UNIT – I

Terpenoids and carotenoids
Classification, occurrence, isolation, general methods of structure determination, isoprene rule, stereochemistry. Synthesis and Industrial uses of following representative molecules: citral, geraniol, Menthol, zingiberene, β-carotene.

UNIT – II

Alkaloids
Definition, nomenclature and physiological action, occurrence, isolation, general methods of structure elucidation, degradation, classification based on nitrogen heterocycle ring, role of alkaloid in plants, structure, stereo chemistry, synthesis and biosynthesis of the following: Conine, Nicotine, atropine, Quinine.

UNIT – III

Perfumes
Composition of perfumes, odorous substances, Extraction of perfumes from plants, synthesis of some important synthetic chemical used in perfume industry cases, phenylethyl alcohol, citronellol, finabul, geraniol, ketone, civetone, muscone, Musk ambrette, musk xylene, coumarin, β-ionone, aldehyde, vanillin, linaloepin, perfume formulation, some representative formulation of rose, jasmine, sandal wood, Fancy perfumes, lavender etc.

UNIT – IV

Carbohydrate and Fermentation Industries
Manufacture of sugar. Manufacture of starch, dextrin from corn, potato, rice and tapioca. Industrial alcohol, manufacture of absolute alcohol, Beer, Wine, Distilled spirit, Butyl alcohol, Acetone, Acetic acid, Citric acid, Lactic acid, Oxalic acid etc.
UNIT-V
Milk and Milk Products, Chemical Composition, Processing of milk, Types of milk, Analysis of Milk and Composition, uses and manufacturer of various milk products viz cream, butter, ghee, cheese, condensed milk, casein, khoa, milk powder, infant milk food, malted milk powder, ice-cream, fermented milk products.
IC 202 - ORGANIC CHEMISTRY – II

UNIT – I
Stereo Chemistry
Conformational analysis of cyclohexane, decalins, effect of conformation on reactivity.
Steric strain due to unavoidable crowding. Element of symmetry, chirality, molecules with more than one chiral center. Threo and erythro isomers, methods of resolution, optical activity, enantiomeric and diastereomeric compounds, stereospecific and stereoselective synthesis. Optical activity in absence of chiral carbon (biphenyls, allenes, spiroanes).

UNIT – II
Asymmetric Synthesis

UNIT – III
Pericyclic Reactions
Molecular orbital symmetry, Frontier orbitals of ethylene, 1,3-butadiene, 1,3,5 hexatriene and allyl systems. Classification of Pericyclic reactions. Woodward – Hoffmann correlation diagrams. FMO and PMO approach. Electrocyclic reaction – conrotatory and disrotatory motions, 4n, 4n+2 and allyl systems. Cyclo additions – antarafacial and suprafacial additions, 4n, 4n+2 systems, 1,3 dipolar cyclo addition. Sigmatropic rearrangements – suprafacial and antarafacial shift of “H”, sigmatropic shifts involving carbon moieties 3,3 and 5,5 sigmatropic rearrangements. Claisen, cope and aza – cope rearrangements.

Photochemistry
Cis-trans isomerization, Paterno – Buchi reaction, norrish types I and II reactions, photo reduction of ketones, photochemistry of arenes.
UNIT – IV

Oxidation
Introduction, Different oxidative processes. Hydrocarbons – Alkenes, aromatic rings, saturated C-H groups (activated and unactivated). Alcohols, diols, aldehydes, ketones, carboxylic acids, amines, hydrazines and sulphides. Oxidation with RuO₄, iodo benzene diacetate etc.

UNIT – V

Reduction
IC 203 - ORGANIC CHEMISTRY - III

UNIT – I

Reagents in organic synthesis
Complex metal hydrides, Gilman’s reagents, lithium dimethyl cuprate, lithium disopropylamide, dicyclohexyl carbodiimide 1,3 dithiane, tri methyl silyl iodide, tri-n-butyl tin hydride, DDQ, Phase transfer catalyst, crown ethers, Merrifield resin, Wilkinson’s catalyst, Baker’s yeast.

UNIT – II

Heterocyclic Chemistry
Synthesis and reactivity of furan, Thiophene, pyrrole, pyridine, Quinoline, Isoquinolone and indole skraup synthesis, Fiesher indole synthesis.

UNIT – III

Molecular Rearrangement
Pinacol/Pinacolone rearrangement, Wagner-mercier rearrangement, wolf, hoffman, curtius, loscen, Schmidt, Backman, Favorskin, Jacobson, Aston, Fries, Claisen, Shapiro.

Protecting Groups
Protection of organic functional groups, protecting reagents and removal of protecting groups.

UNIT – IV

Organic Reactions
Aldol, Perkin, Stobbe, Rieckmann condensation, Reimer- Tiemann, Reformatsky, Diels-Alder, Robinson annulation, Favorskin, Stork-enamine reaction, Michael, Aldrich, Petersons synthesis, chichibabin reaction.
UNIT – V

**Organic Synthesis - A disconnection approach**
Introduction of disconnection, concepts of synthesis, synthetic equivalent, functional group interconversion, concepts and design of synthesis, criteria of good disconnection.

