VETERINARY PHARMACOLOGY AND TOXICOLOGY

<u>Course Structure – at a Glance</u>

CODE	COURSE TITLE	CREDITS
VPT 601	GENERAL PHARMACOLOGY	2+0
VPT 602	AUTONOMIC AND AUTACOID PHARMACOLOGY	2+1
VPT 603	CNS PHARMACOLOGY	2+1
VPT 604	DIGESTIVE AND RESPIRATORY PHARMACOLOGY	2+0
VPT 605	CARDIOVASCULAR AND RENAL PHARMACOLOGY	2+0
VPT 606	ENDOCRINE AND REPRODUCTIVE PHARMACOLOGY	2+0
VPT 607	CHEMOTHERAPY	2+1
VPT 608	TOXICOLOGY OF XENOBIOTICS	2+1
VPT 609	TOXICOLOGY OF PLANTS AND TOXINS	2+0
VPT 610	PHARMACOLOGICAL TECHNIQUES	1+1
VPT 611	TECHNIQUES IN TOXICOLOGY	1+1
VPT 612	ETHNOPHARMACOLOGY	2+0
VPT 691	MASTER'S SEMINAR	1+0
VPT 699	MASTER'S RESEARCH	20
VPT 701	ADVANCES IN NEUROPHARMACOLOGY	2+0
VPT 702	AUTACOID PHARMACOLOGY	1+0
VPT 703	PHARMACOLOGY OF HERBAL DRUGS	2+1
VPT 704	DRUG METABOLISM	2+0
VPT 705	MOLECULAR PHARMACOLOGY	2+0
VPT 706	PHARMACOKINETICS	2+1
VPT 707	PHARMACOGENOMICS	2+0
VPT 708	IMMUNOPHARMACOLOGY	1+0
VPT 709	MOLECULAR TOXICOLOGY	2+0
VPT 710	CLINICAL PHARMACOLOGY	1+1
VPT 711	CLINICAL TOXICOLOGY	2+1
VPT 712	ECOTOXICOLOGY	2+0
VPT 713	REGULATORY TOXICOLOGY	2+1
VPT 790	SPECIAL PROBLEM	0+2
VPT 791	DOCTORAL SEMINAR I	1+0
VPT 792	DOCTORAL SEMINAR II	1+0
VPT 799	DOCTORAL RESEARCH	45

VETERINARY PHARMACOLOGY AND TOXICOLOGY

Course Contents

VPT 601

GENERAL PHARMACOLOGY

2+0

Objective

To study the scope of pharmacology and to understand the basic mechanisms of drug actions and its effects.

Theory

<u>UNIT I</u>

History and scope of pharmacology, Principles of drug absorption, distribution, metabolism and elimination. Drug bioavailability and routes of administration.

<u>UNIT II</u>

Important pharmacokinetic parameters and their clinical significance.

<u>UNIT III</u>

Pharmacodynamics: mechanism of action and the relationship between drug concentration and effect; signal transduction mechanism and drug receptors for physiological regulatory molecules.

UNIT IV

Quantitation of drug-receptor interactions and elicited effects. Competitive and non-competitive antagonism. Factors affecting drug response. Adverse drug reactions.

Suggested Readings

- Brunton LL. (Ed). 2005. Goodman and Gilman's The Pharmacological Basis of Therapeutics.11th Ed. McGraw-Hill.
- Richard AH. (Ed). 2001. Veterinary Pharmacology and Therapeutics. 8th Ed. Iowa State Univ. Press.
- Sandhu HS & Rampal S. 2006. *Essentials of Veterinary Pharmacology and Therapeutics*. 1st Ed. Kalyani Publishers.

VPT 602 AUTONOMIC AND AUTACOID PHARMACOLOGY 2+1

Objective

To study the pharmacodynamics of autonomic drugs.

Theory

<u>UNIT I</u>

Anatomical and physiological considerations of autonomic nervous system (ANS).

<u>UNIT II</u>

Neurohumoral transmission in ANS.

<u>UNIT III</u>

Pharmacology of cholinergic agonists and antagonists.

<u>UNIT IV</u>

Pharmacology of adrenergic agonists and antagonists.

