DPU

**Dr. D. Y. PATIL VIDYAPEETH, PUNE**

**(DEEMED UNIVERSITY)**

# SYLLABUS
# for
# II - MBBS
# (Para - Clinical Subjects)

**2017-18**

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# CURRICULUM IN PHARMACOLOGY

## 1. GOAL

The broad goal of teaching pharmacology to undergraduate students is to inculcate in them a rational and scientific basis of therapeutics for use at Primary Health Centre level and in general practice.

## 2. EDUCATIONAL OBJECTIVES

### 2.1 KNOWLEDGE

At the end of the course, the student shall be able to -

2.1.1 describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs

2.1.2 list the indications, contraindications, interactions and adverse reactions of essential drugs.

2.1.3 indicate the use of appropriate drug in a particular disease with consideration of its cost, efficacy and safety for –

- individual needs, and
- mass therapy under national health programmes.

2.1.4 explain pharmacological basis of prescribing drugs in special situations such as pregnancy, lactation, infancy and old age.

2.1.5 state the principles underlying the concept of `Essential Drugs'

The criteria for selection of essential drugs are :

i. Adequate data on its efficacy and safety should be available from clinical studies.

ii. It should be available in a form in which quality, including, bioavailability, and stability on storage can be assured.

iii. Its choice should depend upon patter of prevalent disease; availability of facility and trained personnel; financial resources; genetic, demographic and environmental factors.
iv. In case of two or more similar drugs, choice should be made on the basis of relative efficacy, safety, quality, price and availability. Cost benefit ratio should be a major consideration.
v. Choice may also be influenced by comparative pharmacokinetic properties and local facilities for manufacture and storage.
vi. Most essential drugs should be single compounds. Fix ratio combination product should be included only when dosage of each ingredient meets the requirements of defined population group, and when combination has a proven advantage.
vii. Selection of essential drug should be a continuous process, which should take into account the changing priorities for public health action, epidemiological conditions as well as availability of better drugs/ formulation and progress in pharmacological knowledge.

## 2.2 SKILLS

At the end of the course, the student shall be able to -

2.2.1 prescribe drugs for common ailments.
2.2.2 identify adverse reactions and interactions of essential drugs.
2.2.3 interpret the data of experiments designed for the study of effects of drugs.
2.2.4 scan information on common pharmaceutical preparations and critically evaluate the drug formulations.
2.2.5 be well conversant with the principles of pharmacy and pharmaceutical preparations.

### 2.3 INTEGRATION

Practical knowledge of rational use of drugs in clinical practice will be acquired through integrated teaching vertically with pre-clinical & clinical subjects and horizontally with other para-clinical subjects.

## 3. DURATION OF PARA-CLINICAL TEACHING

| | | |
|---|---|---|
| 3.1 Semesters | : | III, IV, V |
| 3.2 Teaching days | : | 360 per batch (II MBBS Course) |
| 3.3 Teaching hours | : | 300 per batch (II MBBS Course) |

## 4. SYLLABUS

### 4.1 LEARNING METHODS

Lectures, tutorials, practicals, case studies, group discussions, seminars, integrated
Teaching.

**Distribution of teaching hours**

4.1.1 **Theory**

- Lectures - 108 ± 7
- Case studies, group discussions & seminars - 12 ± 5

**Total - 120 ± 12**

4.1.2 **Practicals &Tutorials - 120 ± 5**

4.1.3 **Revision & Evaluation (Internal Assessment) - 60**

## 4.2 SEQUENTIAL ORGANISATION OF CONTENTS

The students are expected to study the drugs as given below :

| (a) Essential Drugs that must be known | (b) Other Drugs that must be known | (c) Drugs that may be mainly required to be known for solving MCQs |
|---|---|---|
| • Pharmacokinetics<br>• Dosage schedule<br>• Pharmacodynamics<br>• Indications (Uses)<br>• Contraindications<br>• Drug interactions<br>• Adverse effects | • Mechanism of action<br>• Therapeutic Uses<br>• Important Adverse Effects<br>(without dosage schedule, contraindications, drug interactions) | • Classification of drugs |

## A) INTRODUCTION:

**PHARMACOLOGY – (N=3)**

- **A FOUNDATION TO CLINICAL PRACTICE** (n=1)

