MD Pharmacology

Curriculum and Syllabus 2011

Branch Code: 20

SRM Medical College Hospital & Research Centre

SRM University

SRM Nagar, Kattankulathur

Kancheepuram (Dt). 603 203

MD PHARMACOLOGY

PREAMBLE

The overall goal of the course is to develop expertise in the field of Pharmacology. A process of rational thinking and cognitive action will be inculcated in an individual so that he/she shall be competent to pursue various activities as demanded by the profession as an efficient pharmacologist.

GOALS

1) To understand pharmacology in depth with understanding of the rational use of drugs, clinical pharmacology and to prepare themselves as good quality teachers.

2) Introducing students to advances in teaching technology, Computer Aided Learning, internet, patent laws and procedures etc.

3) To orient students for research & developments in Pharmacology.

OBJECTIVES

To achieve this goal, the following objectives must be fulfilled. At the end of course in Pharmacology, the trained specialist shall be able to

IN KNOWLEDGE

1) Possess a sound knowledge of the subject in the following areas:
   - Basic principles of pharmacology (including molecular pharmacology)
   - Process of new drug development
   - Clinical pharmacology (including clinical pharmacokinetics, individualization of drug therapy, drug use in special categories, adverse drug reactions and drug-drug interactions, P-drug concept)
   - Systemic pharmacology
   - Principles of essential drugs and rational use of medicines
   - Pharmacoeconomics
   - Pharmacoepidemiology
   - Pharmacovigilance
   - Pharmacogenomics
   - Research methodology (animal as well as clinical)
   - Biostatistics
   - Commonly used laboratory techniques, analytical methods and instrumentation
   - Major national health problems and programmes
   - Drug regulations in India and abroad
   - Teaching technology
   - Methods of Communication and medical writing.

1) Apply basic principles of pharmacology to practice rational use of existing drugs and evaluation of new drugs.

2) Collect and analyze experimental and clinical data related to drug kinetics and Dynamics.
3) Interpret the analyzed data with reasonable accuracy and derive logical conclusions.
4) Provide appropriate advice related to selection of drug, drug usage (desirable and undesirable effects, Kinetics, interactions), Precautions and measures to be taken during administration of drug and treating the ADRs in a given patient taking into consideration physiological, psychological & Pathological features.
5) Audit drug utilization and drug related adverse events
6) Assess emergency situations while carrying out drug trials and institute emergency management till appropriate assistance from clinical side is available.
7) Develop the ability for continued self learning so as to update the knowledge of recent advances in the field of Pharmacology and allied fields.
8) Be competent to teach and train undergraduate and future postgraduate medical students and junior doctors in Pharmacology as well as nurses and paramedical staff in Medical Colleges, Institutions and other Hospitals.
9) Plan and carry out both laboratory and clinical research with adherence to scientific methodology and GLP/GCP guidelines.
10) Be aware of legal and ethical aspects of drug evaluation.
11) Communicate the findings, results and conclusions of scientific research, both verbally and in writings.
12) Be aware of regulatory procedures needed to be carried out prior to the marketing of a new drug in India.

IN SKILLS

1) Perform common experimental techniques required for evaluation of new drug with competence.
2) Perform common clinical procedures required for evaluation of drug in healthy volunteers and patients with competence.
3) Organize and manage administrative responsibilities for routine day to day work as well as new situations.
4) Carry out necessary resuscitative measures in emergency situations arising during drug evaluation.
5) Use teaching-learning media effectively (E.g. Computer, LCD etc.,)
6) Be able to analyze and evaluate a research paper.
7) Be able to formulate and conduct problem based teaching / learning exercises.
8) Be capable of various managerial skills eg. organization of workshops / training programmes etc.
9) Be able to constitute and conduct the proceedings of various committees e.g. IAEC, IEC etc.

IN ATTITUDES

1) Appreciate socio-psychological, cultural and environmental factors affecting health and drug usage.
2) Appreciate the importance and implementation of National health programmes in context to rational drug utilization.
3) Be aware of the importance of cost-effectiveness in patient Management.
4) Be aware of service activities which a pharmacologist can undertake viz. therapeutic drug monitoring, ADR monitoring, drug information services, poison control centre, drug auditing etc.

5) Adopt ethical principles while conducting experimental and human research
6) Develop communication skills to interact with patients, peers and paramedical Staff - written and verbal (Eg. Publishing scientific paper, training doctors)
7) Realize the importance of team work
8) Develop attitudes required for professional responsibilities.

COURSE OVERVIEW

DURATION OF THE COURSE

The period of certified study and training for the Post-Graduate MD PHARMACOLOGY shall be Three Academic years.(six academic terms). The academic terms shall mean six months training period.

COMMENCEMENT OF ACADEMIC SESSION

The academic session for the Post-Graduate shall commence from May 2nd of the Academic Year.

DATE OF EXAMINATION

The students admitted up to May 31st of the academic year shall be registered for that academic year and shall take up their Final Third Year regular examination in April of the due year and October of the academic year after completion of 3 years.

NUMBER OF EXAMINATIONS

The University shall conduct not more than two examinations in a year, for any subject, with an interval of not less than 4 and not more than 6 months between the two examinations.

ATTENDANCE

All students joining the postgraduate training programme shall work as full time residents during the period of training, attending not less than 80% (eighty percent) of the training during each calendar year, and will be given full time responsibility, assignments and participation in all facets of the educational process.

The period of training for obtaining the degrees shall be three completed years including the period of examination.

First year

1. Introduction to pharmacology and its branches.
2. Selection of Thesis topic
3. Rotation in labs
4. Teaching duties

Second year

1. Teaching duties
2. Extra mural posting like clinical posting
3. Thesis work
4. Rotation in labs

Third year

1. Thesis completion
2. Teaching duties
3. Rotation in labs

COURSE CONTENT

Learning and teaching opportunities will essentially be self directed and will involve

1. Experimental Pharmacology

- Animal experiments - ethics, limits, research insights, animal house.
- Screening methods for drug evaluations and experimental models - general and specific screening.
- Drug assays
- Methods of assays
- Toxicological screening
- Pharmacokinetics experiments
- Biostatistics
- Principles of analytical instrumentation
- Basics of Computers in pharmacology, data base creation

2. Clinical Pharmacology:

- Would include all aspects related with drug trials.
- ICMR guidelines
- Protocol designing
- Basic statistics
- Laws related to drug research including ayurvedic /herbal drugs
- Taking informed consent etc.
- Ethics
- ADR Monitoring
- Therapeutic Drug monitoring
- Pharmacoepidemiology, utilization studies
- Drug estimations in biological fluids

- Sources of drug information, data interpretations
- Advances in clinical pharmacology
- Essential drug listing

3. Teaching/Academics/personality development related topics:

- Microteaching / TOS (teachers oriented sessions)
  Teaching experiences: The student will be regularly involved in the teaching of undergraduate medical and nursing students
- Conducting mock workshop/s and conference/s.
- Presentation skills /group discussions.
- Computer aided learning (CAL) .
- Web searching for medical literature.
- Scientific paper writing etc.

