SYLLABUS: I-T-G One Tier (General) - 200 Marks

Section-A	General Intelligence & Reasoning Ability	40 Marks	The syllabus of General Intelligence & Reasoning Ability includes questions of both verbal and non-verbal types. Test may include questions on analogies, similarities, differences, space visualization, problem solving, analysis, judgement, decision making, visual memory, discrimination, observation, relationship, concepts, arithmetical reasoning, verbal and figure classification, arithmetical number series etc.
	General Awareness	40 Marks	Questions will be designed to test the ability of the candidate's General Awareness of the environment around him/ her and its application to society. The questions will be designed to test knowledge of Current Events and of such matter of everyday observation as may be expected of an educated person. The test will also include questions relating to History, Polity, Constitution, Sports, Art & Culture, Geography, Economics, Everyday Science, Scientific Research, National/ International Organizations/ Institutions etc.
	Arithmetical & Numerical Ability	40 Marks	The test of Arithmetical & Numerical Abilities will cover Number Systems including questions on Simplification, Decimals, Data Interpretation, Fractions, L.C.M., H.C.F., Ratio & Proportion, Percentage, Average, Profit & Loss, Discount, Simple & Compound Interest, Mensuration, Time & Work, Time & Distance, Tables & Graphs etc.
	English Language & Comprehension	40 Marks	Questions will be designed to test the ability of the candidate's understanding and comprehension of the English Language, questions on its Vocabulary, Grammar, Sentence Structure, Synonyms, Antonyms and its correct usage etc. would also be covered.
	Hindi Language & Comprehension	40 Marks	Questions will be designed to test the ability of the candidate's understanding and comprehension of the Hindi Language, questions on its Vocabulary, Grammar, Sentence Structure, Synonyms, Antonyms and its correct usage etc. would also be covered.

SYLLABUS: Pharmacist (Dispenser) in MCD & Pharmacist (Allopathic) in NDMC

PHARMACEUTICS

- History of the profession of Pharmacy in India in relation to Pharmacy education, industry, pharmacy practice, and various professional associations.
- Pharmacopoeia: Introduction to IP, BP, USP, NF and Extra Pharmacopoeia. Salient features of Indian Pharmacopoeia
- **Packaging materials:** Types, selection criteria, advantages and disadvantages of glass, plastic, metal, rubber as packaging materials
- **Pharmaceutical aids:** Organoleptic (Colouring, flavouring, and sweetening) agents. **Preservatives:** Definition, types with examples and uses.
- **Unit operations:** Definition, objectives/applications, principles, construction, and workings of:

  Size reduction: hammer mill and ball mill

  Size separation: Classification of powders according to IP, Cyclone separator, Sieves and standards of sieves

  Mixing: Double cone blender, Turbine mixer, Triple roller mill and Silverson mixer homogenizer

  Filtration: Theory of filtration, membrane filter and sintered glass filter

  Drying: working of fluidized bed dryer and process of freeze drying

  Extraction: Definition, Classification, method, and applications

  Tablets – coated and uncoated, various modified tablets (sustained release, extended-release, fast dissolving, multi- layered, etc.)

  Capsules - hard and soft gelatine capsules

  Liquid oral preparations - solution, syrup, elixir, emulsion, suspension, dry powder for reconstitution

  Topical preparations - ointments, creams, pastes, gels, liniments and lotions, suppositories and pessaries

  Nasal preparations, Ear preparations

  Powders and granules - Insufflations, dusting powders, effervescent powders, and effervescent granules

  Sterile formulations – Injectables, eye drops and eye ointments

  Immunological products: Sera, vaccines, toxoids, and their manufacturing methods.
- Basic structure, layout, sections, and activities of pharmaceutical manufacturing plants
- **Quality control and quality assurance:** Definition and concepts of quality control and quality assurance, current good manufacturing practice (cGMP), Introduction to the concept of calibration and validation
- **Novel drug delivery systems:** Introduction, Classification with examples, advantages, and challenges.

PHARMACEUTICAL CHEMISTRY

- **Introduction to Pharmaceutical chemistry:** Scope and objectives

  Sources and types of errors: Accuracy, precision, significant figures

  Impurities in Pharmaceuticals: Source and effect of impurities in Pharmacopoeial substances, importance of limit test, Principle and procedures of Limit tests for chlorides, sulphates, iron, heavy metals and arsenic.
- **Volumetric analysis:** Fundamentals of volumetric analysis, Acid-base titration, non-aqueous

titration, precipitation titration, complexometric titration, redox titration.

