NSCB Memorial Govt. Degree College
Hamirpur
District Hamirpur (H.P.)
Tel No.: 01972-222227, FAX: 01972-222227, e-Mail: gchamirpur-hp@nic.in

Teaching Plan

Session (2022-2023)

Class: B.Sc III[rd] **Name of the Teachers: 1.Dr Naisergik Deepika Khanna**
2. Dr Mala Sharma

Subject: CHEMISTRY
Course: 1. Polynuclear hydrocarbons, Dyes, Heterocyclic compounds and spectroscopy.
2. Polymer Chemistry
Course Code: 1. CHEM-301TH
2. CHEM-305TH
Room No: 1. 43, 40A. (Two sections Maths Major & Botany + physics Major)
2. 242, 42. (Two sections Chemistry Major & Zoology + physics Major)

S. No	Dates	Topics to be covered
Admissions of B. Sc. 3rd	10-07-2022 to 30-07-2022	**Admissions /Orientation**
Week 1	01-08-2022 to 06-08-2022	Synthesis & reactions of Naphthalene, Anthracene & Phenanthrene. Relative reactivity of these compounds at various positions.
Week 2	08-08-2022 to 13-08-2022	Colour and constitution [electronic concept], classification of dyes. Chemistry and synthesis of methyl orange.
Week 3	16-08-2022 to 20-08-2022	Introduction: Classification and nomenclature, Molecular orbital picture & aromatic characteristics of pyrrole, furan, thiophene & pyridine.
Week 4	22-08-2022 to 27-08-2022	Methods of synthesis, chemical reactions with emphasis on mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine. comparison of basicity of pyridine, piperidine and pyrrole.
Week 5	22-08-2022 to 27-08-2022	Introduction to condensed five & six-membered heterocyclic compounds, preparation & reactions of indole quinoline & isoquinoline with special reference to Fisher indole synthesis Skraup synthesis & Bischler – Napieralski synthesis.
Week 6	29-08-2022 to 03-09-2022	Mechanism of electrophilic substitution reactions of indole, quinoline, & isoquinoline .
Week 7	05-09-2022 to 10-09-2022	Different schemes of classification of polymers, Polymer nomenclature, Molecular forces and chemical bonding in polymers.
Week 8	12-09-2022 to 17-09-2022	Texture of Polymers. Functionality and its importance: Criteria for synthetic polymer formation, classification of polymerization processes,
Week 9	19-09-2022 to 24-09-2022	Relationships between functionality, extent of reaction and degree of polymerization. Bifunctional systems, Poly-functional systems.
Week 10	26-09-2022 to 01-10-2022	Mechanism and kinetics of step growth, radical chain growth, ionic chain (both cationic and anionic) and coordination polymerizations,
Week 11	03-10-2022 to 08-10-2022	Mechanism and kinetics of copolymerization, polymerization techniques. Determination of crystalline melting point and degree of crystallinity.
Week 12	10-10-2022 to 15-10-2022	Morphology of crystalline polymers, Factors affecting crystalline melting point. Nature and structure of polymers-Structure Property relationships.
Week 13	17-10-2022 to 21-10-2022	Application of visible, ultraviolet and Infrared spectroscopy in organic molecules. Electromagnetic radiations, electronic transitions, λmax. & Ɛmax. chromophore, auxochrome, bathochromic and hypsochromic shifts. Application of electronic spectroscopy.

