SYLLABUS FOR

M.D. PHARMACOLOGY
## TRAINING PROGRAMME

### I YEAR

<table>
<thead>
<tr>
<th>Duration</th>
<th>Department</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. 4 Months</td>
<td>Medicine including Paediatrics, Psychiatry, Cardiology, Neurology &amp; Clinical epidemiology</td>
<td>Pharmacology</td>
</tr>
<tr>
<td>II. 2 Months</td>
<td>Optional Departments Pharmacology Anyone / two (Clinical/Nonclinical)</td>
<td>Pharmacology</td>
</tr>
<tr>
<td>III. 1 Month</td>
<td>Statistics</td>
<td>Statistics</td>
</tr>
<tr>
<td>VI. 4 Months</td>
<td>Basic Sciences (including pharmacology)</td>
<td>Basic Sciences</td>
</tr>
<tr>
<td>V. 1 Month</td>
<td>Vacation</td>
<td>Vacation</td>
</tr>
</tbody>
</table>

### II YEAR

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

### III YEAR

- June - December: Pharmacology including clinical Pharmacology /Pharmacology Undergraduate Lectures.
- January - March: Post graduate lectures by invited Speakers from allied specialities
## SCHEME OF EXAMINATION

*(At the end of IIIrd Year)*

<table>
<thead>
<tr>
<th>Theory</th>
<th>Tittle</th>
<th>Duration</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper I</td>
<td>General Pharmacology, Experimental Pharmacology and Bioassay</td>
<td>3 hrs.</td>
<td>100</td>
</tr>
<tr>
<td>Paper II</td>
<td>Systemic pharmacology including recent advances</td>
<td>„</td>
<td>„</td>
</tr>
<tr>
<td>Paper III</td>
<td>Clinical pharmacology and pharmaco therapeutics Including recent advances</td>
<td>„</td>
<td>„</td>
</tr>
<tr>
<td>Paper IV</td>
<td>Applied Pharmacology</td>
<td>„</td>
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**TOTAL** 400

### 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 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.

**TOTAL** 200
# PEDAGOGY & VIVA VOCE

*(IV Session)*

<table>
<thead>
<tr>
<th>Activity</th>
<th>Max</th>
<th>Min (To Pass)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Book</td>
<td>20 Marks</td>
<td></td>
</tr>
<tr>
<td>Pedagogy</td>
<td>20 Marks</td>
<td>30 mts.</td>
</tr>
<tr>
<td>Viva voce</td>
<td>60 Marks</td>
<td>1 hr. 100</td>
</tr>
</tbody>
</table>

## Distribution of Marks

<table>
<thead>
<tr>
<th>Activity</th>
<th>Max</th>
<th>Min (To Pass)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Theory 4 Papers</td>
<td>400 Marks</td>
<td>200</td>
</tr>
<tr>
<td>2. Practical</td>
<td>200 Marks</td>
<td>100</td>
</tr>
<tr>
<td>3. Pedagogy Log Book Viva Voce</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>4. Aggregate of (2 + 3)</td>
<td>300</td>
<td>150</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>700</td>
<td></td>
</tr>
</tbody>
</table>
DETAILED SCHEME OF TRAINING

I. MEDICAL WARDS:

2. Radiological appearance in common diseases and their interpretation.
3. Clinical investigations, their relevance and interpretation.

   a) Paediatrics:
      2. Drugs used and the difference in the dosage schedules compared with adult dosage.

   b) Psychiatry:

   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:
      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 on 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, Spectrophotofluorometer, HPLC, GLGC, Mass spectrometry ,TLC etc, Electrophorosis.

c) Anatomy:
- Anatomy of CNS, ANS, Heart.
- Micro anatomy of live, 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 under graduate 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 under graduate 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, physicat, 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, CVR, 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 anesthetics) ANS, evs, GIT, CUT, Musculoskeletal system, blood and blood forming organs.
2. Drugs affecting active and passive immunity, immune suppressants.
3. Pharmacology of autocoids, 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 catecholamines 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 anesthetics, psychopharmacological agents, neuro muscular blocking agents, antipyretics, anti inflammatory agents, diuretics anti fertility drugs, anti arrhythmic, anti hypertensive drugs, bronchodllators.

RECOMMENDED LIST OF BLOOD

I. APPLIED PHARMACOLOGY:

4. Medical microbiology - Dey & Day - Allied agency, Calcutt.
II. PHARMACOLOGY (BOOKS)

1. Pharmacological basic of therapeutics - Goodman & Gilaman - Macmillan.
4. Modern pharmacology - Craig.
5. Goth’s Medical Pharmacology - Clark.
7. Lewis’s pharmacology - James Crossland.
8. Lecture notes on clinical pharmacology - Reid.
10. Drug discovery - the evolution of modern medicine sneader.
14. Toxicology of drugs chemicals - Deichper & gerund.
15. The drugs & Cosmetics Act.
17. The drugs standand control.

III. BOOKS ON EXPERIMENTAL PHARMACOLOGY:

1. Biological standardization - Burn JH.
2. Biological assay - Gaddum.
4. Fundamental of experimental pharmacology - Ghosh MN
5. Experimental pharmacodynamics - Koppanyi & Karegmar.
6. Pharmacology experiments in isolated preparations- edinburgh University pharmacology department.
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.
7. Physiological Reviews.
8. Drugs Handbooks.

V. JOURNALS IN PHARMACOLOGY:

4. Pharmacological reviews.
5. Drugs.
7. Toxicology & Applied pharmacology.
10. Archives of into pharmacodynamics.
SUGGESTED TEXT BOOKS (latest editions recommended)


SUGGESTED JOURNALS :-

1) Annual Review of Biochemistry.
2) Trends in Biochemical Sciences.
3) Nature.
4) Science.
5) Clinical Chemistry.
6) Lancet.