- **Gravimetric analysis:** Principle and method.
- **Inorganic Pharmaceuticals:** Pharmaceutical formulations, market preparations, storage conditions and uses of:

  Haematinics: Ferrous sulphate, Ferrousfumarate, Ferric ammonium citrate, Ferrous ascorbate, Carbonyl iron.

  Gastro-intestinal Agents: Antacids :Aluminium hydroxide gel, Magnesium hydroxide, Magaldrate, Sodium bicarbonate, Calcium Carbonate, Acidifying agents, Adsorbents, Protectives, Cathartics.

  Topical agents: Silver Nitrate, Ionic Silver, ChlorhexidineGluconate, Hydrogen peroxide, Boric acid, Bleaching powder, Potassium permanganate.

  Dental products: Calcium carbonate, Sodium fluoride, Denture cleaners, Denture adhesives, Mouth washes.

  Medicinal gases: Carbon dioxide, nitrous oxide and oxygen.
- **Introduction to nomenclature of organic chemical systems with particular reference to heterocyclic compounds containing up to three rings.**

STUDY OF THE FOLLOWING CATEGORY OF MEDICINAL COMPOUNDS WITH RESPECT TO CLASSIFICATION, CHEMICAL NAME, CHEMICAL STRUCTURE (COMPOUNDS MARKED WITH*) USES, STABILITY AND STORAGE CONDITIONS, DIFFERENT TYPES OF FORMULATIONS AND THEIR POPULAR BRAND NAMES

- **Drugs Acting on Central Nervous System**

  Anaesthetics: Thiopental Sodium*, Ketamine Hydrochloride*, Propofol

  Sedatives and Hypnotics: Diazepam*, Alprazolam*, Nitrazepam, Phenobarbital*

  Antipsychotics: Chlorpromazine Hydrochloride*, Haloperidol*, Risperidone*, Sulpiride*, Olanzapine, Quetiapine, Lurasidone.

  Anticonvulsants: Phenytoin*, Carbamazepine*, Clonazepam, Valproic Acid*, Gabapentin*, Topiramate, Vigabatrin, Lamotrigine

  Anti-Depressants: Amitriptyline Hydrochloride*, Imipramine Hydrochloride*, Fluoxetine*, Venlafaxine, Duloxetine, Sertraline, Citalopram, Escitalopram,Fluvoxamine, Paroxetine.
- **Drugs Acting on Autonomic Nervous System**

  Sympathomimetic Agents: Direct Acting: Nor- Epinephrine*, Epinephrine, Phenylephrine, Dopamine*, Terbutaline, Salbutamol (Albuterol), Naphazoline*, Tetrahydrozoline. Indirect Acting Agents: Hydroxy Amphetamine, Pseudoephedrine. Agents With Mixed Mechanism: Ephedrine, Metaraminol.

  Adrenergic Antagonists: Alpha Adrenergic Blockers: Tolazoline, PhentolaminePhenoxybenzamine, Prazosin. Beta Adrenergic Blockers: Propranolol*, Atenolol*, Carvedilol

  Cholinergic Drugs and Related Agents: Direct Acting Agents: Acetylcholine*, Carbachol, AndPilocarpine. Cholinesterase Inhibitors: Neostigmine*, Edrophonium Chloride, Tacrine Hydrochloride, Pralidoxime Chloride, Echothiopate Iodide.

  Cholinergic Blocking Agents: Atropine Sulphate*, Ipratropium Bromide.

  Synthetic Cholinergic Blocking Agents: Tropicamide, Cyclopentolate Hydrochloride, Clidinium Bromide, Dicyclomine Hydrochloride*
- **Drugs Acting on Cardiovascular System**

  Anti-Arrhythmic Drugs: Quinidine Sulphate, Procainamide Hydrochloride, Verapamil, Phenytoin Sodium*, Lidocaine Hydrochloride, Lorcainide Hydrochloride, Amiodarone and Sotalol.

