

**SYLLABUS FOR**

**M.D. PHARMACOLOGY**

# TRAINING PROGRAMME

## I YEAR

<b>Duration</b>	<b>Department</b> <i>(Forenoon)</i>	<b>Department</b> <i>(Afternoon)</i>
I. 4 Months	Medicine including Paediatrics, Psychiatry, Cardiology, Neurology & Clinical epidemiology	Pharmacology
II. 2 Months	Optional Departments Anyone / two (Clinical/Nonclinical)	Pharmacology
III. 1 Month	Statistics	Statistics
VI. 4 Months	Basic Sciences (including pharmacology)	Basic Sciences
V. 1 Month	Vacation	Vacation

## II YEAR

June -December	pharmacology Dissertation/paper Publication work, seminar/	Pharmacology Practical
January - April -	Journal clubs	
May	Vacation	Vacation

## III YEAR

June - December	Pharmacology including clinical Pharmacology	Pharmacology / Under graduate Lectures.
January - March	- Post graduate lectures by invited Speakers from allied specialities	

## SCHEME OF EXAMINATION

(At the end of IIIrd Year)

Theory		Title	Duration	Marks
Paper	I	General Pharmacology, Experimental Pharmacology and Bioassay	3 hrs.	100
Paper	II	Systemic pharmacology including recent advances	„	„
Paper	III	Clinical pharmacology and pharmacotherapeutics Including recent advances	„	„
Paper	IV	Applied Pharmacology	„	„
<b>TOTAL</b>				<b>400</b>

### Practicals

#### Day - I

#### Practical

(I session) I Protocol Writing & Clinical Pharmacology Charts 4 hrs. 80

#### Practical

(II session) II Bioassay on isolated tissues 3 hrs. 60

#### Day - II

#### Practical III

(III Session) A - Qualitative analysis of drugs chemical and biological tests 2 hrs. 40

B - Demonstration of simple techniques in  
Experimental animals 1 hrs. 20 (OR)

Simple tests in clinical pharmacology human  
volunteers. (OR)

Discussion of charts & graphs to evaluate  
bioavailability, Dose adjustment etc.

<b>TOTAL</b>	<b>200</b>
--------------	------------

## PEDAGOGY & VIVA VOCE

(IV Session)

Log Book	-	20 Marks	
Pedagogy	-	20 Marks	30 mts.
Viva voce	-	60 Marks	1 hr. 100
<b>Distribution of Marks</b>		<b>Max</b>	<b>Min (To Pass)</b>
1. Theory 4 Papers	-	400 Marks	200
2. Practical	-	200 Marks	100
3. Pedagogy Log Book Viva Voce	-	100	-
4. Aggregate of (2 + 3)	-	300	150
<hr/>			
TOTAL	-	700	
<hr/>			

## **DETAILED SCHEME OF TRAINING**

### **I. MEDICAL WARDS:**

1. Common diseases and their treatment.
  2. Radiological appearance in common diseases and their interpretation.
  3. Clinical investigations, their relevance and interpretation.
  4. Monitoring adverse effect of drugs in patients.
- a) Paediatrics:
1. Common diseases and their treatment.
  2. Drugs used and the difference in the dosage schedules compared with adult dosage.
- b) Psychiatry:
1. Major psychiatric diseases and their treatment.
- c) Cardiology:
1. The use of ECG and interpretation of ECG.
  2. Management of common cardiac diseases.
  3. Management of cardiac emergency with special reference to use of drugs.
- d) Neurology:
1. Common neurological diseases and treatment.
  2. The use of EEG, EMG, and their interpretation.
- e) Community medicine:
- For training in clinical epidemiology.

### **II. OPTIONAL DEPARTMENTS:**

The candidate is posted to one or two departments clinical or nonclinical - according to his field of interest and the type of research he insists to pursue.

### **III. STATISTICS:**

Basic principle of statistics as applied to medicine research planning collection and interpretation of data.

### **IV. BASIC SCIENCES :**

- a) Microbiology:
- Identification of pathogenic bacteria
  - Testing for sensitivity and assaying drugs on micro organisms.
- b) Biochemistry:
- Principles of biochemistry.
  - Acquiring practical experience in the use of instruments used for investigations.

e.g. PH Meter, Calorimeter, Spectrophotometer, HPLC, GLGC, Mass spectrometry, TLC etc, Electrophoresis.

c) Anatomy:

- Anatomy of CNS, ANS, Heart.
- Micro anatomy of liver, Kidney etc.

d) Physiology :

- Basic physiology of CNS, ANS, CVS, GIS, Kidneys etc.
- Learning to use polygraph and stereotaxic instrument.