4. Clinical case discussions:

Post diagnosis discussions on 5 cases from clinical side.
Documentation of these cases in logbook.

5. Computer simulated dog BP exercise:

Identification of unknown drug on Computer simulated dog BP exercise.

6. Log book write-ups: (To be filled by student as provided in the format)

- Main purpose of the log book is to document the work done (Experimentations, journals, thesis work, seminars, workshops etc..)
- The content of the log book work to be signed **ONLY** by the Guide / PG teaching in charge / HOD.

Journal/ seminar presentations in department:

It should be taken care that each student presents 10 -12 seminars during the entire tenure and topics could be divided as per the following format

Year	Topics
1st	General Pharmacology Systemic Pharmacology
2nd	Systemic / Clinical / Experimental Pharmacology
3rd	Recent advances in Pharmacology

- ***Evaluation of the journal /seminar*** should be done by teachers on 5 points
- Eg.Presentation, Completeness, Audio Visual aids use, understanding and Overall performance.
- The purpose of this exercise should be to make the student aware of his progress.

SYLLABUS

UNIT – I

GENERAL PHARMACOLOGICAL PRINCIPLES

1. Definition Of Terms In Pharmacology:

(Pharmacology, Drug, Pharmacokinetics, Pharmacodynamics, Pharmacy, Clinical pharmacology, Pharmacotherapeutics, Pharmacoeconomics, pharmacogenetics, Pharmacogenomics, chemotherapy,toxicology, pharmacoepidemiology, pharmacopoeia, placebo, chronopharmacology, ethno pharmacology, pharmacognosy and pharmacovigilance.

Drug nomenclature (chemical name, non – proprietary name, brand name) Essential drug concept, Orphan drugs, National drug policy Sources of drugs with examples (plants, animals, minerals, synthetic, micro-organisms, genetic engineering)

2. Routes of drug administration:

Enteral route	---	Oral, buccal, sublingual, rectal route,
Parentral route	---	Intravenous, intramuscular, subcutaneous, intradermal, Intra-arterial, intra-articular, intrathecal, intraocular, Inhalation (for local and for systemic effect).

Topical application (for local and for systemic effect)
Advantages and disadvantages of above mentioned routes.

3. Special drug delivery systems:

Transdermal, ocusert, implants, osmotic pump, liposome encapsulation, drug targeting and pro-drugs.

4. Pharmacokinetics:

Absorption - Structure and function of biological membrane, different processes involved in absorption and factors affecting drug absorption.
Bioavailability - Bioavailability, factors affecting bioavailability and bioequivalence.
Distribution - Volume of distribution, redistribution, plasma protein binding and tissue storage and barriers of distribution (blood brain barrier, placental barrier)

Biotransformation - Metabolism of drugs – sites, phases – phase I (non – synthetic), phase II (synthetic) with examples, microsomal enzyme induction, inhibition and their consequences, first pass metabolism and their effects and enterohepatic circulation.

Elimination - Renal, rectal, pulmonary, biliary excretion, excretion in breast milk, skin and salivary elimination,kinetics of elimination , clearance, plasma half- life and its clinical significance, loading dose, maintenance dose, steady state concentration, therapeutic drug monitoring and methods of prolonging the duration of action of a drug.

5. Pharmacodynamics:

Principles of drug action (stimulation, depression, irritation , replacement, cytotoxic action) mechanisms of drug action with examples: (physical action, chemical action, through enzymes, through receptors).Competitive antagonism, non – competitive antagonism.

Receptor-definition and types, agonist, antagonist, partial agonist, inverse agonist, ligand, affinity, intrinsic activity (efficacy), drug action, drug effect. Transducer mechanisms Receptor types, structure and function. Regulation of receptors. Dose-response relationship- potency, efficacy, selectivity.

Therapeutic index and therapeutic window, combined effect of drugs – synergism (additive, Supraadditive), antagonism (physical, chemical, physiological, receptor) – definitions with examples. Fixed drug combination – advantages, disadvantages with examples. Factors modifying drug action, tolerance (cross tolerance, tachyphylaxis,) drug resistance, cumulation.

6. Adverse drug reactions:

Classification, side effects, secondary effects, toxic effects, intolerance, idiosyncrasy, drug allergy, (types, treatment, examples) photosensitivity, drug toxicity – p glycoprotein, drug dependence, drug withdrawal reactions, teratogenicity, carcinogenicity, mutagenicity, drug induced diseases (Iatrogenic disease) – definitions with examples.

7. Drug interactions:

Drug – Drug interactions, pharmacological basis of drug interactions, clinical Significance of drug interactions. Identifying potential drug interactions (outside the body, at site of absorption, during distribution, on receptors, during metabolism, drug excretion), drug food interactions and drug and body tissue interaction.

8. Bioassay-

Definition, principles of bioassay and types of bioassay.

9. Clinical pharmacology and rational drug use

Principles of drug therapy Principles of prescription writing: Prescribing drugs, drug history, p-drug concept, cost – containment, repeat prescriptions, warnings and consent, compliance (patient and doctor), placebo medicines and self - medication. Prescription of common disorders Drugs in children and pregnancy Drugs in geriatrics Clinical uses of drugs in hepatic and renal failure

Adverse drug reaction monitoring and reporting Drug discovery and drug development – clinical drug development (techniques of discovery, models, preclinical studies in animals), ethics, informed consent, phases of clinical development (Phase 1, phase 2, phase 3, phase 4 (post marketing surveillance), types of clinical trials, design of trials, pharmacoepidemiology, pharmacovigilance and pharmacoeconomics.

UNIT – II

DRUGS ACTING ON AUTONOMIC NERVOUS SYSTEM

1. General considerations- Differences between somatic and autonomic nervous system, sympathetic and parasympathetic system, general outlay of autonomic nervous system, steps in neurohumoral transmission, co transmission.

2. **Cholinergic system**- cholinergic transmission, characteristics of muscarinic receptors, nicotinic receptors and cholinergic responses mediated. cholinergic drugs* - classification, cholinergic agonists - cholinomimetic alkaloids, anticholinesterase (reversible and irreversible), pharmacological actions and uses. Pharmacotherapy of glaucoma and myasthenia gravis and anticholinesterase (organophosphorous compounds) poisoning.