Anti-Hypertensive Agents: Propranolol*, Captopril*, Ramipril, MethyldopateHydrochloride, Clonidine Hydrochloride, Hydralazine Hydrochloride, Nifedipine,

Antianginal Agents: IsosorbideDinitrate

- **Diuretics:** Acetazolamide, Frusemide*, Bumetanide, Chlorthalidone, Benzthiazide, Metolazone, Xipamide, Spironolactone
- **Hypoglycemic Agents:** Insulin and Its Preparations, Metformin*, Glibenclamide*, Glimepiride, Pioglitazone, Repaglinide, Gliflozins, Gliptins
- **Analgesic And Anti-Inflammatory Agents:** Morphine Analogues, Narcotic Antagonists; Nonsteroidal Anti- Inflammatory Agents (NSAIDs) - Aspirin*, Diclofenac, Ibuprofen*, Piroxicam, Celecoxib, Mefenamic Acid, Paracetamol*, Aceclofenac.
- **Anti-Infective Agents**

  Antifungal Agents: Amphotericin-B, Griseofulvin, Miconazole, Ketoconazole*, Itraconazole, Fluconazole*, Naftifine Hydrochloride.

  Urinary Tract Anti-Infective Agents: Norfloxacin, Ciprofloxacin, Ofloxacin*, Moxifloxacin.

  Anti-Tubercular Agents: INH*, Ethambutol, Para Amino Salicylic Acid, Pyrazinamide, Rifampicin, Bedaquiline, Delamanid, Pretomanid*.

  Antiviral Agents: Amantadine Hydrochloride, Idoxuridine, Acyclovir*, Foscarnet, Zidovudine, Ribavirin, Remdesivir, Favipiravir.

  Antimalarials: Quinine Sulphate, Chloroquine Phosphate*, Primaquine Phosphate, Mefloquine*, Cycloguanil, Pyrimethamine, Artemisinin.

  Sulfonamides: Sulfanilamide, Sulfadiazine, Sulfamethoxazole, Sulfacetamide*, Mafenide Acetate, Cotrimoxazole, Dapsone*.
- **Antibiotics:** Penicillin G, Amoxicillin*, Cloxacillin, Streptomycin, Tetracyclines: Doxycycline, Minocycline, Macrolides: Erythromycin, Azithromycin, Miscellaneous: Chloramphenicol* Clindamycin.
- **Anti-Neoplastic Agents:** Cyclophosphamide*, Busulfan, Mercaptopurine, Fluorouracil*, Methotrexate, Dactinomycin, Doxorubicin Hydrochloride, Vinblastine Sulphate, Cisplatin*, Dromostanolone Propionate.

PHARMACOGNOSY

- **Definition, history, present status and scope of Pharmacognosy**
- **Classification of drugs:**

  Alphabetical
  Taxonomical
  Morphological
  Pharmacological
  Chemical
  Chemo-taxonomical
- **Quality control of crude drugs:**

  Different methods of adulteration of crude drugs
  Evaluation of crude drugs
- Brief outline of occurrence, distribution, isolation, identification tests, therapeutic activity and pharmaceutical applications of alkaloids, terpenoids, glycosides, volatile oils, tannins and resins.

- **Biological source, chemical constituents and therapeutic efficacy of the following categories of crude drugs:**
  Laxatives: Aloe, Castor oil, Ispaghula, Senna
  Cardiotonic: Digitalis, Arjuna
  Carminatives and G.I. regulators : Corlander, Fennel, Cardamom, Ginger, Clove, Black Pepper, Asafoetida, Nutmeg, Cinnamon
  Astringents : Myrobalan, Black Catechu, Pale Catechu
  Drugs acting on nervous system Hyoscyamus, Belladonna, Ephedra, Opium, Tea leaves, Coffee seeds, Coca
  Anti-hypertensive Rauwolfia
  Anti-tussive Vasaka, Tolu Balsam
  Anti-rheumatics Colchicum seed
  Anti-tumour Vinca, Podophyllum
  AntidiabeticsPterocarpus, Gymnema
  Diuretics Gokhru, Punarnava
  Anti-dysenteric Ipecacuanha
  Antiseptics and disinfectants Benzoin, Myrrh, Neem, Turmeric
  Antimalarials Cinchona, Artemisia
  Oxytocic Ergot
  Vitamins Cod liver oil, Shark liver oil
  Enzymes Papaya, Diastase, Pancreatin, Yeast
  Pharmaceutical Aids Kaolin, Lanolin, Beeswax, Acacia, Tragacanth, Sodium alginate, Agar, Guar gum, Gelatine.
  MiscellaneousSquill, Galls, Ashwagandha, Tulsi, Guggul
- **Plant fibres used as surgical dressings:** Cotton, silk, wool and regenerated fibres Sutures – Surgical Catgut and Ligatures.
- **Basic principles involved in the traditional systems of medicine like:** Ayurveda, Siddha, Unani and Homeopathy.
- **Method of preparation of Ayurvedic formulations like:** Arista, Asava, Gutika, Taila, Churna, Lehya and Bhasma.
- Role of medicinal and aromatic plants in national economy and their export potential
- **Herbs as health food:**
  Brief introduction and therapeutic applications of: Nutraceuticals, Antioxidants, Pro-biotics, Pre-biotics, Dietary fibres, Omega-3-fatty acids, Spirulina, Carotenoids, Soya and Garlic.
- **Introduction to herbal formulations:**
  Herbal cosmetics: Sources, chemical constituents, commercial preparations, therapeutic and cosmetic uses of: Aloe vera gel, Almond oil, Lavender oil, Olive oil, Rosemary oil, Sandal Wood oilPhytochemical investigation of drugs.

