semimicro analysis Total Lectures (C13): 80</p>
Dr. Ramakanta Mondal	<p align="center"><u>Major</u></p> <p>Core T-2-Fundamentals of Chemistry II (3 Credits)</p> <ul style="list-style-type: none"> • Gaseous state I (12 Lectures) • Liquid State (6 Lectures) • Thermodynamics I (12 Lectures) <p>Core P-2-Physico-Chemical Analysis Laboratory (1 Credit)</p> <ul style="list-style-type: none"> • Physical Chemistry Practical (15 Lectures) 	<p>Core T8 - Physical Chemistry III (4 Credits) Application of Thermodynamics – II Molecular Spectroscopy I Electrical Properties of Molecules I</p> <p>Core P8 - Physical Chemistry III Lab. (2 Credits) Total Lectures (T8+P8): 60</p>	<p>Core C14 - T14 - Physical Chemistry IV Molecular Spectroscopy Photochemistry Surface phenomenon</p> <p>DSE4 - T4 – Polymer Chemistry Introduction and history of polymeric materials Functionality and its importance Kinetics of Polymerization Crystallization and crystallinity Nature and structure of polymers</p>

	<p style="text-align: center;"><u>Minor (MN-2)</u></p> <p>T-2-Fundamental of Chemistry II (3 Credits)</p> <ul style="list-style-type: none"> • Gaseous state I • (12 Lectures) • Liquid State • (6 Lectures) • Thermodynamics I (12 Lectures) <p>Core P-2-Physico-Chemical Analysis Laboratory (1 Credit)</p> <ul style="list-style-type: none"> • Physical Chemistry Practical (15 Lectures) <p>Total Lectures: 45 (Major) Total Lectures: 45 (Minor)</p>		<p>Determination of molecular weight of polymers Glass transition temperature (T_g) and determination of T_g Polymer Solution Properties of Polymer</p> <p>Core C14 - P14 - Physical Chemistry IV Lab</p> <p>DSE4 - P4 – Polymer Chemistry Lab Polymer Synthesis Polymer characterization Polymer analysis Total Lectures (C14): 80 Total Lectures (DSE4): 80</p>
Sri Soumen Rakshit	<p>Skill Enhancement Course (SEC - 2)</p> <p>Pharmaceuticals Chemistry (Credits - 3)</p> <ul style="list-style-type: none"> • Drugs & Pharmaceuticals • Fermentation • Hands on Practical <p>Total Lectures: 45</p>	<p>Core T9 - Inorganic Chemistry III (1 Credits) Noble Gases Coordination Chemistry-I</p> <p>Core P9 - Inorganic Chemistry III Lab. (1 Credits) Complexometric titration</p> <p>Total Lectures (T9+P9): 30</p>	<p>DSE3 - T3 – Analytical Methods in Chemistry Qualitative and quantitative aspects of analysis Optical methods of analysis Thermal methods of analysis Electroanalytical methods Separation techniques</p> <p>DSE3 - P3 – Analytical Methods in Chemistry Lab Separation Techniques – Chromatography Solvent Extractions Spectrophotometry Total Lectures (DSE3): 80</p>
Sri Saroj Modak	<p style="text-align: center;"><u>Major</u></p> <p>Core T-2-Fundamentals of Chemistry II (3 Credits)</p> <ul style="list-style-type: none"> • General treatment of Organic Reaction Mechanism I (10 Lectures) • Stereochemistry II (5 Lectures) <p>Core P-2-Physico-Chemical Analysis Laboratory (1 Credit)</p> <ul style="list-style-type: none"> • Identification of Pure Organic Compounds (15 Lectures) 	<p>Core T10 - Organic Chemistry IV (4 Credits) Nitrogen compounds Rearrangements The Logic of Organic Synthesis Organic Spectroscopy</p> <p>Core P10 - Organic Chemistry IV Lab. (2 Credits)</p> <p>SEC T2 - Pharmaceuticals Chemistry (2 Credits) Drugs & Pharmaceuticals Fermentation</p>	<p>SEC4 - T4 – Analytical Clinical Biochemistry Carbohydrates Proteins Enzymes Lipids Structure of DNA (Watson-Crick model) and RNA Biochemistry of disease Hands On Practical</p> <p>Total Lectures (SEC4): 40</p>

	<p style="text-align: center;"><u>Minor</u></p> <p>T-2-Fundamental of Chemistry II (3 Credits)</p> <ul style="list-style-type: none"> • General treatment of Organic Reaction Mechanism I (10 Lectures) • Stereochemistry II (5 Lectures) <p>Core P-2-Physico-Chemical Analysis Laboratory (1 Credit)</p> <ul style="list-style-type: none"> • Identification of Pure Organic Compounds (15 Lectures) <p>Total Lectures: 45 (Major) Total Lectures: 45 (Minor)</p>	<p>Hands On Practical</p> <p>GE T4: Organic Chemistry-III (2 Credits)</p> <p>Carboxylic Acids and Their Derivatives Amines and Diazonium Salts Amino Acids and Carbohydrates</p> <p>GE P4 Organic Chemistry-III Lab (1 Credits)</p> <p>Total Lectures (T10+P10): 30 Total Lectures (SEC T2): 20 Total Lectures (GE T4): 20</p>	
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Tentative date of internal assessment: Mid of May 2024