SYLLABUS OF MASTER OF PHARMACY

First Semester

Category - Departmental / Specialization Basket

Paper- I

PG / PHAR / T/ 111A Pharmaceutics I

Polymers in drug delivery, Gastro retentive drug delivery system, Osmotic drug delivery system, Buccal drug delivery system, Transmucosal drug delivery system, Ocular drug delivery system, Intra-nasal drug delivery system, Vaginal drug delivery system.

PG / PHAR / T/ 111B Pharmacognosy I


PG / PHAR / T/ 111C Microbiology I

Classification and taxonomy; structure and cytology, Nutritional requirements; Enzymes and metabolism by micro –organisms Methods of cultivation of bacteria fungi and viruses.Isolation and identification of contaminants in spoiled pharmaceutical products. Fermentative products of carbohydrates and their uses for identification of some genera of true bacteria.

Methods of sterilization used in pharmaceutical products. Methods of sterility testing for pharmaceutical products. Industrial production of malts, Beverages, antibiotics, and other common products. Methods of preservation against microbial attacks. Different germicidal tests. Mode of action of chemotherapeutic agents in relation to their inhibition of cell wall, protein, cell membrane, RNA, DNA, etc.


Host-parasite relationships, structure and formation of antigens and antibodies; Antigen antibody reaction. Immunofluorescence and electrophoresis, Complement system, etc.

PG / PHAR / T/ 111D Pharmaceutical Engineering I

Flow of fluids

Newtonian fluid flow: Revision of undergraduate curriculum; boundary layer concept and applications; Displacement thickness; Problems.

Nonnewtonian fluid flow: Classification; streamline and turbulent flows, modified Reynolds number; applications and problems
Motion of particles in a fluid: Drag force on spherical and nonspherical particles; Motion of particles in different fields; application and problems; Fluidization – theory and particle. Separation techniques

Filtration and Centrifugation: Theory; Different equipment’s and applications; Filter aids; Super centrifuge; Problems.

Gravitational separation: Total and frictional drags; sedimentation; Thickeners and clarifiers; Pharmaceutical applications.

Chromatographic separation: Different types; Theories and equipments; selective adsorption of biological macromolecules.

Membrane separation: Classification; different membranes and types of operation; Reverse osmosis; Electrodialysis; perevaporation; different applications. Separation of drugs by adsorptive bubble separation method.

Packaging of solids and liquids: Solid packaging; liquid packaging, fillers; marking and labeling, handling and storage.

Conveying of solids.

Paper- II

PG / PHAR / T/ 112A Pharmaceutical Chemistry I

Theory and application of modern analytical instruments. Kinetics in homogeneous system. Physicochemical factors regulating bioavailability, bioequivalence and ADMET parameters.

Drugs from their natural origin with therapeutic importance, their toxicity and regulation: Secondary metabolites with therapeutic importance; Safety, toxicity, pharmacokinetic pharmacodynamic issues; Regulatory perspectives on drug development from Natural sources.

Systemetic study of some newer synthetic drugs. Steriochemical studies and conformation analysis -- Cyclic and acyclic systems. Physicochemical incompatibilities. Combinatorial chemistry, HTS, and deconvolution analysis. Introduction to topological structure representation. Protein and peptide drugs.

PG / PHAR / T/ 112B Biochemistry I

Metabolic pathways lag cholesolrol synthesis, tryptoophan metabolism etc) and their relation to general drug development. Modern elementary concepts of protein and nucleic acid structures. Elementary cytochemistry of mamalian, bacterial and viral cells. Importance of cytochemistry drug development. Study of enzymes emphasizing their general properties, active sites, Kinetics of enzyme reaction, activation and inhibition of enzyme. Basis of metabolic antagonism. Medical enzymes, their production, uses and assay methods. Vitamins as cofactors, their preparation, assay methods and role as drugs.