HUMAN ANATOMY AND PHYSIOLOGY

- **Scope of Anatomy and PhysiologyDefinition of various terminologies**
- **Structure of Cell:** Components and its functions.
- **Tissues of the human body:** Epithelial, Connective, Muscular and Nervous tissues – their sub-types and characteristics.
- **Osseous system:** structure and functions of bones of axial and appendicular skeletonClassification, types and movements of joints, disorders of joints

- **Haemopoietic system**
  Composition and functions of blood
  Process of Hemopoiesis
  Characteristics and functions of RBCs, WBCs, and platelets
  Mechanism of Blood Clotting
  Importance of Blood groups
- **Lymphatic system**
  Lymph and lymphatic system, composition, function and its formation.
  Structure and functions of spleen and lymph node.
- **Cardiovascular system**
  Anatomy and Physiology of heart
  Blood vessels and circulation (Pulmonary, coronary and systemic circulation)
  Cardiac cycle and Heart sounds, Basics of ECG
  Blood pressure and its regulation
- **Respiratory system**
  Anatomy of respiratory organs and their functions.
  Regulation, and Mechanism of respiration.
  Respiratory volumes and capacities – definitions
- **Digestive system**
  Anatomy and Physiology of the GIT
  Anatomy and functions of accessory glands
  Physiology of digestion and absorption
- **Skeletal muscles**
  Histology
  Physiology of muscle contraction
  Disorder of skeletal muscles
- **Nervous system**
  Classification of nervous system
  Anatomy and physiology of cerebrum, cerebellum, mid brain
  Function of hypothalamus, medulla oblongata and basal ganglia
  Spinal cord-structure and reflexes
  Names and functions of cranial nerves.
  Anatomy and physiology of sympathetic and parasympathetic nervous system (ANS)
- **Sense organs - Anatomy and physiology of**
  Eye
  Ear
  Skin
  Tongue
  Nose
- **Urinary system**
  Anatomy and physiology of urinary system
  Physiology of urine formation
  Renin - angiotensin system
  Clearance tests and micturition
- **Endocrine system (Hormones and their functions)**
  Pituitary gland

Adrenal gland
Thyroid and parathyroid gland
Pancreas and gonads

- **Reproductive system**
  Anatomy of male and female reproductive system
  Physiology of menstruation
  Spermatogenesis and Oogenesis
  Pregnancy and parturition

