



## Syllabus Module

### *Department of Chemistry* **Khatra Adibasi Mahavidyalaya**

#### Session 2019-2020

<u>Faculty Name</u>	<u>1<sup>st</sup> Semester</u>	<u>3<sup>rd</sup> Semester</u>	<u>5<sup>th</sup> Semester</u>
Dr. Swarup Kumar Maji	<b>Core C1A - T1 Inorganic Chemistry</b> Atomic Structure Chemical Periodicity Acids and bases Redox reactions  <b>Core C1A - P1 Inorganic Chemistry Lab</b> <b>Total Lectures (C1A): 40</b>	<b>Core C6 - T6 - Inorganic Chemistry II</b> Chemical Bonding-I Chemical Bonding-II Radioactivity  <b>Core C6 - P6 - Inorganic Chemistry II Lab</b> Iodo / Iodimetric Titrations Estimation of metal content in some selective samples <b>Total Lectures (C6): 80</b>	<b>Core C11 - T11 - Inorganic Chemistry IV</b> Coordination Chemistry-II  <b>Core C11 - P11 - Inorganic Chemistry IV Lab</b> Gravimetry <b>Total Lectures (C11): 60</b>
Sri Bivas Dey	<b>Core C2 - T2 - Physical Chemistry I</b> Kinetic Theory and Gaseous state Chemical Thermodynamics Chemical kinetics  <b>Core C2 - P2 - Physical Chemistry I Lab</b> <b>Total Lectures (C2): 80</b>	<b>Core C5 - T5 - Physical Chemistry II</b> Transport processes Applications of Thermodynamics – I Foundation of Quantum Mechanics  <b>Core C1C – T3 Physical Chemistry</b> Chemical Energetics Chemical Equilibrium Conductance  <b>Core C5 - P5 - Physical Chemistry II Lab</b>  <b>Core C1C – P3 Physical Chemistry Lab</b> Thermochemistry Conductance <b>Total Lectures (C1C): 40</b> <b>Total Lectures (C5): 80</b>	<b>DSE1 - T1 – Advanced Physical Chemistry</b> Crystal Structure Statistical Thermodynamics Special selected topics  <b>SEC3 - T3 - IT Skills for Chemists</b> Mathematics Computer programming Hands On Practical  <b>DSE1 - P1 – Advanced Physical Chemistry Lab</b> Computer Programming based on numerical methods  <b>Total Lectures (SEC3): 40</b> <b>Total Lectures (DSE1): 80</b>

<p>Sri Soumen Rakshit</p>		<p><b>SEC T1 – Basic Analytical Chemistry</b>  Introduction  Analysis of soil  Analysis of water  Analysis of food products  Chromatography  Ion-exchange  Analysis of cosmetics  Suggested Applications  Suggested Instrumental demonstrations  <b>Total Lectures (SEC1): 40</b></p>	<p><b>Core C11 - T11 - Inorganic Chemistry IV</b>  Chemistry of d- and f- block elements  Transition Elements  Lanthanoids and Actinoids</p> <p><b>DSE2 - T2 - Green Chemistry</b>  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><b>Core C11 - P11 - Inorganic Chemistry IV Lab</b>  Chromatography of metal ions</p> <p><b>DSE2 - P2 - Green Chemistry Lab</b>  Safer starting materials  Using renewable resources  Avoiding waste  Use of enzymes as catalysts  Alternative Green solvents  Alternative sources of energy  <b>Total Lectures (C11): 20</b>  <b>Total Lectures (DSE2): 80</b></p>
<p>Sri Saroj Modak</p>	<p><b>Core C1 - T1 Organic Chemistry I</b>  Bonding and Physical Properties  General Treatment of Reaction Mechanism I  Stereochemistry-I</p> <p><b>Core C1A - T1 Organic Chemistry</b>  Fundamentals of Organic Chemistry  Stereochemistry  Nucleophilic Substitution and Elimination Reactions  Aliphatic Hydrocarbons  Alkanes  Alkenes  Alkynes  Reactions</p>	<p><b>Core C7 - T7 - Organic Chemistry III</b>  Chemistry of alkenes and alkynes  Aromatic Substitution  Carbonyl and Related Compounds  Organometallics</p> <p><b>Core C1C – T3 Organic Chemistry II</b>  Aromatic Hydrocarbons  Organometallic Compounds  Aryl Halides  Alcohols, Phenols and Ethers  Carbonyl Compounds</p> <p><b>Core C7 - P7 - Organic Chemistry III Lab</b></p>	<p><b>Core C12 - T12 - Organic Chemistry V</b>  Carbocycles and Heterocycles  Cyclic Stereochemistry  Pericyclic reactions  Carbohydrates  Biomolecules</p> <p><b>Core C12 - P12 - Organic Chemistry V Lab</b>  Chromatographic Separations  Spectroscopic Analysis of Organic Compounds  <b>Total Lectures (C12): 80</b></p>