3. **Anticholinergic drugs***-classification, atropine* (prototype), atropine substitutes* (mydriatics, antisecretory-antispasmodics, antiparkinsonian), atropine poisoning
4. **Drugs acting on autonomic ganglia**-clinically important ganglionic stimulants and ganglion blockers.

5. **Adrenergic transmission and its modification by drugs.**
   Adrenergic receptors & adrenergic responses mediated
   Adrenergic drugs*- classification, (Catecholamines, (adrenaline*, nor adrenaline, dopamine) and non catecholamines, β agonists), pressor agents, cardiac stimulants, bronchodilators, nasal decongestants, CNS stimulants, anorectics, uterine relaxants and vasodilators.

6. **Anti-adrenergic drugs*** - classification, α blockers* - (Phenoxybenzamine as prototype), β blockers* - (Propranolol* as prototype) α & β blockers - (Labetalol)

7. **Recent advances**

*** mechanism of action, pharmacological actions, adverse drug reactions, precautions, contraindications, preparations, drug interactions, therapeutic uses/indications.**

UNIT – III
SKELETAL MUSCLE RELAXANTS

1. Peripheral neuromuscular blockers *- classification*
2. Centrally acting muscle relaxants.
3. Directly acting muscle relaxants.
4. Recent advances

UNIT IV
LOCAL ANAESTHETICS

Classification, mechanism and actions of local anaesthetics, synergism with vasopressors, adverse effects, indications, contraindications and complications of different routes of administration of local anaesthetics.

UNIT –V

AUTACOIDS AND RELATED DRUGS

Definition, the various autacoids, their physiological and pathological actions and effects.

1. Histamine actions, releasers, anaphylaxis, clinical significance of histamine, betahistine.

   Conventional H_1 antihistamines* - classification, Second generation H_1 antihistamines*, Drug therapy of vertigo and motion sickness.

2. 5HT(serotonin) – 5HT agonists and antagonists (pharmacological actions, preparations and therapeutic uses). Ergot alkaloids - preparations and uses. Pharmacotherapy of migraine.

3. Bradykinin and their antagonists.

4. Angiotensin and ACE inhibitors* and angiotensin receptor antagonist.

5. Lipid derived autacoids – eicosanoids (prostaglandins*, leukotrienes) and platelet activating factor, PAF antagonists – clinical significance, preparations and uses.

6. Non steroidal anti – inflammatory drugs –classification, Aspirin* (prototype), non-selective and selective cycloxygenase inhibitors*. Drugs used for rheumatoid arthritis and gout.

7. Recent advances in autacoids related drugs.

* **mechanism of action, pharmacological actions, adverse drug reactions, precautions, contraindications, preparations, drug interactions, therapeutic uses/indications.**

UNIT – VI

DRUGS ACTING ON THE CENTRAL NERVOUS SYSTEM

Physiological role of neuro transmitters (excitatory, inhibitory), principles of neuronal regulation and basis of drug action in the CNS.

1. **General anaesthetics***– Definition, mechanism of action, stages of anesthesia, classification, properties of inhalational anesthetics, advantages and disadvantages. Intravenous anaesthetics* – (inducing agents, slower acting drugs) Dissociative anesthesia (ketamine), neuroleptanalgesia. Preanaesthetic medication.
2. **Aliphatic alcohol** – Pharmacological actions, interactions, toxicity, clinical uses. Disulfiram, treatment of alcoholism and treatment of methyl alcohol poisoning.
3. **Sedative - hypnotics**. Definition, classification – barbiturates*, benzodiazepines*, Non- Benzodiazepine hypnotics*, benzodiazepine antagonist. Treatment of barbiturates poisoning.
4. **Antiepileptic drugs** – Classification of drugs* Pharmacotherapy of epilepsy, Management of status epilepticus.
5. **Drugs for CNS degenerative disorders**.

   Drugs for Parkinsonism – classification of drugs*, pharmacotherapy of alzheimer's disease, huntington's disease, motor neuron disease.
6. **Antipsychotic drugs** – Classification* (chlorpromazine* prototype) Atypical Antipsychotics* Pharmacotherapy of Schizophrenia. Antianxiety drugs – Classification* Sedating, non sedating antianxiety drugs, Pharmacotherapy of anxiety. Antidepressant drugs – Classification* (Imipramine* prototype) MAO inhibitors Selective serotonin reuptake inhibitors (SSRI's) Antimanic drugs – Lithium* and others.

7. **Opioid Analgesics** – Classification* (Morphine* prototype) Management of acute morphine poisoning, Other opioids, partial agonists, agonist –Antagonists, Pure antagonists, Management of opium dependence.
8. **Drug addiction and drug abuse.**
9. **CNS stimulants -** Classification*, Cognition enhancers (Nootropics) – uses with examples.
10. **Therapeutic Gases -** Oxygen, Nitrous oxide, carbon dioxide and their use.
11. Recent advances in CNS pharmacology

* **mechanism of action, pharmacological actions, adverse drug reactions, precautions, contraindications, preparations, drug interactions, therapeutic uses/indications.**

UNIT – VII

DRUGS ACTING ON CARDIOVASCULAR SYSTEM

1. **Drugs affecting renin angiotensin system**- angiotensin converting enzyme inhibitors - captopril (prototype)*, angiotensin receptor antagonist losartan (prototype)*
2. **Drugs therapy of heart failure** – classification, Cardiac glycosides*, digitalis toxicity. Newer inotropic agents, role of vasodilators, beta blockers*, ACE inhibitors and diuretics in heart failure.
3. **Drug therapy of arrhythmias** – Classification*, preparations, classes, mechanism of action, indications. Torsades de pointes.
4. **Lipid lowering drugs for the treatment of hypercholesterolemia** – Classification, Mechanism of action, pharmacological actions, adverse effects, contraindications drug interactions and uses.

5. **Drug therapy of Hypertension** – Classification*, angiotensin converting enzyme inhibitors, angiotensin receptor antagonist, calcium channel blockers, diuretics, beta-blockers, alpha-blockers, vasodilators, central sympatholytics. Management of hypertensive emergencies
6. **Drugs for myocardial ischaemia** – Classification*, rationale of combination therapy in angina pectoris, role of antiplatelet drugs . Drug treatment of myocardial infarction.
7. **Drugs used in peripheral vascular diseases**.
8. Recent advances in cardio vascular pharmacology

* **mechanism of action, pharmacological actions, adverse drug reactions, precautions, contraindications, preparations, drug interactions, therapeutic uses/indications**.

