DEPARTMENT OF CHEMISTRY (UG & PG), JHARGRAM RAJ COLLEGE
LESSON PLAN (SESSION: 2023-2024)

TEACHER: DR. ANSUMAN BEJ (ORGANIC CHEMISTRY)

UG SEMESTER-I

PAPER: CEMHMJ101
(MAJOR, UNDER CCFUP PROGRAM] ORGANIC CHEMISTRY

PERIOD	TOPIC(S) TO BE COVERED
October 2023	Valence Bond Theory
November 2023	Electronic displacementsin covalent bond.
December 2023	*MO theory* and π-MO of alkene, conjugated diene and triene system.
January 2023	University question practice and Class test

PAPER: CEMMI-01T (MINOR, UNDER CCFUP PROGRAM] ORGANIC CHEMISTRY

PERIOD	TOPIC(S) TO BE COVERED
November 2023	Physical Effects, Electronic Displacements
December 2023	Aliphatic Hydrocarbons alkanes and alkenes.
January 2024	Practice sessions

UG SEMESTER-II

PAPER: CC4T (ORGANIC CHEMISTRY)

PERIOD	TOPIC(S) TO BE COVERED
March 2024	Reaction thermodynamics: free energy and equilibrium, enthalpy and entropy factor, calculation of enthalpy change via BDE, intermolecular & intramolecular reactions.
April 2024	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 nucleophlicity and basicity.
May 2024	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 2024	PREPARATION OF ORGANIC COMPOUND, NITRATION OF AROMATIC COMPOUNDS, CONDENSATION REACTIONS, ACETYLATION OF PHENOLS/AROMATIC AMINES.
April 2024	ACETYLATION OF PHENOLS/AROMATIC AMINES, SELECTIVE REDUCTION OF *M*-DINITROBENZENE TO *M*-NITROANILINE.
May 2024	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
August2023	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 hydrins and bisulphite.
September2023	Nucleophilic addition-elimination reactions with alcohols, thiols and nitrogen- based nucleophiles; reactions: benzoin condensation.
October2023	Cannizzaro and Tischenko reactions, reactions with ylides: Wittig and Corey-Chaykovsky reaction; Rupe rearrangement.
November2023	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), FUCTIONAL GROUP DETECTION– I (20 Lectures)

PERIOD	TOPIC(S) TO BE COVERED
August 2023	Detection of special elements, Solubility and classification.
September 2023	Detection of the following functional groups by systematic chemical tests.
October 2023	Detection of the following functional groups by systematic chemical tests
November 2023	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), FUCTIONAL GROUP DETECTION– I (20 Lectures)

PERIOD	TOPIC(S) TO BE COVERED
February 2024	Wagner-Meerwein rearrangement, pinacol rearrangement, dienone-phenol; Wolff rearrangement in Arndt-Eistert synthesis, benzil-benzilic acid rearrangement, Demjanov rearrangement, Tiffeneau–Demjanov rearrangement.
March 2024	Rearrangement to electron-deficient centre: rearrangements: Hofmann, Curtius, Lossen, Schmidt and Beckmann, Baeyer-Villiger oxidation, cumene hydroperoxide-phenol rearrangement and Dakin reaction.
April 2024	*Migration from oxygen to ring carbon*: Fries rearrangement and Claisen rearrangement, Fries rearrangement, Claisen rearrangement, Beckmann rearrangement, Baeyer-Villiger oxidation.
May 2024	Migration from nitrogen to ring carbon: Hofmann-Martius rearrangement**,** Fischer-Hepp rearrangement, N-azo to C-azo rearrangement, Bamberger rearrangement, Orton rearrangement and benzidine rearrangement.

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

PERIOD	TOPIC(S) TO BE COVERED
February 2024	Estimation of glucose by titration using Fehling's solution, Estimation of sucrose by titration using Fehling's solution,
March 2024	Estimation of vitamin-C, Estimation of aromatic amine (aniline) by bromination (Bromate-Bromide) method, Estimation of phenol by bromination.
April 2024	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 2023	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 2023	Property of heterocyclic compound with single heteroatom.
September 2023	Synthesis of some five and six membered heterocyclic compound.
October 2023	Chemical reactions of heterocyclic compounds.

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

PERIOD	TOPIC(S) TO BE COVERED
July 2023	Assignment of labelled peaks in the ^{1}H NMR spectra of the known organic compounds.
August 2023	Assignment of labelled peaks in the IR spectrum of the same compound explaining the relative frequencies of the absorptions.
September 2023	Analysis of full spectra of some compound.
October 2023	Analysis of full spectra of some compound.
November 2023	Analysis of full spectra of some compound.

UG SEMESTER-VI

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

PERIOD	TOPIC(S) TO BE COVERED
January 2024	Examples of Green Synthesis/ Reactions and some real world cases.
February 2024	Examples of Green Synthesis/ Reactions and some real world cases.
March 2024	Future Trends in Green Chemistry

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

PERIOD	TOPIC(S) TO BE COVERED
January 2024	Preparation of biodiesel from vegetable/ waste cooking oil.
February 2024	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 2023	Unit-1: Pericyclic reaction-1
November 2023	Unit-1: Organic transformations by using pericyclic reaction.
December 2023	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 2024	Unit-1: Pericyclic reaction-2
March 2024	Unit-2: Reagents chemistry-2

PG SEMESTER-III

PAPER: CEM 302 (ORGANIC CHEMISTRY SPECIALIZATION):

PERIOD	TOPIC(S) TO BE COVERED
September 2023	Unit-1: Pericyclic Reaction-III
October 2023	Unit-1: Pericyclic Reaction-III
November 2023	Unit-4: Organometallic Chemistry

PAPER: CEM 303 (ORGANIC CHEMISTRY SPECIALIZATION):

PERIOD	TOPIC(S) TO BE COVERED
September 2023	Unit-5: Peptides and Nucleic acids
October 2023	Unit-6: Green Chemistry.

PAPER: CEM 395 (ORGANIC CHEMISTRY SPECIALIZATION):

PERIOD	TOPIC(S) TO BE COVERED
September 2023 – December 2023 (16 weeks)	Review work in an area of transition metal naoparticle catalysed reaction.

PG SEMESTER-IV

PAPER: CEM 401 Advanced Spectroscopy-II (COMMON PAPER):

PERIOD	TOPIC(S) TO BE COVERED
February 2024	Unit-1: NMR Spectroscopy I
March 2024	Unit-3: NMR Spectroscopy I

PAPER: CEM 403 (ORGANIC CHEMISTRY SPECIALIZATION):

PERIOD	TOPIC(S) TO BE COVERED
February 2024	Unit-2: Stereochemistry IV
March 2024	Unit-3: Stereochemistry V
April	Unit-4: Stereochemistry VI

PAPER: CEM 495 (ORGANIC CHEMISTRY SPECIALIZATION):

PERIOD	TOPIC(S) TO BE COVERED
February 2024 – May 2024 (16 weeks)	Review work in an area of transition metal naoparticle catalysed reaction and their applications.