	22-10-2022 to 26-10-2022	**Diwali Break**
Week 14	27-10-2022 to 29-10-2022	Woodward rules for calculating λmax. of conjugated dienes and α, β – unsaturated compounds. Infrared radiation and types of molecular vibrations, functional group and fingerprint region.
Week 15	31-10-2022 to 5-11-2022	IR spectra of alkanes, alkenes and simple alcohols (inter and intramolecular hydrogen bonding), aldehydes, ketones, carboxylic acids and their derivatives (effect of substitution on >C=O stretching absorptions).
Week 16	7-11-2022 to 12-11-2022	Principle of nuclear magnetic resonance, number of signals, peak areas equivalent & non-equivalent protons, positions of signals, chemical shift.
Week 17	14-11-2022 to 19-11-2022	Shielding & deshielding of protons, proton counting, splitting of signals & coupling constants, magnetic equivalence of protons.
Week 18	21-11-2022 to 26-11-2022	Discussion of PMR spectra of molecules : ethyl bromide, n –propyl bromide, isopropyl bromide 1,1-dibromoethane 1,1,2- tribromo ethane, ethanol, toluene, acetaldehyde, acetophenone. Simple problems on PMR spectroscopy for structure determination of organic compounds.
Week 19	28-11-2022 to 03-12-2022	Determination of molecular weight of polymers (Mn, Mw, etc) by end group analysis, viscometry, light scattering and osmotic pressure methods. Molecular weight distribution and its significance.
Week 20	5-12-2022 to 10-12-2022	Polydispersity index. Glass transition temperature (Tg) and determination of Tg, Free volume theory, WLF equation, Factors affecting glass transition temperature (Tg).
Week 21	12-12-2022 to 17-12-2022	Criteria for polymer solubility, Solubility parameter, Thermodynamics of polymer solutions, entropy, enthalpy, and free energy change of mixing of polymers solutions, Flory- Huggins theory, Lower and Upper critical solution temperatures.
Week 22-23	19-12-2022 to 31-12-2022	**House Examination**
	01-01-2023 to 04-02-2023	**Winter vacations**
Week 24	06-02-2023 to 11-02-2023	Properties of Polymers (Physical, thermal, Flow & Mechanical Properties). Brief introduction to preparation, structure, properties and application of the following polymers
Week 25	13-02-2023 to 18-02-2023	polyolefins, polystyrene and styrene copolymers, poly(vinyl chloride) and related polymers, poly(vinyl acetate) and related polymers, acrylic polymers, fluoro polymers, polyamides and related polymers.
Week 26	20-02-2023 to 28-02-2023	Phenol formaldehyde resins (Bakelite, Novalac), polyurethanes, silicone polymers, polydienes, Polycarbonates, Conducting Polymers, [polyacetylene, polyaniline, poly(p-phenylene sulphide polypyrrole, polythiophene)].
		Term End Practical/Theory Examinations

Teaching Plan

Session (2022-2023)

Class: B.Sc III[rd] **Name of the Teachers: 1.Dr Naisergik Deepika Khanna**
2. Dr Mala Sharma

Subject: Chemistry
Course:1. Polymer Chemistry
2. Polynuclear hydrocarbons, Dyes, Heterocyclic compounds and spectroscopy.
Course Code: 1.CHEM-305 P
2. CHEM-301 P
Room No: Lab-I, II,III

Serial No.	Month	List of Experiments
Exp-1	August	Preparation of urea-formaldehyde resin. Preparations of novalac resin/resold resin.
Exp-2	September	Preparation of the complexes and measurement of their conductivity: (i) tetraamminecopper (II) sulphate (ii) potassium trioxalatoferrate (III) trihydrate
Exp-3	October	Determination of molecular weight by viscometry: (a) Polyacrylamide-aq.$NaNO_2$ solution (b) (Poly vinyl proplylidine (PVP) in water
Exp-4	November	Separation of mixtures by chromatography: Measure the Rf value in each case. (Combination of two ions to be given) Paper chromatographic separation of Fe^{3+}, $A1^{3+}$ and Cr^{3+} or Paper chromatographic separation of Ni^{2+}, Co^{2+}, Mn^{2+} and Zn^{2+}
Exp-5	December	Determination of molecular weight by end group analysis: Polyethylene glycol (PEG) (OH group).
Exp-6	February	Draw calibration curve (absorbance at λmax vs. concentration) for various concentrations of a given coloured compound ($KMnO_4$/ $CuSO_4$) and estimate the concentration of the same in a given solution.

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Session (2022-2023)

Class: B.Sc III[rd] **Name of the Teacher: Ms. Anjna Kumari.**

Subject: Chemistry

Course: 1. Chemical Technology & Society and Business Skills For Chemistry.
2. Pesticide Chemistry & Pharmaceutical Chemistry.

