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B.Pharm Syllabus

Semester IV

Course Code	Name of the course	No. of hours per week (L/P)	Credit points
BP401T	Herbal Drug Technology (Theory)	3	3
BP402T	Medicinal Chemistry (Theory)	3	3
BP403T	Pharmaceutical Biotechnology (Theory)	3	3
BP404T	Social Pharmacy and Public Health (Theory)	2	2
BP405T	Systemic Pharmacology I (Theory)	3	3
BP406P	Herbal Drug Technology (Practical)	3	1
BP407P	Medicinal Chemistry (Practical)	3	1
BP408P	Pharmaceutical Biotechnology (Practical)	3	1
BP409P	Social Pharmacy and Public Health (Practical)	2	1
BP410P	Systemic Pharmacology I (Practical)	3	1
BP411I	Internship (Mandatory)	8	4
Total		28	23

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Course Code	Course Title			Course Type
BP401T	Herbal Drug Technology (Theory)			Core
Credit	Hours Per Week (L-T-P)			Max. Hours
	L	T	P	
3	3	--	--	45
Maximum Marks	SE			ESE
75	30			45

COURSE OBJECTIVES:

The objectives of this course are to:

1. Understand and apply plant tissue culture techniques and related approaches for biomass and secondary metabolite production.
2. Introduce biomanufacturing concepts in herbal drug technology, including plant-based production systems and edible vaccines.
3. Develop skills in the preparation and optimization of standardized herbal extracts using metabolite analysis and TLC fingerprinting.
4. Study the formulation of herbal products using standardized extracts in conventional and novel dosage forms.
5. Understand quality control, standardization, regulatory guidelines, and interaction studies for safe herbal drug development.

COURSE OUTCOMES (CO):

CO No.	Upon successful completion of this course, the students will be able to:
1	Demonstrate tissue culture applications for herbal drug production and edible vaccines.
2	Summarize the concept of standardized extracts and incorporate them in herbal formulations and cosmetics.
3	Apply analytical methods for quality control of herbal preparations.
4	Analyze herb–drug/food interactions and their clinical significance.
5	Interpret national regulatory provisions and global standards related to herbal drug development.

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B.Pharm Syllabus

Detailed Syllabus:

Unit No.	Topics	No. of Lectures
I	Plant Tissue Culture and Standardized Extracts: Plant tissue culture as an alternative source of medicine: • Historical development • Types of cultures • Nutritional requirements • Growth and maintenance of callus and suspension culture • Role of elicitation, genetic transformation, biotransformation, precursor feeding, and somaclonal variation in biomass and secondary metabolite production Introduction to biomanufacturing: • Medicinal plant-based biomanufacturing • Utilising plant factories in obtaining valuable ingredients for food, pharmaceutical, and cosmetic industries • Examples: Shikonin and Paclitaxel • Oral vaccines in healthcare Optimization and production of standardized extracts of medicinal plants: Strategies for preparation of desired quality extracts by optimizing and adjusting bioactives ensuring quality using analysis of metabolites and TLC fingerprints of the following: • Aqueous and hydro-alcoholic extracts of Ashwagandha, Shatavari, Licorice, Neem, and Haritaki • Flavonoid-rich fraction of Sweet lime peel • Terpenoid-rich fraction of Bacopa • Phenol-rich fraction of Green Tea • Steroid-rich fraction of Tribulus • Alkaloid-rich fraction of Vasaka	10 Hours
II	Herbal Formulations, Excipients and Cosmetics: Herbal formulations: • Conventional herbal formulations: syrups, mixtures, powders, capsules, tablets, creams, ointments • Novel dosage forms: phytosomes (phytochemicals), liposomes, nanoformulations • Composition, preparation, and characterization using standardized extracts and bioactives Herbal cosmetics: • Sources and description of raw materials of herbal origin as active agents in skincare, hair care, and oral hygiene products • Applications in skincare, hair care, and oral hygiene products such as: ◦ Sunscreen-lotion/gel ◦ Hair oil, shampoo, herbal dye ◦ Herbal mouthwash, chewing gums, candies, gargles • Face serums and herbal face packs Excipients of Natural origin • Colorants, sweeteners, binders, diluents	10 Hours