**One group disconnection**
Disconnection and synthesis of alcohols, olefins, simple ketone and acids.

**Two Group disconnection**
Disconnection in 1,3 dioxygenated skeletons, preparation of β-hydroxy carbonyl compounds, disconnection and synthesis of acyclic and cyclic hetero compounds.
UNIT – I

Concept of polymers, polymerization, definition, classification and types, Bonding in polymers.
Condensation polymerization – types extent of condensation and degree of polymerization. Cross-linking, gel point and ring opening polymerization.

UNIT – II

Chemical properties
Hydrolysis, acidolysis, aminolysis, hydrogenation, addition, substitution isomerisation, cyclization and cross linking reactions of polymer.

Polymerization kinetics and Techniques
Free radical, cationic, anionic and radiation, polycondensation, mass, solution, emulsion and suspension polymerizations, Advantages and disadvantages of the techniques and of the products from them.

UNIT – III

Molecular mass
Relative molecular mass, $m_w$, $m_n$ and polydispersibility colligative property measurement and group analysis. Light scattering, ultra centrifugation, osmotic pressure and viscosity methods of molecular mass measurement. Gel permeation chromatography.

Glassy state, glass transition temperature, Mechanisms of glass transitions temperature, Factors influencing the glass transition temp, Relation of glass transitions temperature with molecular weight and melting point. Importance of glass transition temperature, crystallinity in polymers.
UNIT – IV

Rubber
Materials and Processing Technology
Introduction, types, thermoplastic elastomers (TPE), compounding and processing technology, vulcanization of elastomers, theory and accelerator action of sulphur vulcanization, non-sulphur vulcanization, ebonite latex technology some major rubber products. Polymer industries in India.

Polymer degradation and stabilizers
Thermal degradation, photo degradation, Oxidative, degradation biological degradation, the role of antioxidants and stabilizers.

UNIT – V

Plastics Materials

Introduction, Synthesis, properties and uses of following:

1. Polyethylene
2. Polystyrene
3. Acrylic fibers
4. Polyamides
5. Polycarbonates
6. Cellulose plastics
7. Silica
8. Poly Vinyl Chloride
9. Polyurethane’s
UNIT- I

General Pharmacological Principles
a) Drug nomenclature, routes of drug administration.

b) Pharmacokinetics: Passive diffusion and filtration, specialized transport, absorption, bio-availability, distribution, bio transformation (metabolism), Excretion, clearance, plasma half life, loading and maintenance dose, prolongation of drug action.


d) Adverse drug effects.

UNIT - II

Antipyretics analgesics
a) Some common antipyretic drug: Classification, pharmacology, mode of action, adverse effects, synthesis and structure activity relationship of paracetamol, acetanilide, aspirin, cinecophen, phenazone, mefenamic acid

b) Opioid analgesic or Narcotic analgesic drugs: Classification, pharmacology, mode of action, adverse effects, synthesis and structure activity relationship of Morphine sulphate, codeine, levorphanon tartrate, metazocine, pethidine hydrochloride.

c) Non steroidal anti inflammatory drugs: Classification, pharmacology, mode of action, adverse effects, synthesis and structure activity relationship of Indomethacine, Ibuprofen, Neproren, Auranofin.

UNIT- III

a) Sulphonamides: Classification, pharmacology, mode of action, adverse effects, synthesis and structure activity relationship of Sulfanilamide, Sulfathiazole, Sulphadiazine, Sulfacetamide, Mafenide
b) **Cotrimoxazole, Quinolones and Fluroquinolones:** Classification, pharmacology, mode of action, adverse effects, synthesis and structure activity relationship of cotrimoxazole, ciprofloxacin, norfloxacin.

c) **Anti Cancer Drugs:** Classification, pharmacology, mode of action, adverse effects, synthesis and structure activity relationship of Cyclophosphamide, Melphalan, Busulfan, Methotrexate.

**UNIT - IV**

**Antibiotics**

a) **β-Lactam antibiotics:** Classification, pharmacology, mode of action, adverse effects, synthesis and structure activity relationship of Penicilline (Benzy1 penicilline, cloxacillin, ampicil1ne) and Cephalosporins (cephalexin).

b) **Aminoglycosides Antibiotics:** Classification, pharmacology, mode of action, adverse effects, synthesis and structure activity relationship of Streptomyein, neomycin.

c) **Tetracyclines and chloramphenicol:** Classification, pharmacology, mode of action, adverse effects, synthesis and structure activity relationship of Tetracycline, Minocycline and Chloramphenicol.

d) **Macrolide Antibiotics:** Classification, pharmacology, mode of action, adverse effects, synthesis and structure activity relationship of Erythromycin.

c) **Treatment of urinary tract infection:** Antimicrobial agents

**UNIT - V**

a) **Antitubercular Drugs:** Classification, pharmacology, mode of action, adverse effects, synthesis and structure activity relationship of Isoniazid, Rifampin, Streptomycin.

b) **Antileprotic Drugs:** Classification, pharmacology, mode of action, adverse effects, synthesis and structure activity relationship of Dapsone, Clofazimine, Rifampin.
c) **Antimalarial Drugs:** Classification, pharmacology, mode of action, adverse effects, synthesis and structure activity relationship of Chloroquine, Primaquin Phosphate.

d) **Antiamoebic & Antiprotozoal Drugs:** Classification, pharmacology, mode of action, adverse effects, synthesis and structure activity relationship of Mtroniadazole, Diloxanide Furoate, Sodium stibogluconate, Pentamidine.