UNIT – VIII

DRUGS ACTING ON WATER, ELECTROLYTES AND DRUGS AFFECTING RENAL FUNCTION

1. **Water and electrolytes** – transport, imbalance, effects and management.
2. **Nutritional supplementation** – enteral and parenteral therapy.
3. **Diuretics** – Classification*, role of diuretics in acute renal failure and forced alkaline diuresis, site of action pattern of electrolye excretion, short term and long term side effects and therapeutic uses.
4. **Antidiuretics** - Vasopressin (antidiureitic hormone) and vasopressin analogues)*
5. Recent advances in renal system

UNIT –IX

DRUGS ACTING ON THE BLOOD AND THE BLOOD FORMING ORGAN

1. **Hematinics** (Iron, vitamin B**12** & folic acid)*, minerals (trace elements) and vitamins and clinical significance, preparations, uses, treatment of iron deficiency anemia, disadvantages of shotgun antianemic preparations, megaloblastic anemia, iron poisoning. Erythropoietin* and other growth factors.
2. **Coagulants –** Vitamin K*, fibrinogen and styptics.
3. **Anticoagulants** – Classification* thrombolytics*, antifibrinolytics and sclerosing agents
4. **Plasma expanders and blood transfusion -** Chemistry, pharmacokinetics, preparations, dosage and uses, adverse effects.
5. **Drugs induced blood dyscrasias.**
6. **Drugs used in the management of shock**.
7. Recent trends related with blood system.

UNIT – X

DRUGS ACTING ON RESPIRATORY SYSTEM

1. **Drugs for cough** – Classification * Principles of choosing appropriate cough remedies,
   expectorants, mucolytics, antitussives, preparations & uses.
2. **Drugs for bronchial asthma** – Classification*, Principles governing the selection of drugs in bronchial asthma, inhaled asthma medication, precautions to be taken during their use. Management of acute attacks, prophylaxis and status asthmaticus.

3. Recent advances in pulmonary medicine

* **mechanism of action, pharmacological actions, adverse drug reactions, precautions, contraindications, preparations, drug interactions, therapeutic uses/indications.**

UNIT – XI

HORMONES AND HORMONE ANTAGONISTS

1. **Hormones** – Definition, different types and their mechanism of action.
2. **Anterior pituitary hormones** – Regulation of secretion, preparations and uses.
   Importance of drug induced alterations in prolactin levels.
3. **Thyroid hormones** – Levo thyroxine*, antithyroid drugs*- classification, preparations and uses.

4. **Antidiabetic drugs** – Insulins – Actions conventional preparations, highly purified preparations, reactions, uses, newer insulin delivery devices. Oral hypoglycemic drugs*- classification, management of hypoglycemia, diabetic ketoacidosis.

5**. Glucagon** – actions, uses.

6. **Corticosteroids** – regulation of secretion, preparations*, Glucocorticoid antagonists.

8. **Gonadal hormones** – Androgens*, anabolic steroids – preparations, side effects, uses,antiantrogens – side effects, uses. Estrogens – preparations*, hormonal replacement therapy, antiestrogens*, selective estrogen receptor modulators. Progestins – Preparations*, antiprogestins – (Mifepristone) hormonal contraceptives – types of methods, (oral, injectable), preparations*, male contraceptive.

9. **Drugs acting on uterus** – uterine stimulants- classification, (Oxytocin*, Ergometrine*, Prostaglandins). uterine relaxants – Preparations*.
10. **Drugs affecting calcium balance**: Calcium parathyroid hormone, calcitonin, Vitamin D, preparations, uses. Bisphosphonates – actions, uses, Pharmacotherapy of osteoporosis.
11. Recent advances of therapeutics in endocrine system

UNIT – XII

GASTRO INTESTINAL DRUGS

1. **Drugs used for the control of gastric acidity, digestants, antiflatulents**. Drug treatment of peptic ulcer*- classification (H2 blockers*, proton pump inhibitors*, prostaglandin analogs, antacids, ulcer protectives). Treatment of helicobactor pylori infection.
2. **Emetics, antiemetics***, prokinetic drugs – Classification*, mechanism of action, actions, adverse drug reaction, uses & drug interactions. Treatment of gastroesophageal reflux disease.
3. **Drug treatment of gallstones.**
4. **Agents used for constipation** – classification, laxatives, purgatives and hazards of purgatives.
5. **Drugs used in diarrhoea** – indications for the use of antimotility agents*, antimicrobial agents and antisecretory agents and oral rehydration powder. Drugs used in therapy of inflammatory bowel disorders.
6. Recent advances in the Pharmacology of Gastro intestinal system

* **mechanism of action, pharmacological actions, adverse drug reactions, precautions, contraindications, preparations, drug interactions, therapeutic uses/indications.**

UNIT – XIII
CHEMOTHERAPY OF MICROBIAL DISEASES

1. **General principles of chemotherapy**, antibiotics – definition, sources, chemical nature, mechanism of action, (spectrum of activity, type of action, problems. Toxicity, hypersensitivity reactions, drugs resistance – types, mechanisms, prevention of super infection. Factors determining the choice of an antibiotic, minimum inhibitory concentration (MIC), post antibiotic effect (PAE), minimum bactericidal concentration (MBC). Combinations of Antimicrobials – Advantages, disadvantages, indications. Prophylactic use of Antimicrobials – indications with examples, causes for the failure of chemotherapy.
2. **Sulfonamides*** - preparations, cotrimoxazole*
3. **Quinolones*** – classification- first generation, Second generation. Drugs used in typhoid fever.
4. **Beta lactum antibiotics**: classification, Penicillins* (including semisynthetic, Acid resistant, penicillinase resistant, Extented spectrum), Beta lactamase inhibitors, Cephalosporins*,monobactams*, carbapenems*.
5. **Tetracyclines* and chloramphenicol*.**
6. **Aminoglycosides*-** classification.
7. **Macrolide* and miscellaneous antibiotics** –classification, newer macrolides*, clindamycin, Lincomycin, vancomycin, Teicoplanin, Linezolid, Fusidic acid, Polymyxin B,

Bacitracin, Tyrothricin – Spectrum and uses.