SOCIAL PHARMACY

- **Introduction to Social Pharmacy:** Definition and Scope. Social Pharmacy as a discipline and its scope in improving the public health. Role of Pharmacists in Public Health.Concept of Health -WHO Definition, various dimensions, determinants, and health indicators. National Health Policy – Indian perspectivePublic and Private Health System in India, National Health MissionIntroduction to Millennium Development Goals, Sustainable Development Goals, FIP Development Goals.
- **Preventive healthcare – Role of Pharmacists in the following:** Demography and Family PlanningMother and child health, importance of breastfeeding, ill effects of infant milk substitutes and bottle feedingOverview of Vaccines, types of immunity and immunization. Effect of Environment on Health – Water pollution, importance of safe drinking water, waterborne diseases, air pollution, noise pollution, sewage and solid waste disposal, occupational illnesses, Environmental pollution due to pharmaceuticals. Psychosocial Pharmacy: Drugs of misuse and abuse – psychotropics, narcotics, alcohol, tobacco products. Social Impact of these habits on social health and productivity and suicidal behaviours.
- **Nutrition and Health:** Basics of nutrition – Macronutrients and Micronutrients.Importance of water and fibres in diet. Balanced diet, Malnutrition, nutrition deficiency diseases, ill effects of junk foods, calorific and nutritive values of various foods, fortification of food. Introduction to food safety, adulteration of foods, effects of artificial ripening, use of pesticides, genetically modified foods. Dietary supplements, nutraceuticals, food supplements – indications, benefits, Drug-Food Interactions.
- **Introduction to Microbiology and common microorganisms**
  Epidemiology: Introduction to epidemiology, and its applications. Understanding of terms such as epidemic, pandemic, endemic, mode of transmission, outbreak, quarantine, isolation, incubation period, contact tracing, morbidity, mortality.
  Causative agents, epidemiology and clinical presentations and Role of Pharmacists in educating the public in prevention of the following communicable diseases:
  Respiratory infections – chickenpox, measles, rubella, mumps, influenza (including Avian-Flu, H1N1, SARS, MERS, COVID-19), diphtheria, whooping cough, meningococcal meningitis, acute respiratory infections, tuberculosis, Ebola
  Intestinal infections – poliomyelitis, viral hepatitis, cholera, acute diarrheal diseases, typhoid, amebiasis, worm infestations, food poisoning.
  Arthropod-borne infections - dengue, malaria, filariasis and, chikungunya
  Surface infections – trachoma, tetanus, leprosy, STD/HIV/AIDS
- Introduction to health systems and all ongoing National Health programs in India, their objectives, functioning, outcome, and the role of pharmacists.
- **Pharmacoeconomics** – Introduction, basic terminologies, importance of pharmacoeconomics

PHARMACOLOGY

- **General Pharmacology**
  Introduction and scope of Pharmacology
  Various routes of drug administration - advantages and disadvantages
  Drug absorption - definition, types, factors affecting drug absorption
  Bioavailability and the factors affecting bioavailability
  Drug distribution - definition, factors affecting drug distribution
  Biotransformation of drugs - Definition, types of biotransformation reactions, factors influencing drug metabolisms.
  Excretion of drugs - Definition, routes of drug excretion
  General mechanisms of drug action and factors modifying drug action
- **Drugs Acting on the Peripheral Nervous System Steps involved in neurohumoral transmission Definition, classification, pharmacological actions, dose, indications, and contraindications of:**
  Cholinergic drugs
  Anti-Cholinergic drugs
  Adrenergic drugs
  Anti-adrenergic drugs
  Neuromuscular blocking agents
  Drugs used in Myasthenia gravis
  Local anaesthetic agents
  Non-Steroidal Anti-Inflammatory drugs (NSAIDs)
- **Drugs Acting on the EyeDefinition, classification, pharmacological actions, dose, indications and contraindications of:**
  Miotics
  Mydriatics
  Drugs used in Glaucoma
- **Drugs Acting on the Central Nervous SystemDefinition, classification, pharmacological actions, dose, indications, and contraindications of:**
  General anaesthetics
  Hypnotics and sedatives
  Anti-Convulsant drugs
  Anti-anxiety drugs
  Anti-depressant drugs
  Anti-psychotics
  Nootropic agents
  Centrally acting muscle relaxants
  Opioid analgesics
- **Drugs Acting on the Cardiovascular System Definition, classification, pharmacological actions, dose, indications, and contraindications of:**
  Anti-hypertensive drugs
  Anti-anginal drugs
  Anti-arrhythmic drugs
  Drugs used in atherosclerosis and

Congestive heart failure
Drug therapy for shock

- **Drugs Acting on Blood and Blood Forming Organs Definition, classification, pharmacological actions, dose, indications, and contraindications of:**
  Hematinic agents
  Anti-coagulants
  Anti-platelet agents
  Thrombolytic drugs
- **Definition, classification, pharmacological actions, dose, indications, and contraindications of:**
  Bronchodilators
  Expectorants
  Anti-tussive agents
  Mucolytic agents
- **Drugs Acting on the Gastro Intestinal TractDefinition, classification, pharmacological actions, dose, indications, and contraindications of:**
  Anti-ulcer drugs
  Anti-emetics
  Laxatives and purgatives
  Anti-diarrheal drugs
- **Drugs Acting on the Kidney Definition, classification, pharmacological actions, dose, indications, and contraindications of:**
  Diuretics
  Anti-Diuretics
- **Hormones and Hormone Antagonists Physiological and pathological role and clinical uses of:**
  Thyroid hormones
  Anti-thyroid drugs
  Parathormone
  Calcitonin
  Vitamin D
  Insulin
  Oral hypoglycemic agents
  Estrogen
  Progesterone
  Oxytocin
  Corticosteroids
- **Autocoids:**
  Physiological role of Histamine, 5 HT and Prostaglandins
  Classification, clinical uses, and adverse effects ofantihistamines and 5 HT antagonists
- **Chemotherapeutic Agents:**
  Introduction, basic principles of chemotherapy of infections, infestations and neoplastic diseases, Classification, dose, indication and contraindications of drugs belonging to following classes:
  Penicillins, Cephalosporins, Aminoglycosides, Fluoroquinolones, Macrolides, Tetracyclines Sulphonamides, Anti-tubercular drugs, Anti-fungal drugs, Anti-viral drugs