Course Code: 1. CHEM-307
2. CHEM-308

Room No: 63

S. No	Dates	Topics to be covered
Admissions of B. Sc. 3rd	10-07-2022 to 30-07-2022	**Admissions /Orientation**
Week 1	01-08-2022 to 06-08-2022	General introduction to pesticides (natural and synthetic).
Week 2	08-08-2022 to 13-08-2022	Benefits and adverse effects.
Week 3	16-08-2022 to 20-08-2022	Changing concepts of pesticides, structure activity relationship.
Week 4	22-08-2022 to 27-08-2022	Synthesis and technical manufacture and uses of representative pesticides in the following classes: Organochlorines (DDT, Gammexene).
Week 5	22-08-2022 to 27-08-2022	Organophosphates (Malathion, Parathion); Carbamates (Carbofuran and carbaryl).
Week 6	29-08-2022 to 03-09-2022	Quinones (Chloranil), Anilides (Alachlor and Butachlor).
Week 7	05-09-2022 to 10-09-2022	Basic principles of distillation, solvent extraction, solid-liquid leaching and liquid-liquid extraction, separation by absorption and adsorption.
Week 8	12-09-2022 to 17-09-2022	An introduction into the scope of different types of equipment needed in chemical technology, including reactors,
Week 9	19-09-2022 to 24-09-2022	Distillation columns, extruders, pumps, mills, emulgators. Scaling up operations in chemical industry. Introduction to clean technology.
Week 10	26-09-2022 to 01-10-2022	Exploration of societal and technological issues from a chemical perspective. Chemical and scientific literacy as a means to better understand topics like air and water (and the trace materials found in them that are referred to as pollutants)
Week 11	03-10-2022 to 08-10-2022	Energy from natural sources (i.e. solar and renewable forms from fossil fuels and from nuclear fission.
Week 12	10-10-2022 to 15-10-2022	Materials like plastics and polymers and their natural analogues.
Week 13	17-10-2022 to 21-10-2022	Proteins and nucleic acids, and molecular reactivity and interconversions from simple examples like combustion to complex instances like genetic engineering and the manufacture of drugs.
	22-10-2022 to 26-10-2022	**Diwali Break**
Week 14	27-10-2022 to 29-10-2022	Key business concepts: Business plans.
Week 15	31-10-2022 to 5-11-2022	Market need, project management and routes to market.
Week 16	7-11-2022 to 12-11-2022	Current challenges and opportunities for the chemistry-using industries.
Week 17	14-11-2022 to 19-11-2022	Role of chemistry in India and global economies. Financial aspects of business with case studies.

Week 18	21-11-2022 to 26-11-2022	Concept of intellectual property, patents.
Week 19	28-11-2022 to 03-12-2022	Drugs & Pharmaceuticals Drug discovery, design and development; Basic Retrosynthetic approach. Synthesis of the representative drugs of the following classes: analgesics agents, antipyretic agents, antiinflammatory agents (Aspirin, paracetamol, lbuprofen).
Week 20	5-12-2022 to 10-12-2022	Antibiotics (Chloramphenicol); antibacterial and antifungal agents (Sulphonamides; Sulphanethoxazol, Sulphacetamide, Trimethoprim); antiviral agents (Acyclovir).
Week 21	12-12-2022 to 17-12-2022	Central Nervous System agents (Phenobarbital, Diazepam), Cardiovascular (Glyceryl trinitrate), antilaprosy (Dapsone), HIV-AIDS related drugs (AZT-Zidovudine).
Week 22-23	19-12-2022 to 31-12-2022	**House Examination**
	01-01-2023 to 04-02-2023	**Winter vacations**
Week 24	06-02-2023 to 11-02-2023	Fermentation Aerobic and anaerobic fermentation.
Week 25	13-02-2023 to 18-02-2023	Production of (i) Ethyl alcohol and citric acid, (ii) Antibiotics; Penicillin, Cephalosporin, Chloromycetin and Streptomycin
Week 26	20-02-2023 to 28-02-2023	Lysine, Glutamic acid, Vitamin B_2, Vitamin B_{12} and Vitamin C.
		Term End Practical/Theory Examinations