8. **Pharmacotherapy of urinary tract infection, urinary antiseptics,**
9. **Pharmacotherapy of sexually transmitted diseases.**
10. **Antitubercular drugs*** –classification, first line drugs*,
11. **Second line drugs, newer drugs**, antitubercular drug regimens, management of Adverse Drug Reaction with antitubercular drugs, chemoprophylaxis, tuberculosis in AIDS, pregnancy, breast feeding, drugs used in Atypical Mycobacteriae.
12. **Antileprotic drugs*** - Classification, Pharmacotherapy, drug regimen (MDT), Alternative regimens, management of lepra reactions, newer drugs.
13. **Antifungal drugs**: Classification*, local, systemic mycoses management.
14. **Antiviral drugs**: classification, Anti–herpes virus drugs*, Anti–retrovirus drugs*, WHO guidelines for the treatment of HIV infection, anti influenza virus drugs*, nonselective antiviral drugs*.
15. **Anti malarial drugs***: Classification, different forms of anti malarial therapy, management of cerebral malaria, radical cure, malaria prophylaxis, resistant malaria.
16. **Antiamoebic drugs**: Classification*, drugs for giardiasis.
17. **Drugs for trichomoniasis**,
18. **Drugs for leishmaniasis (kalazar).**
19. **Anthelmintics**: classification*, choice of drugs for various worm infestation.
20. **Antifilarial drugs***.
21. Recent trends in chemotherapy and newer antimicrobial agents

*** Chemistry, spectrum of activity, mechanism of action, Pharmacokinetics, Preparations, adverse effects, interactions, precautions, uses.**

UNIT – XIV

CHEMOTHERAPY OF NEOPLASTIC DISEASES

Anticancer drugs: Classification*, general toxicity, general principles in chemotherapy of malignancy, cell cycle, toxicity amelioration.

UNIT – XV

DRUGS USED FOR IMMUNOMODULATION

1. **The immune response**
   General principles of immunosuppressive therapy, immunosuppressants*, Immunostimulants – BCG, Peptides, Immunoglobulins, Cytokines (Interferon -α, Interleukin-2, Levamisole).
2. **Immune mechanism and drug allergy.**

UNIT – XVI

TOXICOLOGY

1. **Heavy metals and antagonists** – Lead, Arsenic, cadmium, Mercury poisoning and Management. Antagonists* (eg- dimercaprol)
2. **General Principles of treatment of acute poisonings**- clinical assessment, Emergency stabilization, active removal of toxin, methods to increase elimination of toxic agents, plasma exchange and exchange transfusion.

3. **Nonmetallic environmental toxicants and occupational toxicology**:

   Air pollution by Carbon monoxide, Hydrogen sulphide, Sulphur dioxide, Nitrogen dioxide.

4. **Management of over dosage** with commonly used therapeutic agents.

5. **Bio medical waste** – types, potential risks and their safe management.

UNIT – XVII

DERMATO PHARMACOLOGY

1. **Skin and mucous membrane** (**dermatological pharmacology**) Systemic treatment – Corticosteroids, antibiotics, antihistamines, Immunosuppressants – indications.
   Topical treatment: Calamine lotion, creams, emollients, antifungal agents, Sunscreens - reflectors, absorbents – indication, advantages, disadvantages, Pharmacotherapy of scabies and pediculosis.
2. Recent advances in Dermatopharmacology

UNIT XVIII
OCULAR PHARMACOLOGY

UNIT XIX
GENE THERAPY - PRINCIPLES AND USES

UNIT XX
MISCELLANEOUS DRUGS

1. **Enzymes in therapy**.

2. **Antiseptics and disinfectanats**, definition, indications, advantages and disadvantages with examples in different groups.
3. **Vitamins and food supplements** *Vitamin B-complex – (B1 (thiamine), B2 (Riboflavin), B3 (nicotinic acid), B6 (Pyridoxine), biotin, Vitamin C*, Vitamin A*, Vitamin E*, Vitamin K*, zinc, spirulina, - indications.
4. **Vaccines and sera typhoid vaccine**, hepatitis A, B vaccine, rabies vaccine, varicella vaccine, indications, dosage and administration, adverse effects, interactions, contraindications, special precautions.

   ***Physiological functions, symptoms and signs of deficiency, preparations, hypervitaminosis, side effects, therapeutic uses.**

DESIRABLES

1) Drug level monitoring

Hands on experience with HPLC, HPTLC, spectrophotometry.

2) CRO visits: to be done by the student in fourth term for 1-2 months in reputed CRO (short listed by university / department) to make the students to have hands on experience in pharmaceutical industry work. In case this is not possible then **10 - 15 days workshop on clinical pharmacology** in reputed institutes would be desirable.

3) Inclusion of topics like pharmacoeconomics, pharmacovigilance, Pharmacogenetics, pharmacoepidemiology, National health programmes and chronopharmacology would be desirable.

Proposed Weekly Time Table for MD Pharmacology

8.00 AM – 4.00 PM

Day	8.00-10.00AM	10.00-12.00 Noon	12.00-1.00 PM	1.00 - 4.00 PM
Monday	*Extra Mural Posting like Clinical Posting / Lab Work	Journal Club	LUNCH	• Teaching duties
Tuesday		Animal Experiments / Bioassay / Chemical Tests		
Wednesday		Thesis discussion		
Thursday		Seminar / Integrated Teaching		
Friday		Recent advances Group discussion		
Saturday	Self study	Clinical case analysis		

- **For conducting MBBS Practicals/Classes for Paramedical Courses**

*** General medicine, Pulmonary medicine, Emergency medicine, IMCU, Surgery, Anaesthesia, Obstetrics & Gynaecology, Paediatrics, Dermatology & Venerology, Psychiatry, Ophthalmology, ENT.**

Proposed Common Areas of Integrated Teaching for MD Pharmacology In Collaboration With Pre, Para & Clinical Departments

S.No.	Topics	Collaborating Departments
1.	Drugs in Anaesthetic practice	Physiology Anaesthesia Surgery
2.	Psychopharmacology	General medicine Psychiatry Biochemistry Clinical psychology
3.	Principles of rational use of drugs	Medicine Pediatrics
4.	Metabolic syndrome	Physiology Cardiology Pathology
5.	Treatment of Peptic Ulcer disease	Gastroenterology Physiology Surgery
6.	Treatment of Mycobacterial infections	Dermatology Microbiology Community Medicine Chest Medicine
7.	Management of poisonings	Forensic Medicine Emergency medicine General Medicine
8.	Pharmacotherapy of Glaucoma	Anatomy Opthalmology Physiology
9.	Pharmacotherapy of pain	Neurology Anaesthesiology Orthopaedics
10.	Drugs in obstetrics	O & G Anaesthesia
11.	Management of allergic conditions	ENT Dermatology Microbiology

MAINTENANCE OF LOGBOOK

Each student should be required to maintain in a log book in which the following details will be entered

a) Experiments performed by him /her
b) Presentations in journal clubs along with title and issue details
c) Interesting topics presented in clinical meetings with other departments
d) Schedule of extramural posting
e) Details of discussion class in the department
f) Conferences attended (National / International)
g) Paper presented at conference with title of the conference, date of presentation
h) Paper published with title, name & issue of the journal

It is preferable that a post graduate student during the course to present one poster presentation and /or to read one paper at a national /state conference and /or to present one research paper which can be published /accepted for publication /sent for publication during the period of his /her postgraduate studies.