<u>UNIT V</u>

Ganglionic stimulants and blockers.

<u>UNIT VI</u>

Autacoids: Histamine, serotonin, kinins, eicosanoids and platelet activating factor.

Practical

Pharmacological experiments on intact and isolated preparations for studying the effects of various prototype drugs on vascular, intestinal, respiratory, urinary and reproductive smooth muscles, autonomic ganglia, skeletal muscles; blood pressure, ECG, heart etc.

Suggested Readings

- Brunton LL. (Ed). 2005. Goodman and Gilman's The Pharmacological Basis of Therapeutics.11th Ed. McGraw-Hill.
- Richard AH. (Ed). 2001. *Veterinary Pharmacology and Therapeutics*. 8th Ed. Iowa State Univ. Press.
- Sandhu HS & Rampal S. 2006. *Essentials of Veterinary Pharmacology and Therapeutics*. 1st Ed. Kalyani Publishers.

VPT 603 CNS PHARMACOLOGY 2+1

Objective

To study the pharmacodynamics of drugs acting on CNS.

Theory

<u>UNIT I</u>

Anatomical and physiological considerations of central nervous system (CNS); neurohumoral transmission in CNS.

<u>UNIT II</u>

Historical development, theories, principles and stages of general anaesthesia.

<u>UNIT III</u>

Pharmacology of anaesthetics, sedatives, hypnotics, neuroleptics, antiepileptics.

UNIT IV

CNS stimulants, analeptics, opioid agonists and antagonists; non-steroidal anti-inflammatory agents, central and peripheral muscle relaxants, local anaesthetics, therapeutic gases. euthanizing agents. Doping.

Practical

Study of pharmacodynamics of prototype drugs of each group in experimental animals.

Suggested Readings

Brunton LL. (Ed). 2005. Goodman and Gilman's The Pharmacological Basis of Therapeutics.11th Ed. McGraw-Hill.

- Richard AH. (Ed). 2001. Veterinary Pharmacology and Therapeutics. 8th Ed. Iowa State Univ. Press.
- Sandhu HS & Rampal S. 2006. *Essentials of Veterinary Pharmacology and Therapeutics*. 1st Ed. Kalyani Publishers.

VPT 604

DIGESTIVE AND RESPIRATORY PHARMACOLOGY 2+0

Objective

To study the pharmacological aspects of drugs acting on digestive and respiratory systems.

Theory

<u>UNIT I</u>

Pharmacology of drugs acting on gastrointestinal tract. Appetite stimulants, emetics and anti-emetics.

UNIT II

Anti-ulcer drugs, modulators of gastric and intestinal motility and secretions.

UNIT III

Gastrointestinal protectants and adsorbents, laxatives and cathartics.

UNIT IV

Agents promoting digestive functions; bile acids and pancreatic enzymes, drugs affecting liver; rumen pharmacology.

UNIT V

Pharmacology of drugs acting on respiratory system: pathogenesis of inflammatory respiratory diseases.

UNIT VI

Bronchodilators, antitussives, mucolytics, expectorants, decongestants. UNIT VII

Drugs used in treatment of asthma.

Suggested Readings

Brunton LL. (Ed). 2005. Goodman and Gilman's The Pharmacological *Basis of Therapeutics*.11th Ed. McGraw-Hill.

- Richard AH. (Ed). 2001. Veterinary Pharmacology and Therapeutics. 8th Ed. Iowa State Univ. Press.
- Sandhu HS and Rampal S. 2006. Essentials of Veterinary Pharmacology and Therapeutics. 1st Ed. Kalyani Publishers.

CARDIOVASCULAR AND RENAL PHARMACOLOGY **VPT 605** 2+0**Objective**

To study the pharmacological aspects of drugs acting on CVS and kidneys.

Theory UNIT I

Pharmacology of cardiac glycosides.

UNIT II

Antiarrhythmic, antihypertensive and antihyperlipidaemic drugs.

UNIT III

Drugs affecting vasomotor and cardiorespiratory reflex mechanisms and haemopoietic system.

UNIT IV

Coagulants and anticoagulants, thrombolytic agents.

UNIT V

Pharmacology of drugs affecting renal functions and fluid-electrolyte balance.

