



DEPARTMENT OF CHEMISTRY (UG & PG), JHARGRAM RAJ COLLEGE
LESSON PLAN (SESSION: 2020-2021)

TEACHER: DR. ANSUMAN BEJ (ORGANIC CHEMISTRY)

UG SEMESTER-I

PAPER: CC1T (ORGANIC CHEMISTRY)

| PERIOD | TOPIC(S) TO BE COVERED |
|---------------|---|
| October 2020 | Valence Bond Theory |
| November 2020 | Electronic displacements in covalent bond. |
| December 2020 | <i>MO theory</i> and π -MO of alkene, conjugated diene and triene system. |
| January 2021 | University question practice and Class test |

PAPER: DSC1A (FOR GENERAL COURSE)

| PERIOD | TOPIC(S) TO BE COVERED |
|---------------|---|
| November 2020 | Physical Effects, Electronic Displacements |
| December 2020 | Aliphatic Hydrocarbons alkanes and alkenes. |
| January 2021 | Practice sessions |

UG SEMESTER-II

PAPER: CC4T (ORGANIC CHEMISTRY)

| PERIOD | TOPIC(S) TO BE COVERED |
|------------|--|
| March 2021 | Reaction thermodynamics: free energy and equilibrium, enthalpy and entropy factor, calculation of enthalpy change via BDE, intermolecular & intramolecular reactions. |
| April 2021 | Concept of organic acids and bases: effect of structure, substituent and solvent on acidity and basicity; proton sponge; gas-phase acidity and basicity; comparison between nucleophilicity and basicity. |
| May 2021 | Tautomerism: prototropy (keto-enol, nitro - aci-nitro, nitroso-oximino, diazo-amino and enamine-imine systems); valence tautomerism and ring-chain tautomerism; composition of the equilibrium in different systems. |

PAPER: CC4P (ORGANIC CHEMISTRY LAB-I)

| PERIOD | TOPIC(S) TO BE COVERED |
|------------|---|
| March 2021 | PREPARATION OF ORGANIC COMPOUND, NITRATION OF AROMATIC COMPOUNDS, CONDENSATION REACTIONS, ACETYLATION OF PHENOLS/AROMATIC AMINES. |
| April 2021 | ACETYLATION OF PHENOLS/AROMATIC AMINES, SELECTIVE REDUCTION OF <i>M</i> -DINITROBENZENE TO <i>M</i> -NITROANILINE. |
| May 2021 | BROMINATION OF ANILIDES USING GREEN APPROACH (BROMATE-BROMIDE METHOD) |

UG SEMESTER-III

PAPER: CC-7T (ORGANIC CHEMISTRY-II), CARBONYL CHEMISTRY (20 Lectures)

| PERIOD | TOPIC(S) TO BE COVERED |
|-------------|---|
| August 2020 | Addition to C=O: structure, reactivity and preparation of carbonyl compounds; mechanism (with evidence), reactivity, equilibrium and kinetic control; Burgi-Dunitz trajectory in nucleophilic additions; formation of hydrates, cyano |



| PERIOD | TOPIC(S) TO BE COVERED |
|----------------|---|
| | hydrins and bisulphite. |
| September 2020 | Nucleophilic addition-elimination reactions with alcohols, thiols and nitrogen-based nucleophiles; reactions: benzoin condensation. |
| October 2020 | Cannizzaro and Tischenko reactions, reactions with ylides: Wittig and Corey-Chaykovsky reaction; Rupe rearrangement. |
| November 2020 | Oxidations and reductions: Clemmensen, Wolff-Kishner, LiAlH_4 , NaBH_4 , MPV, Oppenauer, Bouveault-Blanc, acyloin condensation; oxidation of alcohols with PDC and PCC; periodic acid and lead tetraacetate oxidation of 1,2-diols. |

PAPER: CC-7P (ORGANIC CHEMISTRY LAB), FUNCTIONAL GROUP DETECTION– I (20 Lectures)

| PERIOD | TOPIC(S) TO BE COVERED |
|----------------|---|
| August 2020 | Detection of special elements, Solubility and classification. |
| September 2020 | Detection of the following functional groups by systematic chemical tests. |
| October 2020 | Detection of the following functional groups by systematic chemical tests |
| November 2020 | Preparation, purification and melting point determination of a crystalline derivative of the given compound. Identification of the compound through literature survey. |

UG SEMESTER-IV

PAPER: CC-10T (ORGANIC CHEMISTRY), FUNCTIONAL GROUP DETECTION– I (20 Lectures)

| PERIOD | TOPIC(S) TO BE COVERED |
|---------------|---|
| February 2021 | Wagner-Meerwein rearrangement, pinacol rearrangement, dienone-phenol; Wolff rearrangement in Arndt-Eistert synthesis, benzil-benzilic acid rearrangement, Demjanov rearrangement, Tiffeneau–Demjanov rearrangement. |
| March 2021 | Rearrangement to electron-deficient centre: rearrangements: Hofmann, Curtius, Lossen, Schmidt and Beckmann, Baeyer-Villiger oxidation, cumene hydroperoxide-phenol rearrangement and Dakin reaction. |
| April 2021 | <i>Migration from oxygen to ring carbon</i> : Fries rearrangement and Claisen rearrangement, Fries rearrangement, Claisen rearrangement, Beckmann rearrangement, Baeyer-Villiger oxidation. |
| May 2021 | <i>Migration from nitrogen to ring carbon</i> : Hofmann-Martius rearrangement, Fischer-Hepp rearrangement, N-azo to C-azo rearrangement, Bamberger rearrangement, Orton rearrangement and benzdine rearrangement. |
| PERIOD | TOPIC(S) TO BE COVERED |
| February 2021 | Colligative properties: thermodynamic treatment, applications, abnormalities |
| March 2021 | Phase rule: thermodynamic derivation, one- and multi-component systems |
| April 2021 | First order phase transition and Clapeyron equation |
| May 2021 | Binary solutions; Class tests |