Anti-amoebic agents
Anthelmintics
Anti-malarial agents
Anti-neoplastic agents

- **Biologicals Definition, types, and indications of biological agents with examples**

COMMUNITY PHARMACY AND MANAGEMENT

- **Community Pharmacy Practice** – Definition, history and development of community pharmacy - International and Indian scenarios.
- **Professional responsibilities of community pharmacists. Introduction to the concept of Good Pharmacy Practice and SOPs.**
- **Prescription and prescription handling:**
  Definition, parts of prescriptions, legality of prescriptions, prescription handling, labelling of dispensed medications (Main label, ancillary label, pictograms), brief instructions on medication usage.
  Dispensing process, Good Dispensing Practices, dispensing errors and strategies to minimize them.
- **Communication skills:**
  Definition, types of communication skills
  Interactions with professionals and patients
  Verbal communication skills (one-to-one, over the telephone)
  Written communication skills
  Body language
  Patient interview techniques
- **Patient counseling;**
  Definition and benefits of patient counseling
  Stages of patient counselling - Introduction, counselling content, counselling process, and closing the counselling session
  Barriers to effective counseling - Types and strategies to overcome the barriers
  Patient counselling points for chronic diseases/disorders - Hypertension, Diabetes, Asthma, Tuberculosis, Chronic obstructive pulmonary disease, and AIDS
  Patient Package Inserts - Definition, importance and benefits, Scenarios of PPI use in India and other countries
  Patient Information leaflets - Definition and uses
- **Medication Adherence:**Definition, factors influencing non- adherence, strategies to overcome non-adherence.
- **Health Screening Services in Community Pharmacy** Introduction, scope, and importance of various health screening services - for routine monitoring of patients, early detection, andreferral of undiagnosed cases
- **Over The Counter (OTC) Medications:**
  Definition, need and role of Pharmacists in OTC medication dispensing
  OTC medications in India, counseling for OTC products
  Self-medication and role of pharmacists in promoting the safe practices during self-medication
  Responding to symptoms, minor ailments, and advice for self-care in conditions such as -

Pain management, Cough, Cold, Diarrhea, Constipation, Vomiting, Fever, Sore throat, Skin disorders, Oral health (mouth ulcers, dental pain, gum swelling).

- **Community Pharmacy Management:**
  Legal requirements to set up a community pharmacy
  Site selection requirements
  Pharmacy designs and interiors
  Vendor selection and ordering
  Procurement, inventory control methods, and inventory management
  Financial planning and management
  Accountancy in community pharmacy – Day book, Cash book
  Introduction to pharmacy operation softwares – usefulness and availability
  Customer Relation Management (CRM)
  Audits in Pharmacies
  SOP of Pharmacy Management
  Introduction to Digital Health, mHealth and Online pharmacies

BIOCHEMISTRY & CLINICAL PATHOLOGY

- **Introduction to biochemistry:** Scope of biochemistry in pharmacy; Cell and its biochemical organization.
- **Carbohydrates:**
  Definition, classification with examples, chemical properties
  Monosaccharides - Structure of glucose, fructose, and galactose
  Disaccharides - structure of maltose, lactose, and sucrose
  Polysaccharides - chemical nature of starch and glycogen
  Qualitative tests and biological role of carbohydrates
- **Proteins:**
  Definition, classification of proteins based on composition and solubility with examples
  Definition, classification of amino acids based on chemical nature and nutritional requirements with examples
  Structure of proteins (four levels of organization of protein structure)
  Qualitative tests and biological role of proteins and amino acids
  Diseases related to malnutrition of proteins.
- **Lipids:**
  Definition, classification with examples
  Structure and properties of triglycerides (oils and fats)
  Fatty acid classification - Based onchemical and nutritional requirements with examples
  Structure and functions of cholesterol in the body
  Lipoproteins - types, composition and functions in the body
  Qualitative tests and functions of lipids
- **Nucleic acids:**
  Definition, purine and pyrimidine bases
  Components of nucleosides and nucleotides with examples
  Structure of DNA (Watson and Crick model), RNA andtheir functions
- **Enzymes:**
  Definition, properties and IUB and MB classification