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	• Viscosity builders, disintegrants • Flavors and perfumes • Protective agents, waxes, bleaching agents and antioxidants	
III	Quality Control and Standardisation of Herbal Medicines: • WHO, AYUSH, and EU guidelines on quality control, stability, and shelf life studies of herbal medicines • Approaches for standardisation and quality control of botanicals and formulations • Testing methods and regulatory considerations • Role of DNA fingerprint and molecular markers such as rbcL, matK, and SCAR in quality control • Forensic pharmacognosy: Role in identification of illicit herbal drugs (e.g., Cannabis, Opium)	7 Hours
IV	Herb–Drug / Food / Herb Interactions: • General introduction to interactions and role of ADME, Cytochrome P450, and P-gp • Herb–drug interactions: ◦ St. John's Wort with warfarin ◦ Ginkgo biloba with aspirin • Herb–food interactions: ◦ Licorice with salty foods ◦ Turmeric with fats ◦ Green tea with iron-rich foods • Herb–herb interactions: ◦ Ephedra with Ginseng ◦ Chamomile with Valerian • Adverse reactions related to plants and foods such as allergy, intolerance, and toxicity	10 Hours
V	Regulatory Requirements of Herbal Drugs and Botanicals: Regulatory framework in India for Herbal and ASU medicines: a) Role of regulatory bodies b) ASU DTAB (Ayurveda, Siddha, and Unani Drugs Technical Advisory Board) c) ASU DCC (Drugs Consultative Committee for ASU drugs) d) Schedule T – GMP requirements for ASU drugs e) Schedule E1 – Poisonous drugs listed under AYUSH f) Drugs and Cosmetics Act – Regulatory provisions relevant to herbal/ASU medicines, procedures for registration, trade, and export g) Concept of Phytopharmaceuticals and Ayush Aahara in bridging Indian traditional knowledge with modern science.	8 Hours
Recommended References (Preferably latest editions): 1. Waldesch, F. G. <i>Herbal Medicinal Products</i>. CRC Press. 2. <i>Indian Herbal Pharmacopoeia</i>. Indian Drug Manufacturers' Association. 3. World Health Organization. <i>Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants</i>. 4. <i>Drugs and Cosmetics Act and Rules (India)</i>. Government of India.		

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Course Code	Course Title			Course Type
BP402T	Medicinal Chemistry (Theory)			Core
Credit	Hours Per Week (L-T-P)			Max. Hours
	L	T	P	
3	3	--	--	45
Maximum Marks	SE			ESE
75	30			45

COURSE OBJECTIVES:

The objectives of this course are to:

1. Develop a comprehensive understanding of the fundamental principles of medicinal chemistry, including physicochemical properties, drug metabolism, and prodrug concepts.
2. Classify and describe the chemical structures, therapeutic uses, and structure–activity relationships of drugs acting on the autonomic and cardiovascular systems.
3. Apply the principles of structure–activity relationships (SAR) to explain and predict the pharmacological activity.
4. Understand the synthetic pathways of drugs, emphasizing important reaction steps and chemical transformations.
5. Analyze the relationship between drug structure and pharmacological activity in relation to therapeutic efficacy and safety.

COURSE OUTCOMES (CO):

CO No.	Upon successful completion of this course, the students will be able to:
1	Relate the physicochemical properties of drug molecules to their biological activity and pharmacokinetic behavior.
2	Categorize drugs affecting the autonomic nervous system and predict their therapeutic outcomes.
3	Analyze and interpret the structure-activity relationships of selected drug classes (e.g., beta-blockers, local anesthetics, thiazide diuretics, NSAIDs) to optimize drug design.
4	Outline the synthetic routes of selected drugs, identifying key intermediates and reactions involved in their preparation.
5	Correlate the chemical structure of drugs with their therapeutic uses and potential adverse effects. Apply the knowledge of medicinal chemistry principles to understand and potentially contribute to the drug discovery and development process.