Teaching method

The following methods are to be used for the teaching of the post-graduate students

1. Journal club – 1hr duration (Thursday)
2. Symposium or Seminar – 1hr duration (Alternate Thursday)
3. Lecture – Once in a month
4. Practical classes – Every Tuesday
5. Clinical society meeting – Every Friday
6. Basic Science class – Once in a month

7. Microteaching – Once in a month

Computer simulated experiments – Every Wednesday

THESIS

Every student registered as post graduate shall carry out work on an assigned research project under the guidance of a recognized post graduate teacher, the result of which shall be written up and submitted in the form of a thesis.

Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature. Thesis shall be submitted at least six months before the theoretical and clinical / practical examination.

The thesis shall be a bound volume of a minimum of 50 pages and not exceeding 75 pages of typed matter (Double line spacing and on one side only) excluding certification, acknowledgements, annexure and bibliography.

Thesis should consist of

(a) Introduction
(b) Review of literature
(c) Aims and objectives
(d) Material and methods
(e) Result
(f) Discussion
(g) Summary and conclusion
(h) Tables
(i) Annexure
(j) Bibliography

Four copies of thesis shall be submitted six months prior to the commencement of the theory examinations on the date prescribed by the

Controller of Examinations of this University. The thesis should be approved by the Professor of that branch and the same has to be forwarded to the Controller of Examinations, by the head of the department through the Dean of the college.

Two copies in addition are to be submitted as an electronic version of the entire thesis in a standard C.D. format by mentioning the details and technicalities used in the C.D. format.

The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and clinical; and on the acceptance of the thesis by two examiners, the student shall be allowed to appear for the final examination.

EVALUATION OF THESIS :

ACCEPTED / NOT ACCEPTED

No marks will be given

SCHEME OF EXAMINATION

UNIVERSITY EXAMINATION PATTERN

There will be four theory papers of 3-hours duration, each of 100 marks. Each theory paper will have 2 sections.

Paper - I

General pharmacology, History, Screening and evaluation of drugs (Animal and Clinical), biostatistics.

Paper - II

Systemic pharmacology.

Paper - III

Applied pharmacology including therapeutics.

Paper - IV

Clinical Pharmacology & Recent advances.

Note: S.A.R (Structure Activity Relationship) not expected in any paper

DISTRIBUTION OF MARKS

In each theory paper, sections 1 & 2

1) Section 1:– 2 Essays (20 marks each) - 40 marks
2) Section 2:– 10 Short notes (6 marks each) – 60 marks

Distribution of Marks in Theory Examination

Theory Papers	Marks		Total Marks
	Section.1	Section.2	
	Essays (2)	Short notes (10)	
Paper I	40	60	100
Paper II	40	60	100
Paper III	40	60	100
Paper IV	40	60	100
Total Marks			**400**

PRACTICAL EXAMINATION

The Practical Examination will have long exercises, short exercises. This examination will be of 2 days duration between 9 AM – 4 PM

MARKING SCHEME FOR PRACTICAL EXAMINATION

Practical Exercise	Maximum Marks
Long Experiment	80
Short Experiment	60
Protocol Writing	30
Computer Simulated experiment	30
Micro teaching / Pedagogy	50
Viva Voce	50
Total Marks	**300**

MARKS QUALIFYING FOR A PASS

MARKS QUALIFYING FOR A PASS	MAXIMUM MARKS	QUALIFYING FOR A PASS 50% MARKS
Theory Examination	400	200
Practical Including clinical and Viva voce examination	300	150

A student shall secure not less than 50% marks in each head of passing which shall include 1. Theory, 2. Practical including clinical and viva voce examination.

EXAMINATION AND EVALUATION

(1) EXAMINERS

(a) All the Post Graduate Examiners shall be recognised Post Graduate Teachers holding recognised Post Graduate qualifications in the subject concerned.

(b) For all Post Graduate Examinations, the minimum number of Examiners shall be four, out of which at least two (50%) shall be External Examiners, who shall be invited from other recognised universities from outside the State and other two will be internal examiners for M.D.

(c) Under exceptional circumstances, examinations may be held with 3 (three) examiners provided two of them are external and Medical Council of India is intimated the justification of such action prior to publication of result for approval. Under no circumstances, result shall be published in such cases without the approval of Medical Council of India.

(d) In the event of there being more than one centre in one city, the external examiners at all the centres in that city shall be the same. Where there is more than one centre of examination, the University shall appoint a Supervisor to coordinate the examination on its behalf.

(e) The guidelines regarding appointment of examiners are as follows;-

1. No person shall be appointed as an examiner in any subject unless he fulfils the minimum requirements for recognition as a Post Graduate teacher as laid down by the Medical Council of India and has teaching experience of 8 (Eight) years as a Lecturer / Assistant Professor out of which he has not less than 5 (Five) years teaching experience after obtaining Post Graduate degree. For external examiners, he should have minimum three years experience of examinership for Post Graduate diploma in the concerned subject. Out of internal examiners, one examiner shall be a professor and Head of Department or Head of Department.

2. There shall be at least four examiners in each subject at an examination out of which at least 50% (Fifty percent) shall be external examiners. The external examiner who fulfils the condition laid down in clause – 1 above shall ordinarily be invited from another recognised university, from outside the State: provided that in exceptional circumstances examinations may be held with 3 (three) examiners if two of them are external and Medical council of India is intimated with the justification of such examination and the result shall be published in such a case with the approval of Medical council of India.

3. An external examiner may be ordinarily been appointed for not more than three years consecutively. Thereafter he may be reappointed after an interval of two years.

4. The internal examiner in a subject shall not accept external examinership for a college from which external examiner is appointed in his subject.

5. The same set of examiners shall ordinarily be responsible for the written, practical or part of examination.

6. In the event of there being more than one centre in one city, the external examiners at all the centres in the city shall be the same.

7. There shall be a Chairman of the Board of paper – setters who shall be an external examiner and shall moderate the question papers.

8. Where there is more than one centre of examination, there shall be Co-ordinator appointed by the University who shall supervise and Co-ordinate the examination on behalf of the University with independent authority.

9. The Head of the Department of the institution concerned shall ordinarily be one of the internal examiners and second internal examiner shall rotate after every two year.

(2) Number of candidates

The maximum number of candidates to be examined in Clinical / practical and Oral on any day shall not exceed eight for M.D. degree examination.

3) Number of examinations

The university shall conduct not more than two examinations in a year, for any subject, with an interval of not less than 4 and not more than 6 months between the two examinations.