PAPER: CC-10P (ORGANIC CHEMISTRY LAB), Quantitative Estimations (20 Lectures)

| PERIOD | TOPIC(S) TO BE COVERED |
|---------------|---|
| February 2021 | Estimation of glucose by titration using Fehling's solution, Estimation of sucrose by titration using Fehling's solution, |
| March 2021 | Estimation of vitamin-C, Estimation of aromatic amine (aniline) by |



| PERIOD | TOPIC(S) TO BE COVERED |
|------------|--|
| | bromination (Bromate-Bromide) method, Estimation of phenol by bromination. |
| April 2021 | Estimation of urea, Estimation of formaldehyde. |

UG SEMESTER-V

PAPER: CC12T (ORGANIC CHEMISTRY): Carbocycles and Heterocyclic compounds (25 Lectures)

| PERIOD | TOPIC(S) TO BE COVERED |
|----------------|--|
| July 2020 | Polynuclear hydrocarbons and their derivatives, synthetic methods include Haworth, Bardhan-Sengupta, Bogert-Cook and other useful syntheses (with mechanistic details); fixation of double bonds and Fries rule. |
| August 2020 | Property of heterocyclic compound with single heteroatom. |
| September 2020 | Synthesis of some five and six membered heterocyclic compound. |
| October 2020 | Chemical reactions of heterocyclic compounds. |

PAPER: CC12T (ORGANIC CHEMISTRY LAB): Spectroscopic Analysis of Organic Compounds (10 Lectures)

| PERIOD | TOPIC(S) TO BE COVERED |
|----------------|--|
| July 2020 | Assignment of labelled peaks in the ^1H NMR spectra of the known organic compounds. |
| August 2020 | Assignment of labelled peaks in the IR spectrum of the same compound explaining the relative frequencies of the absorptions. |
| September 2020 | Analysis of full spectra of some compound. |
| October 2020 | Analysis of full spectra of some compound. |
| November 2020 | Analysis of full spectra of some compound. |

UG SEMESTER-VI

PAPER: DSE3T: (GREEN CHEMISTRY): (10 Lectures)

| PERIOD | TOPIC(S) TO BE COVERED |
|---------------|---|
| January 2021 | Examples of Green Synthesis/ Reactions and some real world cases. |
| February 2021 | Examples of Green Synthesis/ Reactions and some real world cases. |
| March 2021 | Future Trends in Green Chemistry |

PAPER: DSE3P: (GREEN CHEMISTRY LAB): (10 Lectures)

| PERIOD | TOPIC(S) TO BE COVERED |
|---------------|---|
| January 2021 | Preparation of biodiesel from vegetable/ waste cooking oil. |
| February 2021 | Photoreduction of benzophenone to benzopinacol in the presence of sunlight. |

PG SEMESTER-I

**PAPER: CEM 102 (ORGANIC CHEMISTRY):**

| PERIOD | TOPIC(S) TO BE COVERED |
|---------------|---|
| October 2020 | Unit-1: Pericyclic reaction-1 |
| November 2020 | Unit-1: Organic transformations by using pericyclic reaction. |
| December 2020 | Unit-1: Synthesis of organic compound by using pericyclic reaction. |

PG SEMESTER-II**PAPER: CEM 202 (ORGANIC CHEMISTRY):**

| PERIOD | TOPIC(S) TO BE COVERED |
|---------------|-------------------------------|
| February 2020 | Unit-1: Pericyclic reaction-2 |
| March 2020 | Unit-2: Reagents chemistry-2 |

PG SEMESTER-III**PAPER: CEM 302 (ORGANIC CHEMISTRY SPECIALIZATION):**

| PERIOD | TOPIC(S) TO BE COVERED |
|----------------|----------------------------------|
| September 2020 | Unit-1: Pericyclic Reaction-III |
| October 2020 | Unit-1: Pericyclic Reaction-III |
| November 2020 | Unit-4: Organometallic Chemistry |

PAPER: CEM 303 (ORGANIC CHEMISTRY SPECIALIZATION):

| PERIOD | TOPIC(S) TO BE COVERED |
|----------------|------------------------------------|
| September 2020 | Unit-5: Peptides and Nucleic acids |
| October 2020 | Unit-6: Green Chemistry. |

PAPER: CEM 395 (ORGANIC CHEMISTRY SPECIALIZATION):

| PERIOD | TOPIC(S) TO BE COVERED |
|---|---|
| September 2020 – December 2020 (16 weeks) | Review work in an area of transition metal nanoparticle catalysed reaction. |

PG SEMESTER-IV**PAPER: CEM 401 Advanced Spectroscopy-II (COMMON PAPER):**

| PERIOD | TOPIC(S) TO BE COVERED |
|---------------|----------------------------|
| February 2021 | Unit-1: NMR Spectroscopy I |
| March 2021 | Unit-3: NMR Spectroscopy I |

PAPER: CEM 403 (ORGANIC CHEMISTRY SPECIALIZATION):

| PERIOD | TOPIC(S) TO BE COVERED |
|---------------|----------------------------|
| February 2021 | Unit-2: Stereochemistry IV |
| March 2021 | Unit-3: Stereochemistry V |
| April 2021 | Unit-4: Stereochemistry VI |

PAPER: CEM 495 (ORGANIC CHEMISTRY SPECIALIZATION):

| PERIOD | TOPIC(S) TO BE COVERED |
|-------------------------------------|--|
| February 2021 – May 2021 (16 weeks) | Review work in an area of transition metal nanoparticle annulations reaction of aryl halide and diarylacetylene. |