PG / PHAR / T/ 112C Pharmacology I

Paper- III

PG / PHAR / T/ 113A Pharmacetics II

Principles and application of sustained / controlled drug delivery system, Development of various novel drug delivery system, Drug regulatory affairs.

PG / PHAR / T/ 113B Pharmacognosy II


PG / PHAR / T/ 113C Microbiology II


Studies of microbial agents of disease by bacteria, and fungi, clinical features, laboratory diagnosis and epidemiology of bacterial diseases. Antibiotics and chemotherapeutic agents. Drug parasite relationships and drug dependence. Host-parasite relationships, structure and formation of antigens and antibodies; Antigen antibody reaction. Immunofluorescence and electrophoresis, Complement system, etc.

PG / PHAR / T/ 113D Pharmaceutical Engineering II

Flow of fluids
Newtonian fluid flow: Revision of undergraduate curriculum; boundary layer concept and applications; Displacement thickness; Problems.
Nonnewtonian fluid flow: Classification; streamline and turbulent flows, modified Reynolds number; applications and problems
Motion of particles in a fluid: Drag force on spherical and nonspherical particles; Motion of particles in different fields; application and problems; Fluidization – theory and particle.
Separation techniques
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Membrane separation: Classification; different membranes and types of operation; Reverse osmosis; Electrodialysis; perevaporation; different applications. Separation of drugs by adsorptive bubble separation method. Packaging of solids and liquids: Solid packaging; liquid packaging, fillers; marking and labeling, handling and storage. Conveying of solids.

PG / PHAR / T/ 113E Pharmaceutical Chemistry II

Theory and application of modern analytical instruments. Kinetics in homogeneous system. Physicochemical factors regulating bioavailability, bioequivalence and ADMET parameters. Drugs from their natural origin with therapeutic importance, their toxicity and regulation: Secondary metabolites with therapeutic importance; Safety, toxicity, pharmacokinetic pharmacodynamic issues; Regulatory perspectives on drug development from Natural sources. Systemetic study of some newer synthetic drugs. Steriochemical studies and conformation analysis -- Cyclic and acyclic systems. Physicochemical incompatibilities. Combinatorial chemistry, HTS, and deconvolution analysis. Introduction to topological structure representation. Protein and peptide drugs.

PG / PHAR / T/ 113F Biochemistry II


PG / PHAR / T/ 113G Pharmacology II

Biostatistics: Mean, median, Mode, SD, coefficient of variation (CV), student t test, one way ANOVA, Chi-square test, probability, frequency distribution, regression analysis, bioavailability, cross-over design, Wilcoxon signed rank test, introduction to control charts. Pharmacokinetics and Pharmacodynamics. Drugs and poison information, pharmacy administration. Drug allergies- drug dependence- drug tolerance- drug interaction

Category – Inter - Disciplinary Basket

Paper - IV

PG / PHAR / T/ 114A Pharmaceutical Pre formulation Product Development

Pre-formulation studies for candidate drug selection, Biopharmaceutical studies for drug selection, Pre-formulation for product design and development, Bio-pharmaceutics for product design and development, product optimization.
Paper - V

PG / PHAR / T/ 115A  Pharmaceutical Quality Assurance

Analytical method development and monitoring of drug release from formulation, instrumental methods and techniques involved in drug and formulation testing, in process quality assurance method, selection and testing of major raw material input, methods of drug sampling, statistical quality control of major categories of dosage forms. High throughput screening of drug development, evaluation and assessment of drugs with the modern techniques like HTS, HRS, Bioassay guided fractionation etc. Development of chromatographic techniques for drug development like HPLC, HPTLC, CPC, LC-MS etc.

Paper - VI

Subject to be offered by other departments.