- Development of the branch of pharmacology; Scope of the subject; role of drugs as one of the modalities to treat diseases,
- Definition of drug;
- Nature and sources of drugs;
- Subdivisions of pharmacology
- Rational pharmacotherapy

- **DRUG DEVELOPMENT.** (n=1)

- **DRUG ASSAYS.** (n=1)

## B) GENERAL PHARMACOLOGY: (N=11 ± 2)

- Pharmacokinetics: Absorption, Distribution, Biotransformation, Elimination (n=5)
  Pharmacodynamics: Principles of drug action, Mechanisms of drug action.
- Receptors (Nature, Types, Theories, Regulation) (n=1)
- Application to pharmacotherapeutics: Relevance of Pharmacokinetics and dynamics in clinical practice, Sequelae of repeated administration of drug (n=2)
- Factors modifying drug action (n=1)
- Adverse Drug Reactions (n=2)

## C) AUTONOMIC PHARMACOLOGY: (N= 9 ± 2)

- General Considerations (n=1)
- Adrenergic agonists (n=2)

| | | |
|---|---|---|
| Adrenaline, Isoprenaline, Ephedrine, Dopamine Phenylephrine, Xylometazoline, Isoxsuprine | Dobutamine, Mephenteramine, Ritodrine. | Noradrenaline, Oxymetazoline, Amphetamine, Fenfluramine, Methoxamine. |

- Adrenergic antagonists (n=2)

| | | |
|---|---|---|
| Prazosin, Propranolol, Timolol, Atenolol | Metoprolol | Phentolamine, Acebutalol, Labetalol |

- Cholinergic agonists & Anticholinesterases (n=2)

| | | |
|---|---|---|
| Pilocarpine, Neostigmine, Physostigmine, Pyridostigmine, Pralidoxime. | Acetylcholine, Bethanechol, Edrophonium. | Methacholine, Carbachol, DFP, Tik 20, Soman, Propoxur, Echothiophate, Tabun, Sarin, Parathion, Malathion. |

- Antimuscarinic drugs (n=1)

| | | |
|---|---|---|
| Atropine, Hyoscine butyl bromide, Homatropine, Ipratropium bromide, Tropicamide, Dicyclomine, Biperidine. | Glycopyrrolate, Pirenzepine, Benzhexol, Benztropine. | Cyclopentolate, Propantheline. |

- Skeletal muscle relaxants (n=1)

| | | |
|---|---|---|
| Succinylcholine, Vecuronium, Alcuronium, Pancuronium, Atracurium, | d - Tubocurarine | Dantrolene, Baclofen |

## D) CARDIOVASCULAR SYSTEM INCLUDING DRUGS AFFECTING COAGULATION AND THOSE ACTING ON KIDNEYS: (N=13 ± 2)

- General Considerations and Overview of antihypertensivet herapy (n=1)

- Diuretics (n=2)

| | | |
|---|---|---|
| Frusemide, Hydrochlorothiazide, Acetazolamide, Mannitol Spironolactone, | Chlorthalidone, | Triamterene Amiloride. |

- Angiotensin Converting Enzyme (ACE) inhibitors & A II antagonists (n=1)

| | | |
|---|---|---|
| Enalapril | Captopril | Ramipril, Lisinopril, Losartan |

- Sympatholytics & vasodilators (n=1)

| | | |
|---|---|---|
| Methyldopa, Hydralazine, Sodium Nitroprusside. | Clonidine | Reserpine, Minoxidil |

- Antianginal Drugs (n=1)

| | | |
|---|---|---|
| Glyceryl Trinitrate, Isosorbide-5-Mononitrate, Isosorbide dinitrate | | Nicorandil |

• Drugs affecting coagulation / thrombosis / bleeding Coagulants (n=2)

| | | |
|---|---|---|
| Vit. K (Phytomenadione), Factor VIII conc.& Factor IX complex | | |

• Anticoagulants, Thrombolytics & Antiplatelet Agents

| | | |
|---|---|---|
| Heparin, Warfarin, Acenocumarol, Streptokinase. | Urokinase | Alteplase, Ticlopidine, Dipyridamol. |