Factors affecting enzyme activity
Mechanism of action of enzymes, Enzyme inhibitors
Therapeutic and pharmaceutical importance of enzymes

- **Vitamins:**
  Definition and classification with examples
  Sources, chemical nature, functions, coenzyme form, recommended dietary requirements, deficiency diseases of fat-and water-soluble vitamins
- **Metabolism (Study of cycle/pathways without chemical structures):**
  Metabolism of Carbohydrates: Glycolysis, TCA cycle and glycogen metabolism, regulation of blood glucose level. Diseases related to abnormal metabolism of Carbohydrates.
  Metabolism of lipids: Lipolysis, β-oxidation of Fatty acid (Palmitic acid) ketogenesis and ketolysis. Diseases related to abnormal metabolism of lipids such as Ketoacidosis, Fatty liver, Hypercholesterolemia.
  Metabolism of Amino acids (Proteins): General reactions of amino acids and its significance– Transamination, deamination, Urea cycle and decarboxylation. Diseases related to abnormal metabolism of amino acids, Disorders of ammonia metabolism, phenylketonuria, alkaptonuria and Jaundice.
  Biological oxidation: Electron transport chain and Oxidative phosphorylation.
- **Minerals:** Types, Functions, Deficiency diseases, recommended dietary requirements.
- **Water and Electrolytes:**
  Distribution, functions of water in the body
  Water turnover and balance
  Electrolyte composition of the body fluids, Dietary intake of electrolyte and Electrolyte balance
  Dehydration, causes of dehydration and oral rehydration therapy
  Introduction to Biotechnology
- **Organ function tests:**
  Functions of kidney and routinely performed tests to assess the functions of kidney and their clinical significances.
  Functions of liver and routinely performed tests to assess the functions of liver and their clinical significances.
  Lipid profile tests and its clinical significances.
- **Introduction to Pathology of Blood and Urine:**
  Lymphocytes and Platelets, their role in health and disease
  Erythrocytes - Abnormal cells and their significance
  Normal and Abnormal constituents of Urine and their significance

PHARMACO THERAPEUTICS

- **Pharmacotherapeutics-** Introduction, scope, and objectives. Rational use of Medicines, Evidence Based Medicine, Essential Medicines List, Standard Treatment Guidelines (STGs). Definition, etiopathogensis, clinical manifestations, non-pharmacological and pharmacological management of the associated with:-

- **Cardiovascular System**
  - Hypertension
  - Angina and Myocardial infarction
  - Hyperlipidaemia
  - Congestive Heart Failure
- **Respiratory System**
  - Asthma
  - COPD
- **Endocrine System**
  - Diabetes
  - Thyroid disorders - Hypo and Hyperthyroidism
- **Central Nervous System**
  - Epilepsy
  - Parkinson's disease
  - Alzheimer's disease
  - Stroke
  - Migraine
- **Gastro Intestinal Disorders**
  - Gastro oesophageal reflux disease
  - Peptic Ulcer Disease
  - Alcoholic liver disease Inflammatory Bowel Diseases (Crohn's Disease and Ulcerative Colitis)
- **Haematological disorders**
  - Iron deficiency anaemia
  - Megaloblasticanaemia
- **Infectious diseases**

  Tuberculosis
  - Pneumonia
  - Urinary tract infections
  - Hepatitis
  - Gonorrhoea and Syphilis
  - Malaria
  - HIV and Opportunistic infections
  - Viral Infections (SARS, CoV2)
- **Musculoskeletal disorders**
  - Rheumatoid arthritis
  - Osteoarthritis
- **Dermatology**
  - Psoriasis
  - Scabies
  - Eczema
- **Psychiatric Disorders**
  - Depression
  - Anxiety

Psychosis

- **Ophthalmology**
  - Conjunctivitis (bacterial and viral)
  - Glaucoma
- **Anti-microbial Resistance**
- **Women's Health**
  - Polycystic Ovary Syndrome
  - Dysmenorrhea
  - Premenstrual Syndrome