Category – Sessional Courses

Sessional 1

PG / PHAR / S / 111  Laboratory

Sessional 2

PG / PHAR / S / 112  Seminar

Second Semester

Category - Departmental / Specialization Basket

Paper – VII

PG / PHAR / T/ 127A  Pharmaceutics A

Pharmaceutical Biotechnology - DNA Structure, Replication, Transcriptional (Gene Expression) and Translocation Processes, protein folding and design, protein design tests and their significances to create new molecules, DNA recombination and cloning, basics of Immuno-pharmacology and its relevance to drug and pharmaceutical research. Various drugs and vaccines (whole organism vaccines, recombinant vector vaccines, synthetic peptide vaccines, multivalent sub-unit vaccines and anti-idiotype vaccines) of biotechnological origin. Anti-sense therapy and technology. Gene as drug delivery system and gene therapy using polymeric carrier systems. 

Biotransformation: Induction, type of reaction involved, design of biotransformation process and their improvement. Technology and immobilization of enzymes and its significance in Drug Research.
PG / PHAR / T/ 127B  Pharmacognosy A

Screening and evaluation (including modern methods like molecular pharmacology)

Techniques of the following:
Parasympathomimetics, Parasympathomimetic blocking agents, Sympathomimetics, Sympathetic blocking agent, Ganglion stimulant and blocker, Neuromuscular stimulant and blocker, General and local anaesthetics, Sedative and hypnotic, Psychopharmacological agents, Analgesic and Anti-inflammatory agents, Drugs used in Alzheimers disease, Drug used in migraine, Anti parkinsons drugs, CNS stimulant, Cardiotonic, Anti hypertensive drugs, Antiarrythmic, Drugs used in ischemic heart disease, Drugs used in atherosclerosis, Diuretic, Drug used in GI disorders, Drugs used in respiratory disorders, Drugs used in diabetes, Hormones and endocrine disorders.

Concept of High throughput screening, cell lines and stem cell research.

PG / PHAR / T/ 127C  Microbiology A

Classification and taxonomy; structure and cytology, Nutritional requirements; Enzymes and metabolism by microorganisms Methods of cultivation of bacteria fungi and viruses.Isolation and identification of contaminants in spoiled pharmaceutical products.Fermentative products of carbohydrates and their uses for identification of some genera of true bacteria.

Methods of sterilization used in pharmaceutical products. Methods of sterility testing for pharmaceutical products. Industrial production of malts, Beverages, antibiotics, and other common products. Methods of preservation against microbial attacks. Different germicidal tests. Mode of action of chemotherapeutic agents in relation to their inhibition of cell wall, protein, cell membrane, RNA, DNA etc.

Studies of microbial agents of disease by bacteria, and fungi, clinical features, laboratory diagnosis and epidemiology of bacterial diseases. Anti biotics and chemotherapeutic agents.

Drug parasite relationships and drug dependence.

Host-parasite relationships, structure and formation of antigens and antibodies; Antigen antibody reaction. Immunofluorescence and electrophoresis, Complement system, etc.

PG / PHAR / T/ 127D  Pharmaceutical Engineering A

Flow of fluids
Newtonian fluid flow: Revision of undergraduate curriculum; boundary layer concept and applications; Displacement thickness; Problems.

Nonnewtonian fluid flow: Classification; streamline and turbulent flows, modified Reynolds number; applications and problems.

Motion of particles in a fluid: Drag force on spherical and non-spherical particles; Motion of particles in different fields; application and problems; Fluidization – theory and particle.

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Membrane separation: Classification; different membranes and types of operation; Reverse osmosis; Electrodialysis; perevaporation; different applications.

Separation of drugs by adsorptive bubble separation method.
Packaging of solids and liquids: Solid packaging; liquid packaging, fillers; marking and labeling, handling and storage.

Conveying of solids.

PG / PHAR / T/ 127E  Pharmaceutical Chemistry A


Insight to drug discovery from natural sources:
Ethnobotany, Ethnopharmacology and aspects of biodiversity for development of natural products; Screening and evaluation of natural products; Standardization and Quality Control of natural products in Global and Indian Perspectives.