(4) Doctor of Medicine (M.D.) Pharmacology

M.D. examination shall consist of Thesis, Theory Papers, and clinical / Practical and Oral examinations.

(a) Thesis

Every candidate shall carry out work on an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis.

Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the candidate to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature. Thesis shall be submitted at least six months before the theoretical and clinical / practical examination.

The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical; and on the acceptance of the thesis by two examiners, the candidate shall appear for the final examination.

(b) Theory

(i) There shall be four theory papers.

(ii) Out of these one shall be of Basic Medical Sciences and one shall be of recent advances.

(iii) The theory examinations shall be held sufficiently earlier than the Clinical and Practical examination, so that the answer books can be assessed and evaluated before the start of the Clinical / Practical and Oral examination.

(c) Clinical / Practical and Oral

(i) Clinical examination for the subjects in Clinical Sciences shall be conducted to test the knowledge and competence of the candidates for undertaking independent work as a specialist / Teacher, for which candidates shall examine a minimum one long case and two short cases.

(ii) Practical examination for the subjects in Basic Medical Sciences shall be conducted to test the knowledge and competence of the candidates for making valid and relevant observations based on the experimental / Laboratory studies and his ability to perform such studies as are relevant to his subject.

(iii) The Oral examination shall be thorough and shall aim at assessing the candidate knowledge and competence about the subject, investigative procedures, therapeutic technique and other aspects of the speciality, which form a part of the examination.

A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory, (2) Practical including clinical and viva voce examination.

Evaluation of Answer Scripts

The answer books will be valued by two examiners. One of the two examiners will be from this university and the other will be from any other university. The Average of the two marks secured by the candidate will be taken into account. If the difference between two marks exceeds 10%, the answer scripts shall be valued by the third examiner. The average of the nearest two marks shall be considered as the final mark.

MODEL QUESTION PAPER

M.D. PHARMACOLOGY

Paper - I

General pharmacology, History, Screening and evaluation of drugs (Animal and Clinical), biostatistics.

Answer All Questions

Draw diagrams & flow charts wherever necessary

Time : Three hours **Max.Marks: 100**

SECTION – I **(2 x 20 = 40 marks)**

Essays:

1. Discuss in detail about the phases of drug development in humans. Add a note on the types of therapeutic trials. Briefly outline the significance of Expiry date of Pharmaceuticals.
2. Discuss the various mechanisms of drug actions in different levels with suitable examples and diagrams.

SECTION – II **(10 x 6 = 60 marks)**

Short Notes:

1. Pharmacokinetic drug interactions
2. Therapeutic drug monitoring
3. Fixed drug combinations –Advantages and disadvantages with examples
4. Briefly discuss the concepts involved in rational prescribing
5. ADR monitoring and Prevention of adverse effects
6. Animal toxicity studies
7. Evaluation techniques for memory in animals & humans
8. Importance of Bias and controls in clinical studies.
9. Sampling methods
10. History of the development of General anaesthetics

M.D. PHARMACOLOGY

Paper - II

Systemic pharmacology

Answer All Questions

Draw diagrams & flow charts wherever necessary

Time: Three hours **Max.Marks:100**

SECTION – I **(2 x 20 = 40 marks)**

Essays:

1. Outline the Renin-angiotensin aldosterone system, Discuss the basic & applied pharmacology of various drugs acting on the various levels of it.

2. Classify the drugs, which inhibit cell wall synthesis, Elaborate the mechanism of action, spectrum of activity, adverse effects, drug interactions, special precautions, contraindications and therapeutic uses of Cephalosporins.

SECTION – II **(10 x 6 = 60 marks)**

Short notes:

1. Enumerate clinical uses of Neostigmine with rationale in each disease.
2. PAF receptor antagonists and their clinical role.
3. Enumerate 5HT antagonists, Explain the various uses and its mechanisms.
4. Explain the various adverse effects of NSAIDs and how to avoid & treat them.
5. Discuss the treatment of thyroid storm with reasons for the selection of drugs.
6. Discuss the principles for using corticosteroids safely & effectively.
7. Name the general anaesthetics used for outpatient surgeries. Discuss their advantages & disadvantages.
8. Classify clinically important antiplatelet drugs. Discuss their special precautions & uses.
9. Discuss Anti H.Pylori regimen with Rationale of using them.

10. Advantages & disadvantages of combined used of antimicrobial drugs.

M.D. PHARMACOLOGY

PAPER – III

Applied Pharmacology Including Therapeutics

Answer All Questions

Draw diagrams & flow charts wherever necessary

Time : Three hours **Max.Marks:100**

SECTION – I **(2 x 20 = 40 marks)**

Essays:

1. Describe briefly the general principles in cancer chemotherapy.
2. Discuss the pharmacotherapy of diabetes mellitus.

SECTION – II **(10 x 6 = 60 marks)**

Short Notes:

1. Treatment of acne vulgaris
2. Mechanism of action of oral contraceptives
3. Discuss the drugs used in postpartum haemorrhage
4. Advantages & disadvantages of Radio active iodine
5. Treatment of mycobacterial avium complex (MAC)
6. Outline the treatment for Alzheimer disease
7. Drug therapy for typhoid fever
8. General principles in the management of poisoning
9. Explain briefly the antimicrobial drugs acting on folate metabolism
10. Briefly explain the drugs used in osteoporosis

M.D. PHARMACOLOGY

PAPER – IV

Clinical Pharmacology and Recent advances

Answer All Questions

Draw diagrams & flow charts wherever necessary

Time: Three hours **Max.Marks: 100**

SECTION – I **(2 x 20 = 40 marks)**

Essays:

1. Discuss the recent advances in the treatment of HIV infection.
2. Describe the pharmacokinetic and pharmacodynamic changes in the drug therapy of elderly people.

SECTION – II **(10 x 6 = 60 marks)**

Short Notes:

1. Recent advances in the treatment of glaucoma
2. Cost containment
3. Patient compliance
4. Post marketing surveillance
5. Meta analysis
6. Design of trials
7. Recent advances in the treatment of epilepsy
8. Drug dosage
9. Recent advances in the treatment of congestive heart failure
10. Drug therapy in pregnancy

EXPERIMENTAL EVALUATION SYSTEM (TO BE EVALUATED BY GUIDE, SIGNED AND PASTED IN THE LOG BOOK)

Example of evaluation sheet format given below.