HOSPITAL AND CLINICAL PHARMACY

- **Hospital Pharmacy:**
  - Definition, scope, national and international scenario
  - Organizational structure
  - Professional responsibilities, Qualification and experience requirements, job specifications, work load requirements and inter professional relationships
  - Good Pharmacy Practice (GPP) in hospital
  - Hospital Pharmacy Standards (FIP Basel Statements, AHSP)
  - Introduction to NAQS guidelines and NABH Accreditationand Role of Pharmacists
- **Different Committees in the Hospital:**
  - Pharmacy and Therapeutics Committee - Objectives, Composition, and functions
  - Hospital Formulary - Definition, procedure for development and use of hospital formulary
  - Infection Control Committee – Role of Pharmacist in preventing Antimicrobial Resistance
- **Supply Chain and Inventory Control:**
  - Preparation of Drug lists - High Risk drugs, Emergency drugs, Schedule H1 drugs, NDPS drugs, reserved antibiotics
  - Procedures of Drug Purchases – Drug selection, short term, long term, and tender/e-tender process, quotations, etc.
  - Inventory control techniques: Economic Order Quantity, Reorder Quantity Level, Inventory Turnover etc.
  - Inventory Management of Central Drug Store – Storage conditions, Methods of storage, Distribution, Maintaining Cold Chain, Devices used for cold storage (Refrigerator, ILR, Walk-in-Cold rooms.
  - FEFO, FIFO methods.
  - Expiry drug removal and handling, and disposal. Disposal of Narcotics, cytotoxic drugs.
  - Documentation - purchase and inventory
- **Drug distribution:**
  - Drug distribution (in- patients and out - patients) – Definition, advantages and disadvantages of individual prescription order method, Floor Stock Method, Unit Dose Drug Distribution Method, Drug Basket Method.
  - Distribution of drugs to ICCU/ICU/NICU/Emergency wards.
  - Automated drug dispensing systems and devices
  - Distribution of Narcotic and Psychotropic substances and their storage Compounding in Hospitals. Bulk compounding, IV admixture.Services and incompatibilities, Total

parenteral nutrition.

Radio Pharmaceuticals - Storage, dispensing and disposal ofradiopharmaceuticals

Application of computers in Hospital Pharmacy Practice, Electronic health records, Softwares used in hospital pharmacy.

- **Clinical Pharmacy**

  Definition, scope, and development - in India and other countries. Technical definitions, common terminologies used in clinical settings and their significance such as Paediatrics, Geriatric, Anti-natal Care, Post-natal Care, etc.

- **Daily activities of clinical pharmacists: Definition, goal, and procedure of:**

  Ward round participation
  Treatment Chart Review
  Adverse drug reaction monitoring
  Drug information and poisons information
  Medication history
  Patient counseling
  Interprofessional collaboration

- **Pharmaceutical care**

  Definition, classification of drug related problems. Principles and procedure to provide pharmaceutical care

- **Medication Therapy Management, Home Medication Review**
- **Clinical laboratory tests used in the evaluation of disease states - significance and interpretation of test results**

  Haematological, Liver function, Renal function, thyroid function tests
  Tests associated with cardiac disorders
  Fluid and electrolyte balance
  Pulmonary Function Tests

- **Poisoning**

  Types of poisoning: Clinical manifestations and Antidot

- **Drugs and Poison Information Centre and their services**

  Definition, Requirements, Information resources with examples, and their advantages and disadvantages

- **Pharmacovigilance:**

  Definition, aim and scope
  Overview of Pharmaco vigilance

- **Medication errors**

  Definition, types, consequences, and strategies to minimize medication errors, LASA drugs and Tallman lettering as per ISMP.

- **Drug Interactions**

  Definition, types, clinical significance of drug interaction

PHARMACY LAW AND ETHICS

- **General Principles of Law, History and various Acts related to Drugs and Pharmacy profession.**
- **Pharmacy Act-1948 and Rules**

  Objectives, Definitions, Pharmacy Council of India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils, Registration of

Pharmacists, Offences and Penalties.

- **Pharmacy Practice Regulations 2015**
- **Drugs and Cosmetics Act 1940 and Rules 1945 and New Amendments**
- **Objectives, Definitions, Legal definitions of schedules to the Act and Rules Import of drugs-** Classes of drugs and cosmetics prohibited from import, Import under license or permit.