UNIT VI

Fluid and electrolyte therapy, diuretics, antidiuretics, uricosuric drugs.

Suggested Readingss

- Brunton LL. (Ed). 2005. Goodman and Gilman's The Pharmacological *Basis of Therapeutics*.11th Ed. McGraw-Hill.
- Richard AH. (Ed). 2001. Veterinary Pharmacology and Therapeutics. 8th Ed. Iowa State Univ. Press.
- Sandhu HS & Rampal S. 2006. Essentials of Veterinary Pharmacology and *Therapeutics*. 1st Ed. Kalyani Publishers.

VPT 606

ENDOCRINE AND REPRODUCTIVE PHARMACOLOGY 2+0

Objective

To study the pharmacology of drugs affecting endocrine functions.

Theory

<u>UNIT I</u>

Pharmacology of drugs affecting endocrine functions of pituitary, thyroid, adrenals and pancreas.

<u>UNIT II</u>

Hormonal regulation of calcium and phosphorus homeostasis.

<u>UNIT III</u>

Pharmacology of drugs affecting male reproductive organs, spermatogenesis.

<u>UNIT IV</u>

Pharmacology of drugs affecting female reproductive organs, ovulation, oestrus, conception, gestation and lactation.

<u>UNIT V</u>

Oxytocic and tocolytic drugs.

Suggested Readings

Brunton LL. (Ed). 2005. Goodman and Gilman's The Pharmacological Basis of Therapeutics.11th Ed. McGraw-Hill.

Richard AH. (Ed). 2001. Veterinary Pharmacology and Therapeutics. 8th Ed. Iowa State Univ. Press.

Sandhu HS & Rampal S. 2006. *Essentials of Veterinary Pharmacology and Therapeutics*. 1st Ed. Kalyani Publishers.

2+1

VPT 607

CHEMOTHERAPY

Objective

To study the recent advances of chemotherapeutic agents with relevance to pharmacological and therapeutic aspects.

Theory

<u>UNIT I</u>

General consideration and principles of chemotherapy, classification of chemotherapeutic agents; development of microbial resistance to antimicrobials, combination therapy.

<u>UNIT II</u>

Systemic and gut acting sulfonamides, diaminopyrimidines, quinolones sulfones, nitrofurans.

<u>UNIT III</u>

Penicillins, cephalosporins, beta-lactam antibiotics.

<u>UNIT IV</u>

Chloramphenicol, tetracyclines, macrolides, polymixins, polypeptides.

<u>UNIT V</u>

Aminoglycosides and other antibiotics.

<u>UNIT VI</u>

Anti-protozoans, anthelmintics, ectoparasiticides.

<u>UNIT VII</u>

Antituberculosis, antifungal, antiviral and antineoplastic drugs.

Practical

General methods for assay of chemotherapeutic agents, antibiotic sensitivity tests, estimation of sulfonamides, penicillins, oxytetracyclines,

trimethoprim and nitrofurans in biological fluids to study their kinetics and bioavailability.

Suggested Readings

- Brunton LL. (Ed). 2005. Goodman and Gilman's The Pharmacological Basis of Therapeutics.11th Ed. McGraw-Hill.
- Richard AH. (Ed). 2001. *Veterinary Pharmacology and Therapeutics*. 8th Ed. Iowa State Univ. Press.
- Sandhu HS & Rampal S. 2006. *Essentials of Veterinary Pharmacology and Therapeutics*. 1st Ed. Kalyani Publishers.

VPT 608

TOXICOLOGY OF XENOBIOTICS

2+1

Objective

To study the poisonings and their antidotal therapy in animals.

Theory

<u>UNIT I</u>

Principles and scope of toxicology, sources of poisoning.

<u>UNIT II</u>

General modes of action of poisons, detoxification, factors affecting toxicity, general principles of diagnosis and treatment of poisonings.

<u>UNIT III</u>

Toxicology of metals, agrochemicals, solvents and vapors, feed additives. UNIT IV

Toxic effects of radiations and radioactive chemicals, genetic and developmental toxicology; forensic and regulatory aspects of toxicology.

Practical

Extraction, separation and detection of common poisons in toxicological specimens, study of toxicity and antidotal treatment in animals, designing of animal toxicity experiments and general toxicity tests.