	<p><b>Core C1 - P1 – Organic Chemistry I Lab</b> Separation Determination of boiling point Identification of a Pure Organic Compound</p> <p><b>Core C1A - P1 Organic Chemistry Lab</b> Qualitative Analysis of Single Solid Organic Compound(s) <b>Total Lectures (C1A): 40</b> <b>Total Lectures (C1): 80</b></p>	<p>Qualitative Analysis of Single Solid Organic Compounds</p> <p><b>Core C1C – P3 Organic Chemistry Lab</b> Identification of a pure organic compound <b>Total Lectures (C1C): 40</b> <b>Total Lectures (C7): 80</b></p>	
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**Tentative date of internal assessment: 1<sup>st</sup> week of November 2019**

	<u>2<sup>nd</sup> Semester</u>	<u>4<sup>th</sup> Semester</u>	<u>6<sup>th</sup> Semester</u>
Dr. Swarup Kumar Maji	<p><b>Core C3 - T3 - Inorganic Chemistry II</b> Extra nuclear Structure of atom Chemical periodicity</p> <p><b>Core C1B – T2 Inorganic Chemistry</b> Chemical Bonding and Molecular Structure Comparative study of p-block elements</p> <p><b>Core C3 - P3 - Inorganic Chemistry II Lab</b> Acid and Base Titrations</p> <p><b>Core C1B – P2 Inorganic Chemistry Lab</b> Qualitative semi-micro analysis of mixtures containing three radicals <b>Total Lectures (C3): 50</b> <b>Total Lectures (C1B): 40</b></p>	<p><b>Core C9 - T9 - Inorganic Chemistry III</b> General Principles of Metallurgy Chemistry of s and p Block Elements Inorganic Polymers</p> <p><b>Core C1D – T4 Inorganic Chemistry</b> Transition Elements Coordination Chemistry Crystal Field Theory Analytical and Industrial Chemistry</p> <p><b>Core C9 - P9 - Inorganic Chemistry III Lab</b> Inorganic preparations</p> <p><b>Core C1D – P4 Inorganic Chemistry Lab</b> <b>Total Lectures (C9): 50</b> <b>Total Lectures (C1D): 40</b></p>	<p><b>Core C13 - T13 - Inorganic Chemistry V</b> Bioinorganic Chemistry Organometallic Chemistry Catalysis by Organometallic Compounds Reaction Kinetics and Mechanism</p> <p><b>Core C13 - P13 - Inorganic Chemistry V Lab</b> Qualitative semimicro analysis <b>Total Lectures (C13): 80</b></p>
Sri Bivas Dey	<p><b>Core C1B – T2 Physical Chemistry</b> Kinetic Theory of Gases and Real gases Liquids Solids Chemical Kinetics</p> <p><b>Core C1B – P2 Physical Chemistry Lab</b> Surface tension measurement</p>	<p><b>Core C8 - T8 - Physical Chemistry III</b> Application of Thermodynamics – II Electrical Properties of molecules Quantum Chemistry</p> <p><b>Core C8 - P8 - Physical Chemistry III Lab</b> <b>Total Lectures (C8): 80</b></p>	<p><b>Core C14 - T14 - Physical Chemistry IV</b> Molecular Spectroscopy Photochemistry Surface phenomenon</p> <p><b>DSE4 - T4 – Polymer Chemistry</b> Introduction and history of polymeric materials Functionality and its importance</p>