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B.Pharm Syllabus

Detailed Syllabus:

Unit No.	Topics	No. of Lectures
	Study of the development of the following classes of drugs, Chemical Classification, Structure, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and Synthesis of selected drugs as superscripted (*)	
I	Fundamentals of Medicinal Chemistry • Introduction: History and scope of medicinal chemistry • Physicochemical properties in relation to biological action: Ionization, solubility, partition coefficient, hydrogen bonding, Chelation, Bioisosterism and protein binding • Drug metabolism: Phase I & II reactions	7 hours
II	Drugs Acting on the Autonomic Nervous System 1. Adrenergic or Sympathomimetic agents: Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine, Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol*, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline, Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine, Metaraminol. 2. Anti-adrenergic or Sympatholytic agents: Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Propranolol*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetalol, Carvedilol. SAR of beta adrenergic blockers. 3. Cholinergic or Parasympathomimetic agents: Acetylcholine, Carbachol*, Bethanechol, Methacholine, Pilocarpine, Physostigmine, Neostigmine, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride, Ambenonium chloride, Isofluorophate, Echothiophate iodide, Parathione, Malathion. Pralidoxime chloride. 4. Anti-Cholinergic or Parasympatholytic agents: Atropine, Hyoscyamine, Scopolamine, Homatropine, Ipratropium*, Tropicamide, Cyclopentolate, Clidinium Glycopyrrolate, Dicyclomine*, Methantheline, Propantheline, Benztropine mesylate, Orphenadrine, Biperidine, Procyclidine, Tridihexethyl, Isopropamide, Ethopropazine, SAR of cholinergic blockers. 5. Local anesthetic agents: Cocaine, Hexylcaine, Meprylcaine, Cyclomethycaine, Piperocaine. Benzocaine, Butamben, Procaine*, Butacaine, Propoxycaine, Tetracaine, Benoxinate, Lignocaine, Mepivacaine, Prilocaine, Etidocaine, Phenacaine, Dipreron, Dibucaine.* SAR of Local anesthetics.	15 hours
III	Drugs Acting on the Cardiovascular System 1. Anti-anginals: Amyl nitrite, Nitroglycerin, Pentaerythritol, Isosorbide dinitrite*, Dipyridamole, Verapamil, Bepridil	09 hours

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	hydrochloride, Diltiazem, Nifedipine, Amlodipine, Felodipine, Nicardipine, Nimodipine. 2. Anti-hypertensives: Timolol, Captopril, Lisinopril, Enalapril, Benazepril, Quinapril, Methyldopate,* Clonidine, Guanethidine, Guanabenz, Sodium nitroprusside, Diazoxide, Minoxidil, Reserpine, Hydralazine. 3. Drugs to treat Congestive Heart Failure (CHF): Digoxin, Digitoxin, Nesiritide, Bosentan, Tezosentan. 4. Anti-arrhythmics (Class I–IV): Quinidine sulphate, Procainamide, Disopyramide*, Phenytoin, Lidocaine, Tocainide, Mexiletine, Lorcanide, Amiodarone, Sotalol.	
IV	Drugs acting on blood and Renal System 1. Antihyperlipidemic Agents: Fenofibrate*, Lovastatin, Cholesteramine and Cholestipol 2. Coagulants and Anti-Coagulants: Menadione, Acetomenadione, Warfarin, Anisindione, clopidogrel. 3. Diuretics: Acetazolamide*, Methazolamide, Dichlorphenamide, Chlorthiazide, Hydrochlorothiazide, Hydroflumethiazide, Cyclothiazide, Furosemide*, Bumetanide, Ethacrynic acid, Spironolactone, Triamterene, Amiloride. Mannitol. SAR of Thiazides.	06 hours
V	Autacoids and related drugs 1. Antihistamines a. H₁-antagonists: Diphenhydramine hydrochloride*, Dimenhydrinate, Doxylamines, Clemastine, Diphenylpyraline, Tripelenamine, Chlorcyclizine, Meclizine, Buclizine, Chlorpheniramine, Triprolidine, Phenindamine, Promethazine*, Trimeprazine, Cyproheptadine, Azatidine, Astemizole, Loratadine, Cetirizine, Levocetirizine Cromolyn. b. H₂-antagonists: Cimetidine*, Famotidine, Ranitidine. 2. Gastric Proton pump inhibitors: Omeprazole, Lansoprazole, Rabeprazole, Pantoprazole Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), Antipyretics: Sodium salicylate, Aspirin, Diflunisal, Mefenamic acid*, Niflumic acid, Meclofenamate, Indomethacin, Sulindac, Tolmetin, Zomepirac, Diclofenac, Ketorolac, Ibuprofen*, Naproxen, Piroxicam, Phenacetin, Acetaminophen, Antipyrine, Phenylbutazone, Celecoxib, Etoricoxib, SAR of representative agents by class.	08 hours
Recommended References (Preferably latest editions): 1. Lemke, T. L., Williams, D. A. and Roche, V. F. <i>Foye's Principles of Medicinal Chemistry</i>. Lippincott Williams & Wilkins. 2. Beale, J. M., Thomas, J. T. and Duckett, M. H. <i>Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry</i>. Lippincott Williams & Wilkins. 3. Abraham, D. J. and Griffin, J. L. <i>Burger's Medicinal Chemistry and Drug Discovery</i>. Wiley. 4. Patrick, G. L. <i>An Introduction to Medicinal Chemistry</i>. Oxford University Press. 5. Kar, A. <i>Medicinal Chemistry</i>. New Age International. 6. Li, J. J. and Welch, W. M. <i>Modern Drug Synthesis</i>. Wiley. 7. Lednicer, D. <i>The Organic Chemistry of Drug Synthesis</i>. Wiley. 8. Furniss, B. S., Hannaford, A. J., Smith, P. W. G. and Tatchell, A. R. <i>Vogel's Textbook of Practical Organic Chemistry</i>. Pearson Education.		