Suggested Readings

Klassen CD, Amdure MO & Doull J. (Eds). 1996. *Casarett & Doull's Toxicology: The Basic Sciences of Poisons*. 5th Ed. McGraw Hill.

Sandhu HS & Brar RS. 2000. *Text Book of Veterinary Toxicology*. 1st Ed. Kalyani Publishers.

Stive KE & Brown TM. 2006. Principles of Toxicology. 2nd Ed. CRC Press.

VPT 609

TOXICOLOGY OF PLANTS AND TOXINS 2+0

Objective

To impart knowledge of toxicity of poisonous plants & natural toxins.

Theory

<u>UNIT I</u>

Classification, identification and chemical constituents of poisonous plants. Plants containing cyanide, nitrate/nitrite, oxalate, lectins and cardiotoxic glycosides.

<u>UNIT II</u>

Plants producing lathyrism, thiamine deficiency and photosensitization. UNIT III

Toxicology of mycotoxins: aflatoxins, rubratoxins, ochratoxins, trichothecenes, tremorgens and ergot.

<u>UNIT IV</u>

Animal bites and stings: snake venom, scorpion, spider and insect stings and toad poisoning. Bacterial toxins: botulism.

Suggested Readings

- Chopra SR, Badhwar RL & Ghosh S. 1984. *Poisonous Plants of India*. 1st Ed., Academic Publishers, Jaipur.
- Klassen CD, Amdure MO & Doull J. (Eds). 1996. *Casarett & Doull's Toxicology: Basic Sciences of Poisons*. 5th Ed., McGraw Hill.
- Sandhu HS and Brar RS. 2000. *Text Book of Veterinary Toxicology*. 1st Ed., Kalyani Publishers.

VPT 610PHARMACOLOGICAL TECHNIQUES1+1

Objective

To impart the knowledge of various basic pharmacological techniques and screening methods of drugs.

Theory

<u>UNIT I</u>

Principles of drug action and bioassay. Dose response curves and their analysis.

<u>UNIT II</u>

Techniques for setting up isolated and intact preparations.

<u>UNIT III</u>

Organization of screening programme of drugs; multidimensional screening procedures and gross observational methods.

Practical

Setting up of isolated and intact preparations, recording of BP in dog/rat, recording of ECG in rat, experiments on drug potentiation, antagonism and tachyphylaxis. Construction of dose-response plots, calculation of EC₅₀, dissociation rate constants, potency ratio, pA_x , pDx and pD'_x values.

Specific tests for evaluation of tranquillizing, hypnotic, analgesic, anticonvulsant, general and local anesthetic, muscle relaxant, antiinflammatory, antipyretic, antiarrhythmic, antihypertensive, antihyperglycemic and anticholesterimic activities.__Determination of potency ratio, median effective, toxic or lethal doses. Bioassay techniques.

Suggested Readings

Ghosh MN. (Ed). 2005. *Fundamentals of Experimental Pharmacology*. 3rd Ed. Hilton & Co.

- Kulkarni SK (Ed). 2004. *Handbook of Experimental Pharmacology*. 3rd Ed. Vallabh Prakashan.
- Laurance DR & Bacharach AL. (Ed). 1964. *Evaluation of Drug Activities: Pharmacometrics*. Vols. I, II. Academic Press.
- Parmar NS & Shiv Prakash 2006. *Screening Methods in Pharmacology*. 1st Ed. Narosa.
- Seth UK, Dadkar NK & Usha G Kamat (Eds). 1972. Selected Topics in Experimental Pharmacology. 1st Ed. Kothari Book Depot.
- Tallarida RJ & Murray RB. 1987. *Manual of Pharmacologic Calculations*. 2nd Ed. Springer Verlag.

VPT 611

Objective

To understand the animal toxicity tests and assessment of various toxicants using specific tests.

Theory

<u>UNIT I</u>

Animal models in toxicological studies.

<u>UNIT II</u>

Animal toxicity tests for acute, sub-acute and chronic toxicity.

<u>UNIT III</u>

Specific toxicity tests for neurotoxicity, immunotoxicity, developmental, behavioural, reproductive and inhalation toxicity, mutagencity, carcinogenicity.