	<p>Viscosity measurement Kinetics Study</p> <p><b>Total Lectures (C1B): 40</b></p>		<p>Kinetics of Polymerization Crystallization and crystallinity Nature and structure of polymers Determination of molecular weight of polymers Glass transition temperature (T<sub>g</sub>) and determination of T<sub>g</sub> Polymer Solution Properties of Polymer</p> <p><b>Core C14 - P14 - Physical Chemistry IV Lab</b></p> <p><b>DSE4 - P4 – Polymer Chemistry Lab</b> Polymer Synthesis Polymer characterization Polymer analysis <b>Total Lectures (C14): 80</b> <b>Total Lectures (DSE4): 80</b></p>
Sri Soumen Rakshit	<p><b>Core C3 - T3 - Inorganic Chemistry II</b> Acid-Base reactions Redox Reactions and precipitation reactions</p> <p><b>Core C3 - P3 - Inorganic Chemistry II Lab</b> Oxidation-Reduction Titrations <b>Total Lectures (C3): 30</b></p>	<p><b>Core C9 - T9 - Inorganic Chemistry III</b> Noble Gases Coordination Chemistry-I</p> <p><b>Core C9 - P9 - Inorganic Chemistry III Lab</b> Complexometric titration <b>Total Lectures (C9): 30</b></p>	<p><b>DSE3 - T3 – Analytical Methods in Chemistry</b> Qualitative and quantitative aspects of analysis Optical methods of analysis Thermal methods of analysis Electroanalytical methods Separation techniques</p> <p><b>DSE3 - P3 – Analytical Methods in Chemistry Lab</b> Separation Techniques – Chromatography Solvent Extractions Spectrophotometry <b>Total Lectures (DSE3): 80</b></p>
Sri Saroj Modak	<p><b>Core C4 - T4 - Organic Chemistry II</b> Stereochemistry II General Treatment of Reaction Mechanism II Substitution and Elimination Reactions</p> <p><b>Core C4 - P4 - Organic Chemistry II Lab</b> Organic Preparations <b>Total Lectures (C4): 80</b></p>	<p><b>Core C10 - T10 - Organic Chemistry IV</b> Nitrogen compounds Rearrangements The Logic of Organic Synthesis Organic Spectroscopy</p> <p><b>SEC2 - T2 - Pharmaceuticals Chemistry</b> Drugs &amp; Pharmaceuticals Fermentation Hands On Practical</p> <p><b>Core C1D – T4 Organic Chemistry</b></p>	<p><b>SEC4 - T4 – Analytical Clinical Biochemistry</b> Carbohydrates Proteins Enzymes Lipids Structure of DNA (Watson-Crick model) and RNA Biochemistry of disease Hands On Practical <b>Total Lectures (SEC4): 40</b></p>

		<p>Carboxylic Acids and Their Derivatives  Amines and Diazonium Salts  Amino Acids and Carbohydrates</p> <p><b>Core C10 - P10 - Organic Chemistry IV Lab</b></p> <p><b>Core C1D – P4 Organic Chemistry Lab</b></p> <p><b>Total Lectures (C10): 80</b>  <b>Total Lectures (C1D): 40</b>  <b>Total Lectures (SEC2): 40</b></p>	
<b>Tentative date of internal assessment: Mid of September 2020</b>			