Headings	Comments			
Assembly				
Cleanliness				
Instruments used				
Technique				
Results / interpretation				
Discussion: Theory				
Discussion: Practical				
Overall remarks Excellent Good Fair Poor	Excellent	Good	Fair	Poor

RECOMMENDED BOOKS & JOURNALS

1. Goodman & Gilman's The Pharmacological Basis of Therapeutics - Goodman &Gilman's. 12th Edition Laurance L, Brunton Ph.D, Bruce A Chambner MD, Bjorn C Knollman MD Ph.D, McGraw Hill education pvt. Ltd, 2011.
2. Basic & Clinical Pharmacology – 11th Edition Bertram G Katzung, Tata McGraw Hill education pvt. ltd., 2009.
3. Avery's Drug Treatment - Graeme S Avery. 4th Edition TM Speight, IDIS International, 1997.
4. Principles of Drug Action. The Basis of Pharmacology - 3rd Edition WB Pratt & P Taylor, 2008 – digitized.
5. Pharmacology & Pharmacotherapeutics – Satoskar.RS. 21st Edition Bhandarkar SD, Popular Prakashan, 2009.
6. Essentials of Medical Pharmacology - Tripathi KD. 6th Edition Tripathi KD, Jaypee Brothers, 2008.
7. Clinical Pharmacology - Laurence DR, Bennet PN, Brown MJ. 10th Edition Elsiever, 2008.
8. A Textbook of Clinical Pharmacology – Illustrated reprint Roger HJ, Spector RG, Trounce JR, Hodder and Stoughton, 1981.
9. Harrison's Principles of Internal Medicine - 18th Edition Dan.L.Longo, Anthony S Fauci, Dennis L Kasper, SL hauser, McGraw Hill, 2012.
10. Guide to Good Prescribing – WHO. 1st Edition TPGM de vries, RH Henning, HV Hogerzeil, DA Fresle , Jaypee, 1997.
11. Critical appraisal of epidemiological studies and clinical trials - Mark Elwood. 3rd Edition Oxford Press, 2007.
12. Rang and Dale's Pharmacology - Rang HP, Dale M, Ritter JM. 6th Edition Churchill Livingstone, Elsevier, 2007.
13. Netter's illustrated pharmacology - Robert B.Raff, Scott, Frank Hendry netter. Illustrated Icon learning system, 2004 digitised.
14. Clinical Pharmacokinetics– Concept and application - Malcolm Rowland & Thomas N Tozer. 3rd Edition Williams & Wilkins, 1995.

Pertaining to Evaluation of Drugs

1. Drug discovery and evaluation - 2nd Edition H.Gerhard vogel, Springer – New York, 2002.
2. Hand book of experimental pharmacology - Kulkarni S.K. 3rd Edition Vallabh Publication prakasham , 2010.
3. Biomedical Research - G.Jagadeesh, Sreekanth Murthy, Y.K.Gupta, Amitabh. 1st Edition, Lippincott,2010.
4. Fundamentals of Experimental Pharmacology - Hilton & company. 3rd Edition MN Ghosh, 2005.
5. Evaluation of Drug Activities : Pharmacometrics - 1st Edition DR Laurence & AL Bacharach, Academic Press, 1964.
6. Selected Topics in Experimental Pharmacology - 1st Edition UK Seth, NK Dadkar & UG Kamat, Kothari Book Depot, 1974.

Pertaining to Biostatistics

1. Methods in Biostatistics - B.K.Mahajan. 6th Edition Jaypee brothers, 2004.
2. Introductory Medical Statistics - Mould RF. 3rd Edition Adam Hilger, Bristol and Philadelphia, Institute of physics publications, 1998.

Others

1. Basic principles of clinical research and methodology - 1st Edition S.K.Gupta, 2007.

RECOMMENDED JOURNALS

- Annual review in Pharmacology
- Annual Review in Medicine
- British Journal of Clinical Pharmacology
- British Journal of Pharmacology
- Clinical Pharmacology
- Drugs
- ICMR bulletin

- Indian Journal of Experimental Biology
- Indian Journal of Medical research
- Indian Journal of Pharmacology
- Lancet
- New England Journal of Medicine
- Pharmacological Reviews
- Trends in Pharmacological Sciences
- WHO Reports & Bulletin
- European journal of clinical pharmacology

SAMPLE OF LOG BOOK FORMAT ATTACHED.

LOG BOOK

(FORMAT)

MD(PHARMACOLOGY)

SRM UNIVERSITY

SRM MEDICAL COLLEGE HOSPITAL & RESEARCH CENTRE

PERSONAL BIODATA

Passport Size Photograph

NAME OF THE STUDENT –

NAME OF THE INSTITUTE –

YEAR AND MONTH OF REGISTRATION –

NAME OF THE P.G.TEACHER –

FATHER'S NAME –

PERMANENT ADDRESS OF THE STUDENT –

DATE OF BIRTH OF THE STUDENT –

EDUCATION QUALIFICATIONS

S.No.	DEGREE	INSTITUTE/ UNIVERSITY	YEAR OF PASSING
1.			
2.			
3.			

SERVICE RECORD

Sl.No	POSITION	VENUE	FROM	TO	REMARKS
1	INTERNSHIP				
2.					
3.					
4.					
5.					

THESIS DETAILS

NAME OF THE TOPIC –

GUIDE –

COGUIDE IF ANY –

DATE OF CLEARANCE BY ETHICS COMMITTEE –

POSTING SCHEDULES

FIRST YEAR

S.No.	From	To	Place of the Posting	Remarks Sign of I/C

SECOND YEAR

S.No.	From	To	Place of the Posting	Remarks Sign of I/C

THIRD YEAR

S.No.	From	To	Place of the Posting	Remarks Sign of I/C

JOURNAL CLUBS

TERM AND YEAR **HELD** **ATTENDED** **REMARKS**

1.

2.

3.

4.

5.

6.

SHORT TALKS/SEMINARS CONDUCTED BY THE STUDENT

S.No.	TOPIC	DATE	REMARKS OF GUIDE
1.			
2.			
3.			
4.			
5.			
6.			
7.			

EXPERIMENTS CONDUCTED BY THE STUDENT
[GRAPH IF ANY TO BE PRSSERVED]

S.NO.	NAME OF THE EXPERIMENT	DATE	RESULT	REMARKS OF THE GUIDE

THIS SHOULD INCLUDE CLINICAL PHARMACOLOGY EXPT.
USE ADDITIONAL SHEETS IF REQUIRED.

CONFERENCES/WORKSHOPS ATTENDED

1.

2.

3.

4.

5.

PAPERS/POSTERS PRESENTED IN CONFERENCES

1.

2.

3.

4.

PUBLICATIONS IF ANY

1.

2.

3.

4.

SIGN. OF GUIDE. **SIGN. OF HOD**

To succeed you have to believe in something with such a passion that it becomes a reality

- Winston Churchill