<u>UNIT IV</u>

Animal toxicological tests for the study of metabolism, synergism and antagonism.

Practical

Tests for acute, sub-acute and chronic toxicity, protocols and various specific toxicity tests. Assay for marker enzymes, analysis of toxicant residues in biological materials.

Suggested Readings

Derelanko MJ. 1995. CRC Hand Book of Toxicology. Mannfred A. Holinger.

Gad SC & Chengelis CP. 1998. Acute Toxicology Testing. 2nd Ed. Academic Press.

Hayes AW. 1994. Principles and Methods of Toxicology. 3rd Ed. Raven Press.

VPT 612 ETHNOPHARMACOLOGY

2+0

Objective

To impart the knowledge and importance of traditional Indian medicine.

Theory

<u>UNIT I</u>

Historical aspects: Traditional Indian remedies and regional folklore in disease cure.

<u>UNIT II</u>

Classification, identification and chemical constituents of medicinal plants. Extraction, distillation, evaporation and other processes used in purification and preparation of active constituents from medicinal plants.

<u>UNIT I</u>II

Standardization and clinical validation of bioactive molecules from vegetable sources. Therapeutic and adverse effects of potential herbal drugs. Indigenous drugs used as carminatives, antiseptics, antimicrobials, analgesics, and anti-inflammatory agents.

<u>UNIT I</u>V

Alternate systems of medicine in animals.

Suggested Readings

Agrawal VS. (Ed). 1997. Drug Plants of India. Kalyani Publishers.

Anjaria J. 2002. Inventory of Traditional Veterinary Medicinal Practices in India. GOI Publ., Pathik Enterprises, Ahmedabad.

- Bisset NG. (Ed). 1994. Herbal Drugs and Phytopharmaceuticals. CRC Press.
- Chopra RN, Nayar SL & Chopra IC. (Eds.). 2002. Glossary of Indian Medicinal Plants. NISCAIR, CSIR, New Delhi.
- Pushpangadan P, Nyman U & George V. (Eds). 1995. *Glimpses of Indian Ethnopharmacology*. TBGRI Publication.
- Rastogi RP & Mehrotra BN (Eds). 1993-95. *Compendium of Indian Medicinal Plants*. Vols. I-IV. Publication and Information Directorate, New Delhi.
- Tallarida RJ & Murray RB. 1987. *Manual of Pharmacologic Calculations*. 2nd Ed. Springer Verlag.

VPT 701ADVANCES IN NEUROPHARMACOLOGY2+0

Objective

To understand the underlying mechanisms of drug receptor interactions and its effects.

Theory

<u>UNIT I</u>

Definition, classification of receptors, molecular structure of receptors.

<u>UNIT II</u>

G-protein coupled, ligand gated-ion channel and tyrosine kinase-linked receptors.

<u>UNIT III</u>

Ligand binding study of receptors. Signal transduction system: introduction to signal transduction, receptor linked to ion channels.

<u>UNIT IV</u>

G-proteins, second messengers: phospholipases, phosphokinases, intracellular calcium, protein kinase-C, IP₃, diacylglycerol and cyclic nucleotides.

<u>UNIT V</u>

Signal transduction through protein tyrosine kinases. Receptors as pharmaceutical targets.

1+0

Suggested Readings

Selected articles from journals.

VPT 702

AUTACOID PHARMACOLOGY

Objective

To study the pharmacodynamics of autacoids.

Theory

<u>UNIT I</u>

Pharmacodynamics of histamine and antihistamines.

<u>UNIT II</u>

Pharmacodynamics of serotonin and its antagonists; eicosanoids, bradykinin, angiotensin, kallikrein and other kinins.

<u>UNIT III</u>

Platelet-activating factors, slow reacting substances.

<u>UNIT IV</u>

Putative neurohumoral transmission – purine nucleotides, peptides, amino acids and nitric oxide.

Suggested Readings

Selected articles from journals.

VPT 703

PHARMACOLOGY OF HERBAL DRUGS

Objective

To study the pharmacological, therapeutic and toxicological aspects of potential medicinal plants and herbal drugs.

Theory

<u>UNIT I</u>

Historical aspect, chemical constituents of medicinal plants and their classification.