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9. Brunton, L., Hilal-Dandan, R. and Knollmann, B. *Goodman and Gilman's The Pharmacological Basis of Therapeutics*. McGraw-Hill Education.
10. Williams, D. A. Foye's Principles of Medicinal Chemistry. Lippincott Williams & Wilkins.

Course Code	Course Title			Course Type
BP403T	Pharmaceutical Biotechnology (Theory)			Core
Credit	Hours Per Week (L-T-P)			Max. Hours
	L	T	P	
3	3	--	--	45
Maximum Marks	SE			ESE
75	30			45

COURSE OBJECTIVES:

The objectives of this course are to:

1. Understand and apply plant tissue culture techniques and related approaches for biomass and secondary metabolite production.
2. Introduce biomanufacturing concepts in herbal drug technology, including plant-based production systems and edible vaccines.
3. Develop skills in the preparation and optimization of standardized herbal extracts using metabolite analysis and TLC fingerprinting.
4. Study the formulation of herbal products using standardized extracts in conventional and novel dosage forms.
5. Understand quality control, standardization, regulatory guidelines, and interaction studies for safe herbal drug development.

COURSE OUTCOMES (CO):

CO No.	Upon successful completion of this course, the students will be able to:
1	Explain the role of biotechnology in pharmaceutical sciences, including monoclonal antibodies and enzyme immobilization.
2	Apply genetic engineering and recombinant DNA technology for the production of biopharmaceuticals such as insulin, interferons, and vaccines.
3	Describe microbial biotransformation and analyze fermentation processes used in pharmaceutical industries.
4	Assess the role of bioinformatics and artificial intelligence in the Human Genome Project and personalized medicine.
5	Describe vaccine and sera development, including preparation, evaluation, standardization, and regulatory requirements, and critically evaluate challenges and emerging approaches in vaccine and sera development and commercialization

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Detailed Syllabus:

Unit No.	Topics	No. of Lectures
I	Introduction to Pharmaceutical Biotechnology Introduction to biotechnology in pharmaceutical sciences; protein therapeutics; analytical characterization of proteins; monoclonal antibodies; antigens; enzyme immobilization; cell culture and immobilization techniques; pharmaceutical applications.	9 Hours
II	Genetic Engineering and Recombinant DNA Technology Principles of genetic engineering; recombinant DNA technology; production of interferons, hepatitis-B vaccine, and insulin; polymerase chain reaction (PCR) and its applications; mutations and types of mutants.	9 Hours
III	Microbial Biotransformation and Fermentation Technology Microbial biotransformation; fermentation principles and process control; industrial production of alcohol, penicillins, citric acid, and vitamin B ₁₂ ; blood products—collection, processing, and storage.	9 Hours
IV	Gene Therapy, Genomics and Personalized Medicine Gene therapy—types and methodologies; delivery systems; ethical concerns and challenges; Human Genome Project; role of bioinformatics and artificial intelligence in personalized medicine.	9 Hours
V	Immunology, Vaccines and Sera Basics of immunology; types and generations of vaccines; immunization strategies; vaccine preparation, evaluation, and standardization; regulatory aspects; sera therapy; marketed products; challenges and newer approaches.	9 Hours
Recommended References (Preferably latest editions): 1. Crommelin, D. J. A., Sindelar, R. D. and Meibohm, B. <i>Pharmaceutical Biotechnology: Fundamentals and Applications</i>. Springer. 2. Walsh, G. <i>Biopharmaceuticals: Biochemistry and Biotechnology</i>. Wiley-Blackwell. 3. Brown, T. A. <i>Gene Cloning and DNA Analysis: An Introduction</i>. Wiley-Blackwell. 4. Glick, B. R., Pasternak, J. J. and Patten, C. L. <i>Molecular Biotechnology: Principles and Applications of Recombinant DNA</i>. ASM Press. 5. Doran, P. M. <i>Bioprocess Engineering Principles</i>. Academic Press. 6. Vogel, H. C. and Todaro, C. L. <i>Fermentation and Biochemical Engineering Handbook</i>. William Andrew. 7. Primrose, S. B., Twyman, R. M. and Old, R. W. <i>Principles of Gene Manipulation and Genomics</i>. Wiley-Blackwell. 8. Strachan, T. and Read, A. <i>Human Molecular Genetics</i>. Garland Science. 9. Plotkin, S. A., Orenstein, W. A., Offit, P. A. and Edwards, K. M. <i>Plotkin's Vaccines</i>. Elsevier. 10. Kindt, T. J., Goldsby, R. A., Osborne, B. A. and Kuby, J. <i>Kuby Immunology</i>. W. H. Freeman. 11. Janeway, C. A., Travers, P., Walport, M. and Shlomchik, M. <i>Janeway's Immunobiology</i>. Garland Science.		

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Semester-IV

Course Code	Course Title			Course Type
BP404T	Social Pharmacy and Public Health (Theory)			Core
Credit	Hours Per Week (L-T-P)			Max. Hours
	L	T	P	
2	2	--	--	30
Maximum Marks	SE			ESE
50	20			30

COURSE OBJECTIVES:

The objectives of this course are to:

1. Understand the concepts of social pharmacy, public health, and their interrelation.
2. Identify the social determinants of health and their impact on health outcomes and medication use.
3. Recognize the role of pharmacists in public health initiatives, health promotion, and disease prevention.
4. To gain knowledge about the Indian healthcare system, national health policies, and important health programs.
5. To understand basic epidemiological principles and their application in public health.

COURSE OUTCOMES (CO):

CO No.	Upon successful completion of this course, the students will be able to
1	Describe the scope of social pharmacy and the pharmacist's role in the public health system.
2	Explain the influence of socio-cultural and behavioral factors on health, illness, and medication adherence.
3	Discuss various national health programs and the pharmacist's contribution to their success.
4	Apply basic principles of epidemiology to understand disease distribution and control.
5	Develop health education materials and counsel patients on preventive healthcare measures and rational drug use.

Detailed Syllabus:

Unit No.	Topics	No. of Lectures
I	Introduction to Social Pharmacy and Public Health a) Social Pharmacy: Definition, scope, historical development, and importance. Social pharmacy as a multidisciplinary field. b) Public Health: Definition, concepts, history, core functions, and ethical	6 Hours