During the clinical postings during June - October, the students will work in the Department of Pharmacology, between 2-5 pm. During this period the post graduate student will familiarise himself with the routine of the Department and participate in all the undergraduate teaching programmes.

## **II YEAR**

During the II Year of the course the post graduate student will embark on a project and carry out work sufficient for writing a dissertation under the guidance of recognised PG teacher. The dissertation work must aim at contributing to the development of a spirit of enquiry, besides exposing the candidates to the techniques of research, critical analysis, acquaintance with the latest advances in medical sciences, with special reference to pharmacology and manner of identifying and consulting available literature. It is desirable that the work done is published in a standard medical journal.

The post graduate student will also actively participate in the seminars / journal club presentations in the department during this period candidate learns to perform routine experiments in mammals, amphibians and clinical pharmacology and also bioassay.

## **III YEAR**

During this period the post graduate student will engage himself in the teaching of undergraduates, participate in seminars etc. lectures by eminent teachers from other allied specialities may be arranged.

## **SYLLABUS**

### **1. APPLIED PHARMACOLOGY :**

The post graduate students is expected to have a fair knowledge of the applied pharmacological aspects. The standard expected shall be above that of the undergraduate students but not as detailed as that expected of the post graduate student of the specialities.

### **Knowledge of the following:**

1. Diseases caused by parasites.
2. Disorders due to chemical, physical, climatic and environmental factors like acute poisoning industrial toxicology and ionising radiations.
3. Genetic constitutional factors in diseases.
4. Diseases of endocrine glands, liver, gall bladder, pancreas and GIT.
5. Diseases affecting CNS, CVS, RS, GUT; BLOOD and blood forming organs, musculo skeletal system.
6. Basic principles of paediatric medicine and psychiatric medicine.
7. A sound understanding of statistics as applicable to medicine.
8. Basic knowledge of anatomy, physiology, biochemistry, and microbiology as applied to pharmacology.
9. Basic principles and practical skill in the use of the following instruments.
  - a) PH meter
  - b) Spectrophotometer.
  - c) Polygraph, ECG, EEG, EMG

### **II. GENERAL PHARMACOLOGY:**

1. History of pharmacology.
2. General pharmacology.
3. Evaluation of drugs and experimental methods (theoretical knowledge of the principles and techniques.)
  - a) Experimental methods in the evaluation and or elucidation of the mechanism of action of drugs on CNS, ANS, CVS, GUS, GIT, Endocrines, reproduction, allergy, smooth muscles, inflammation, diuresis, parasites, cancer.
  - b) Methods in Acute and chronic toxicity studies.
  - c) Methods in phytochemistry.
  - d) Quantitative pharmacology (eg) biological standardisation, bioassay, LDSO, EDSO, etc.
  - e) Methodology in clinical pharmacology.
  - f) Methods in pharmacokinetics.

### **III. SYSTEMIC PHARMACOLOGY INCLUDING RECENT ADVANCES:**

1. Drugs action on eNs (Including local anaesthetics) ANS, evs, GIT, CUT, Musculoskeletal system, blood and blood forming organs.
2. Drugs affecting active and passive immunity, immune suppressants.
3. Pharmacology of autocooids, temperature regulation and chemotherapeutic agents.
4. Pharmacology of miscellaneous drugs - vitamins, hormones, locally acting drugs, heavy metals and chelatirig agents.
5. High altitude pharmacology.
6. Toxicology-of drugs encountered during their use in therapy biological effects of industrial and environmental toxic substances insecticides, pesticides, rodenticides, weedicides, toxic gases.  
-Monitoring of adverse drug reactions.
7. sociological aspects of pharmacology and pharmacolepidemiology.

#### **1. Bioassay:**

The candidate should be able to carry out the bioassay of acetyl choline, histamine, SHT and catocholamines on various isolated tissues like frog rectus, guinea pig ileum tracheal chain, vas deferens, rat uterus, rat fundus, rabbit duodenum.

#### **2. Experimental methods for testing:**

Analgesics, anticonvulsants, local anaesthetics, psychopharmacological agents, neuro muscular blocking agents, antipyreties, anti inflammatory agents, diuretics anti fertility drugs, anti arrhythmic, anti hypertensive drugs, bronchodllators.