<u>UNIT II</u>

Identification, collection, preservation, purification, isolation, standardization and clinical validation of bioactive molecules from vegetable sources.

<u>UNIT III</u>

Characterization of pharmacological, therapeutic and toxic effects of potential herbal drugs.

UNIT IV

Strategies for development of herbal drugs.

Practical

Extraction, detection, isolation and purifications of active chemical constituents from plant sources. Pharmacological effects of herbal drugs on intact and isolated preparations.

Suggested Readings

Selected articles from journals.

VPT 704

DRUG METABOLISM

Objective

To study the mechanisms and processes of drug biotransformation.

Theory

<u>UNIT I</u>

Mechanisms and processes of drug biotransformation.

<u>UNIT II</u>

Synthetic and non-synthetic pathways of drug metabolism.

<u>UNIT III</u>

Chemical, biological, genetic and environmental factors. Species variations affecting drug biotransformation mechanisms.

<u>UNIT IV</u>

Hepatic microsomal and non-microsomal enzyme systems.

<u>UNIT V</u>

Enzyme induction and inhibition.

Suggested Readings

Selected articles from journals.

VPT 705

MOLECULAR PHARMACOLOGY

2+0

2+0

2+1

Objective

To study the identification and characterization of receptors and drug receptors interactions.

Theory

<u>UNIT I</u>

Physicochemical properties of drugs, forces involved in binding of drugs to receptors.

<u>UNIT II</u>

Receptor conformation and configuration and structure activity relationship. <u>UNIT III</u>

Theories of drug receptor interactions; analysis of dose response relationship and molecular mechanisms of drug actions.

<u>UNIT IV</u>

Methods of identification, isolation and characterization of receptors.

Suggested Readings

Selected articles from journals.

VPT 706

PHARMACOKINETICS

2+1

Objective

To study the absorption, distribution, biotransformation and excretion of drugs.

Theory

<u>UNIT I</u>

Routes of drug administration, factors modifying drug delivery; absorption, distribution, biotransformation and elimination.

<u>UNIT II</u>

Kinetics following single and multiple dosage; compartmental models of drug distribution, bioavailability, volume of distribution and protein binding of drugs.

<u>UNIT III</u>

Rates of absorption, distribution and elimination; absorption and elimination half-lives and rate of transfer of drugs between compartments.

<u>UNIT IV</u>

Renal clearance, dosage regimen; non-compartmental pharmacokinetic modeling.

<u>UNIT V</u>

Application of pharmacokinetic principles in therapeutics.

Practical

Analysis of pharmacokinetic data and determination of different pharmacokinetic parameters and bioavailability of drugs in normal and diseased animal models.

Suggested Readings

Selected articles from journals.

VPT 707 PHARMACOGENOMICS

2+0

Objective

To study the responses to drugs with respect to various aspects of genomics. **Theory**

UNIT I

Introduction, species variations affecting drug responses, increased and decreased responsiveness to drug effects/toxicities & novel drug effects UNIT II

Genetic polymorphism.

<u>UNIT III</u>

Gene therapy: gene transfer technology, viral vectors, natural delivery strategies.

<u>UNIT IV</u>

Drugs & gene therapy of inherited diseases, genetic repair and inactivation strategies; synthesis of therapeutic proteins and cancer gene therapy. UNIT V

Role of bioinformatics in pharmacogenomics.

Suggested Readings

Selected articles from journals.

VPT 708IMMUNOPHARMACOLOGY1+0

Objective

To study the pharmacological control of immune system.

Theory

UNIT I

General aspect of immune system, chemical mediators of immune system. UNIT II

Pharmacological control of immune responses. Immunomodulators; immunostimulants, immunosuppressant and tolerogens; immunological basis of drug allergy and drug tolerance.

<u>UNIT III</u>

Interaction of nervous system, endocrine system and immune system, immunotoxic effects of environmental and other pollutants.

<u>UNIT IV</u>

Xenobiotic-induced immune dysfunctions and immune deficiencies; autoimmune reactions to xenobiotics, immunoregulants and their therapeutic applications in asthma, arthritis, cancer, dermatology and organ transplant etc.