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	considerations. c) Interplay between Social Pharmacy and Public Health: The evolving role of the pharmacist in the public health arena. d) Concept of Health and Disease: WHO definition of health; dimensions of health – physical, mental, social, spiritual, and environmental. e) Determinants of Health: Social, economic, environmental, lifestyle, and healthcare service determinants and their impact on population health. f) Health Indicators: Indicators used to measure health status and health outcomes in a population.	
II	Health Systems, Policy, and Pharmacoepidemiology a) Healthcare Delivery Systems: Overview of global healthcare systems. b) Indian Healthcare System: Structure, public and private sectors, primary, secondary, and tertiary levels of care. c) Health Policy: Introduction to health policy formulation and analysis; objectives of India's National Health Policy. d) National Health Mission (NHM): NRHM and NUHM – goals, strategies, and impact on public health indicators. e) Pharmacoepidemiology: Definition, aims, scope, and applications. f) Measures of Disease Frequency and Distribution: Incidence, prevalence, endemic, epidemic, pandemic; morbidity and mortality rates, Odds ratio and relative risk. g) Introduction to Biostatistics: Role in public health; types of data; basic data presentation methods.	6 Hours
III	Preventive Healthcare, Health Promotion, and Communicable Diseases a) Levels of Prevention: Primordial, primary, secondary, and tertiary prevention with examples. b) Role of Pharmacists in Disease Prevention and Health Promotion: Immunization services, screening programs, lifestyle counselling. c) Health Education: Definition, principles, methods, and importance; development of effective health education materials. d) Mother and Child Health (MCH): Antenatal care, postnatal care, breastfeeding, immunization schedules. e) Communicable Diseases: Modes of transmission, prevention, and control of tuberculosis, HIV/AIDS, malaria, dengue, typhoid, influenza; pharmacist's role.	6 Hours
IV	Non-Communicable Diseases, Nutrition, Mental Health, and National Programs a) Non-Communicable Diseases (NCDs): Diabetes, hypertension, cardiovascular diseases, chronic respiratory diseases, cancer; prevention and management. b) Nutrition and Health: Balanced diet, macro- and micronutrients, malnutrition, nutritional deficiency disorders, food safety, and adulteration. c) Mental Health: Common mental disorders, stigma, promotion of mental well-being; pharmacist's role. d) National Health Programs in India: Programs related to MCH, NCDs, communicable diseases, tobacco control, and deafness prevention.	6 Hours

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V	Pharmacoeconomics, Rational Use of Medicines, Professional Roles, and Future Trends a) Pharmacoeconomics: Introduction, significance; Cost-Benefit Analysis (CBA), Cost-Effectiveness Analysis (CEA), Cost-Utility Analysis (CUA). b) Rational Use of Medicines (RUM): Definition, importance, problems of irrational drug use; pharmacist's role. c) Medication Adherence: Factors affecting adherence, consequences of non-adherence, improvement strategies. d) Drug Misuse and Abuse: Alcohol, tobacco, opioids, prescription drug abuse; pharmacist's role. e) Professionalism and Ethics in Social Pharmacy: Ethical dilemmas in public health pharmacy. f) Disaster Management: Role of pharmacists. g) Emerging Trends: Telepharmacy, digital health, personalized medicine, expanding public health responsibilities of pharmacists.	6 Hours
Recommended References (Preferably latest editions) 1. Anderson, S., Dedrick, R. and Tiffany, B. <i>Community Pharmacy Practice for Public Health</i>. McGraw-Hill Education. 2. Desselle, S. <i>Public Health and Pharmacy Practice</i>. McGraw-Hill Education. 3. Donyai, P. <i>Social and Cognitive Pharmacy: Theory and Case Studies</i>. Pharmaceutical Press. 4. Gillam, S., Yates, J. and Badrinath, P. <i>Essential Public Health: Theory and Practice</i>. Cambridge University Press. 5. Levin, B. L. and Hanson, A. <i>Essentials of Public Health Pharmacy</i>. Jones & Bartlett Learning. 6. Park, K. <i>Park's Textbook of Preventive and Social Medicine</i>. Banarsidas Bhanot Publishers. 7. Schneider, M. J. <i>Introduction to Public Health</i>. Jones & Bartlett Learning. 8. Taylor, K. and Harding, G. <i>Pharmacy Practice</i>. CRC Press. 9. Wertheimer, A., Ibrahim, M. I. M. and Babar, Z. U. D. <i>Social and Administrative Aspects of Pharmacy in Low- and Middle-Income Countries</i>. Elsevier.		