PG / PHAR / T/ 127F  Biochemistry - A


PG / PHAR / T/ 127G  Pharmacology A


Paper – VIII

PG / PHAR / T/ 128A  Pharmaceutics B

Bio-pharmaceutics, bioequivalence studies, pharmacokinetics.

PG / PHAR / T/ 128B  Pharmacognosy B

Concept of biogenesis and application of radio chemical techniques in the study of the biogenesis of the secondary metabolites. Study of biogenetic pathway for certain important phytochemicals. General consideration of the principles and application of

PG / PHAR / T/ 128C Microbiology B


PG / PHAR / T/ 128D Pharmaceutical Engineering B

Unit process: Introduction to basic pharmaceutical and fine chemical industries in India; Unit processes like acylation, alkylation, amination, esterification, halogenation, hydrolysis, nitration, oxidation and reduction, sulfonation and sulfation, polymerization etc; manufacturing aspects or important pharmaceuticals. Hazards in process units and safety practices. Corrosion and materials of construction: Different types of corrosion; prevention of corrosion; Materials for pharmaceutical plant construction, machineries and accessories. Basic Instrumentation in pharmaceutical Industries: Instrumentation for measuring pressure, temperature, humidity, density, flow rate etc; control devices; Transducers. Instrumentation and techniques in tablet & capsule manufacturing. Effect of pollution in Pharmaceutical Industries: Air and water pollution; pollution monitoring and controlling equipments; wastewater treatments plant (E T P); waste management. Pilot plant and scale up Techniques: Similarity concept, Rezime concept, concept of model and pilot plant, scale equations, problems.

PG / PHAR / T/ 128E Pharmaceutical Chemistry B

PG / PHAR / T/ 128F  Biochemistry B

Intensive study of a few metabolic pathways (e.g. Tricarboxylic acid cycle), at the enzymatic level oxidative phosphorylation and other energy conserving mechanisms. Drugs laying their sites of action at these points. Biochemistry and mode of action on steroid hormones; their use as drugs. Biochemistry and mode of action of hormones which are proteins or peptides in nature; their preparation, assay methods and role as drugs. 

Radio –isotopes: Their importance in biochemistry and medicine. Synthesis of radioactive compounds of medicinal importance.

PG / PHAR / T/ 128G  Pharmacology B

Introduction to diseases- path physiology, symptoms and general principles of treatment of the following:
CVS, CNS, Respiratory system, GI system, Endocrine system, Excretory system, Skin, Degenerative disorders.

Paper – IX

PG / PHAR / T/ 129A  Pharmaceutics C

Novel drug delivery systems like microparticles, nanoparticals, liposome, noisome resealed erythrocytes, transdermal drug delivery, colon specific drug delivery, pro-drugs.

PG / PHAR / T/ 129B  Pharmacognosy C


PG / PHAR / T/ 129C  Microbiology C

The subject content will be the recent trends and latest developments in the field of Microbiology.

PG / PHAR / T/ 129D  Pharmaceutical Engineering C

The subject content will be the recent trends and latest developments in the field of Pharmaceutical Engineering.

PG / PHAR / T/ 129E  Pharmaceutical Chemistry C

The subject content will be the recent trends and latest developments in the field of Pharmaceutical Chemistry.

PG / PHAR / T/ 129F  Biochemistry C
The subject content will be the recent trends and latest developments in the field of Biochemistry.

PG / PHAR / T/ 129G Pharmacology C

The subject content will be the recent trends and latest developments in the field of Pharmacology.

Category – Sessional Courses

Sessional 1
PG / PHAR / S / 121 Term Paper Leading to Thesis

Sessional 2
PG / PHAR / S / 122 Seminar

Third and Fourth Semester

Sessional 1
PG / PHAR / TH / 21 Thesis Work

Sessional 2
PG / PHAR / VV/ 22 Viva – Voce