Suggested Readings

Selected articles from journals.

VPT 709

MOLECULAR TOXICOLOGY

2+0

Objective

To understand the mechanisms & targets of cellular/ molecular toxicity

Theory

<u>UNIT I</u>

Cellular, subcellular and molecular targets of toxicity; mechanisms of toxicities.

<u>UNIT II</u>

Factors affecting toxicity, interactions of toxicants with target molecules.

UNIT III

Cellular dysfunctions, repair and dysrepair.

UNIT IV

Target organ directed toxicological effects of xenobiotics, detoxification, risk assessment.

<u>UNIT V</u>

Mechanism of chemical mutagenesis, carcinogenesis, teratogenesis and radiation toxicity.

Suggested Readings

Selected articles from journals.

VP1 /10 Objective

To study the clinical pharmacological aspects of drugs.

Theory

<u>UNIT I</u> Scope of clinical pharmacology.

<u>UNIT II</u>

Drug discovery and clinical trials. Pharmacovigilance. Pharmacoepidemiology and pharmacoeconomics.

<u>UNIT III</u>

PK-PD relationship and its applications. Drug interactions and adverse drug reactions.

<u>UNIT IV</u>

Therapeutic drug monitoring. Rationale of drug use, drug regulations and acts.

Practical

Study on drug interactions and drug levels in diseased conditions. Study on plasma drug concentration-time profile and establishment of various pharmacokinetic parameters. Dosage adjustment in diseased conditions. Clinical trials of various drugs.

Suggested Readings

Selected articles from journals.

VPT 711CLINICAL TOXICOLOGY2+1

Objective

To study the scope of clinical toxicology and management of poisonings including regulatory and forensic toxicology.

Theory

<u>UNIT I</u>

Scope of clinical toxicology. Toxicological investigation and management of poisonings.

<u>UNIT II</u>

Target organ directed toxicity, Antidotal therapy.

<u>UNIT III</u>

Clinical aspect of poisoning due to specific toxicants viz. metals, pesticides, mycotoxins, animal and bacterial toxins, solvents and vapours, drugs and other food/feed contaminants.

<u>UNIT IV</u>

Forensic and analytical toxicology.

Practical

Demonstration of poisonings and their antidotal treatment; use of biomarkers in the assessment of toxicity. GLP evaluation, analysis of poisons in biological samples.

Suggested Readings

Selected articles from journals.

VPT 712

ECOTOXICOLOGY

Objectives

To impart knowledge regarding ecotoxicology for conservation of healthy eco-system.

Theory

<u>UNIT I</u>

Basic principles of ecotoxicology. Sources of contamination and effects of pollutants on eco-health.

<u>UNIT II</u>

Chemical contamination of air, water, soil and food by major agricultural and industrial chemicals – pesticides, hydrocarbons and metals. Fate of chemicals in the environment and target species.

<u>UNIT III</u>

Marine and wildlife as monitors of environmental quality.

<u>UNIT IV</u>

Contamination control and approaches to rehabilitating damaged ecosystems.

Suggested Readings

Selected articles from journals.

REGULATORY TOXICOLOGY 2+1

Objectives

Introduction to general principles in toxicological risk assessment.

Theory

VPT 713

<u>UNIT I</u>

Principles of risk assessment. Test protocols for toxicity studies.

<u>UNIT II</u>

Interaction between toxicology and industry. Compounds under regulatory legislation demands. Regulatory essential dose levels in chemical risk assessment (NOEL, NOAEL, LOEL, LOAEL & AOEL).

<u>UNIT III</u>

Risk assessment in practice. Classification and marking/branding of chemicals. Monitoring/surveillance of chemicals. Exposure assessment and modeling.

<u>UNIT IV</u>

Quality control in safety research (GLP). Operation of product register.

Practical

Good laboratory practice in toxicological research. Screening procedures in regulatory toxicology. Mandatory toxicity testing protocols. Determination of ADI, NOEL, NOAEL, LOEL, LOAEL and AOEL.

Suggested Readings

Selected articles from journals.

VPT 790

SPECIAL PROBLEM

0+2

Objective

To provide expertise in handling practical research problem(s).

Practical

Short research problem(s) involving contemporary issues and research techniques.