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Course Code	Course Title			Course Type
BP405T	Systemic Pharmacology I (Theory)			Core
Credit	Hours Per Week (L-T-P)			Max. Hours
	L	T	P	
3	3	--	--	45
Maximum Marks	SE			ESE
75	30			45

COURSE OBJECTIVES:

The objectives of this course are to:

1. Develop a comprehensive understanding of neurohumoral transmission, neurotransmitters, and the organization and function of the autonomic nervous system.
2. Provide knowledge of the classification, mechanisms of action, and pharmacological effects of various classes of drugs.
3. Explain the pharmacology of drugs acting on the peripheral nervous system, cardiovascular system, and urinary system.
4. Describe the physiological roles of autacoids and the pharmacology of drugs used in the management of pulmonary diseases and related disorders.
5. Familiarize students with the pharmacology of drugs acting on the immune system, hematopoietic system, and blood, and relate pharmacological principles to clinical conditions through case-based learning.

COURSE OUTCOMES (CO):

CO No.	Upon successful completion of this course, the students will be able to
1	Explain the classification of neurotransmitters and describe neurohumoral transmission, including the organization, function, and pharmacological modulation of the autonomic nervous system.
2	Classify and explain the mechanisms of action, pharmacological effects, and therapeutic uses of drugs used in cardiovascular disorders such as heart failure, arrhythmias, hypertension, angina, and lipid disorders.
3	Describe the pharmacology and therapeutic uses of drugs acting on blood and kidney, including anticoagulants, antiplatelet agents, hematinics, and diuretics.
4	Explain the physiological roles of autacoids and analyze the pharmacology of drugs that modulate autacoid pathways, including antihistamines, antimigraine agents, NSAIDs, and antirheumatic drugs.
5	Evaluate the mechanisms of action, therapeutic uses, and adverse effects of drugs acting on the respiratory and immune systems.

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Detailed Syllabus:

Unit No.	Topics	No. of Lectures
I	Pharmacology of drugs acting on the peripheral nervous system a) Organization and functions of PNS. b) Neurohumoral transmission, co-transmission. Neurotransmitters and their receptors, including non-adrenergic and non-cholinergic (NANC) neurotransmitters. c) Parasympathomimetic and Parasympatholytic drugs. d) Sympathomimetic and sympatholytic drugs. e) Skeletal muscle relaxants (peripheral and central). f) Drugs used in the treatment of myasthenia gravis and glaucoma	10 Hours
II	Pharmacology of drugs acting on the cardiovascular system a) Introduction to cardiovascular hemodynamic and cardiac electrophysiology. b) Drugs used in congestive cardiac failure. c) Anti-arrhythmic drugs. d) Anti-anginal and newer anti-ischemic drugs. e) Anti-hypertensive drugs. f) Shock, types of shocks and drugs used in their management. g) Stroke, types of strokes and drugs used in their management	10 Hours
III	Pharmacology of drugs acting on blood and kidney 1. Pharmacology of drugs acting on blood a) Anti-platelet agents b) Coagulants and anticoagulants. c) Fibrinolytics and Plasma expanders. d) Haematinics. e) Anti-hyperlipidaemic drugs. 2. Pharmacology of drugs acting on kidney a) Diuretics. b) Anti-diuretics.	10 Hours
IV	Pharmacology of autacoids and related drugs a) Introduction to autacoids and their classification. Therapeutic significance of important agonists and antagonists of prostaglandins, thromboxane, leukotrienes, angiotensin, bradykinin and substance P. b) Histamine and antihistamines. c) 5-HT, its agonists and antagonists, drugs used in migraine. d) Non-steroidal anti-inflammatory drugs, antipyretics and analgesics. e) Anti-gout and Antirheumatic drugs including Disease Modifying Antirheumatic Drugs (DMARDs).	9 Hours
V	i) Pharmacology of Drugs acting on respiratory system a) Drugs used in the treatment of bronchial asthma and COPD. b) Definitions, classification and therapeutic uses of nasal decongestants,	6 Hours

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mucolytics, expectorants and antitussives. c) Respiratory stimulants. ii) Pharmacology of Drugs acting on immune system Mechanism of action, adverse effects and therapeutic uses of important classes of immune stimulants and immunosuppressants.	
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