### **RECOMMENDED LIST OF BLOOD**

#### **I. APPLIED PHARMACOLOGY :**

1. Anatomy, regional, functional and clinical-Kanagasuntheram , R, Sivanandhasingam P & Krishnamurti A.PG pulishing, Singapore.
2. Reviw of medical physiology - William F Ganong Lange Medical publications.
3. Biochemical aspects of human diseases - Elkeles R.S. & Tavill A.S. Blackwell scientific publications.
4. Medical microbiology - Dey & Day - Allied agency, Calcutt.
5. Fundamentals of immunology - Weir, D.M. - ELBS.
6. Medical statistic made easy - Fiona Broughton Pipkin-Churchill Livingstone.



## **II. PHARMACOLOGY (BOOKS)**

1. Pharmacological basic of therapeutics - Goodman & Gilman - Macmillan.
2. Clinical pharmacology - Laurence.
3. Basic & clinical pharmacology -, Katzung.
4. Modern pharmacology - Craig.
5. Goth's Medical Pharmacology - Clark.
6. Pharmacology - Rang.
7. Lewis's pharmacology - James Crossland.
8. Lecture notes on clinical pharmacology - Reid.
9. Drug interactions - Stockely.
10. Drug discovery - the evolution of modern medicine sneader.
11. Pharmacology - self assessment question for - Einstein.
12. Selective toxicity - Albert.
13. Avery's drug treatment - principles & practice of clinical pharmacology - trevor M. Speight.
14. Toxicology of drugs chemicals - Deichper & gerund.
15. The drugs & Cosmetics Act.
16. The dangerous drugs Act.
17. The drugs standand control.

## **III. BOOKS ON EXPERIMENTAL PHARMACOLOGY:**

1. Biological standardization - Burn JH.
2. Blological assay - Gaddum.
3. Selected topics in Experimental pharmacology sheth. UK Dadkar NK & Usha G. Kamat.
4. Fundamental of experimental pharmacology - Ghosh MN
5. Experimental pharmacodynamics - Koppanyi & Karegmar.
6. Pharmacology experiments in isolated preparations - edinburg University pharmacology department.
7. Evaluation of drug activities, pharmacometrics Vol. I & II Laurence. & Baccarach.
8. Screening methods in pharmacology - Vols. I & II - Turner, RA & Hebborn P.
9. Methods in medical research Vols. I. XIV.
10. Standard methods in clinical chemistry - seligon D.

#### **IV. ADVANCES REVIEWS IN PHARMACOLOGY:**

1. Annual reviews in pharmacology & Toxicology.
2. Advances in pharmacology.
3. Advances in Drug Therapy. .
4. Year book of drug Therapy
5. Progress in Medicinal Chemistry - Vol I - XVI - Ellis & West.
6. Pharmacological Reviews.
7. Physiological Reviews.
8. Drugs Handbooks.
9. American drug index.

#### **V. JOURNALS IN PHARMACOLOGY:**

1. Journal of pharmacology & experimental therapeutics.
2. British J1. Pharmacological sciences.
3. Trends in pharmacological sciences.
4. Pharmacological reviews.
5. Drugs.
6. Americal J1. Clinical pharmacology.
7. Toxicology & Applied pharmacology.
8. British Medical Journal.
9. Indian J1. Of pharmacology.
10. Archives of into pharmacodynamics.

### **SUGGESTED TEXT BOOKS (latest editions recommended)**

- 1) ALAN H. GOUENLOCK : Varley's Practical Clinical Biochemistry: 6/e - 1988.
  - 2) BISHOP: Clinical Chemistry: 4/e - 2000.
  - 3) CARLA, BURTIS: Tietz Fundamentals of Clinical Chemistry: 5/e - 2001.
  - 4) DONALD VOET : Biochemistry: 2/e - 1997.
  - 5) GEOFFERY M. COOPER: The Cell- A Modular Approach: 2/e - 2000.
  - 6) HARPER: Illustrated Biochemistry : 26/e - 2003.
  - 7) LEHNINGER : Principles of Biochemistry: 3/e - 2000.
  - 8) LIPPINCOTT'S: Illustrated reviews, Biochemistry : 3/e - 2005.
  - 9) LUBERT STRYER: Biochemistry: 4/e-1995.
  - 10) THOMAS M. DEVLIN: Text Book of Biochemistry with clinical correlations: 5/e - 2002.
- 

### **SUGGESTED JOURNALS :-**

- 1) Annual Review of Biochemistry.
- 2) Trends in Biochemical Sciences.
- 3) Nature.
- 4) Science.
- 5) Clinical Chemistry.
- 6) Lancet.
- 7) New England Journal of Medicine.