• Drugs for CCF: Digitalis glycosides & Other agents (n=1)

| | | |
|---|---|---|
| Digoxin | | Amrinone, Milrinone. |

• Antiarrhythmic Agents (n=1)

| | | |
|---|---|---|
| Quinidine, Procainamide, Mexiletin, Amiodarone | | |

• Agents used for the management of shock (n=1)
Plasma expanders, water and electrolyte balance (I.V Fluids)

| | | |
|---|---|---|
| Albumin, Dextran-70, polygelene, Glucose, Glucose + NaCl, Ringer Lactate, NaCl, KCL, Intraperitoneal Dialysis soln. | P.V.P. | |

• Hypolipidaemic drugs (n=1)

| | | |
|---|---|---|
| Lovastatin | Cholestyramine, Clofibrate, Probucol, Nicotinic Acid | |

## E) HAEMATINICS AND HAEMATOPOIETIC FACTORS: (N=1)

- Agents used in the therapy of iron deficiency and megaloblastic anaemia

| | | |
|---|---|---|
| Ferrous salt, Folic acid Ferrous salt + Folic acid, Folinic Acid, Iron Dextran | Iron Sorbitol Citric Acid | |

## F) DRUGS AFFECTING C.N.S. (N=15 ± 2)

- Sedative-Hypnotics (n=1)

| | | |
|---|---|---|
| Diazepam, Clonazepam, Phenobarbitone, Chloral hydrate. | Alprazolam | Lorazepam |

- Psychopharmacology: (n=3)
  Antianxiety & Antimanic

| | | |
|---|---|---|
| Lithium | | Buspirone |

- Antipsychotics:

| | | |
|---|---|---|
| Chlorpromazine, Flufenazine, Haloperidol. | | |

- Antidepressants:

| | | |
|---|---|---|
| Amitriptyline, Imipramine, Clomipramine, Fluoxetine, | | Citalopram, Sertraline |

- Antiepileptics (n=2)

| | | |
|---|---|---|
| Carbamazepine, Sodium Valproate, Phenytoin Sodium | | Ethosuximide, |

• Anti-Parkinsonian agents (n=1)

| | | |
|---|---|---|
| Levodopa-Carbidopa, Trihexiphenidyl | Selegiline | Bromocriptine, Amantadine |

• Local anaesthetics (n=1)

| | | |
|---|---|---|
| Lignocaine, Bupivacaine, Lignocaine + Adrenaline, Tetracaine. | Procaine | |

• General anaesthetics (n=1)

| | | |
|---|---|---|
| Thiopental Sodium, Ether, Halothane, Ketamine, Nitrous Oxide | Isoflurane, Fentanyl | Lorazepam, Propofol |

• Analgesics: (n=3)
Opioids & NSAIDs:

| | | |
|---|---|---|
| Morphine, Pethidine, Codeine, Naloxone, Pentazocine | | Methadone, Naltrexone |
| Acetyl Salicylic Acid, Ibuprofen, Paracetamol, Diclofenac, | Piroxicam, Ketorolac, Nimesulide | Flurbiprofen, Celecoxib |

• Pharmacotherapy of rheumatoid arthritis and gout (n=1)

| | | |
|---|---|---|
| Allopurinol, Colchicine, | Probenecid | d-penicillamine |

• Substance abuse: Management of opioid, alcohol and tobacco addictions (n=1)

• Alcohol (n=1)

| | | |
|---|---|---|
| Ethyl Alcohol (70 %) | | Disulfiram |

## G) MISCELLANEOUS TOPICS - I: (N=7 ± 2)

**Autacoids** *(to be covered before pain lectures)*

- Drug treatment of migraine (n=1)
- Ergot, serotonin. (n=1)

| | | |
|---|---|---|
| Ergotamine, Dihydroegotamine, Methyl ergometrine | Ondansetron, Sumatriptan | Cyproheptadine |

- Antihistaminics (n=1)

| | | |
|---|---|---|
| Chlorpheniramine, Promethazine, Pheniramine | Loratadine, Cetirizine, Diphenhydramine | Meclizine, Cyclizine, Cinnarizine. |

- Drugs acting on the uterus (n=1)

| | | |
|---|---|---|
| Oxytocin | | Ethacridine, Magnesium |

**Drugs acting on immune system:**

- Immunostimulants, immunosuppressants; pharmacology of vaccines & sera (n=1)

| | | |
|---|---|---|
| Cyclosporine | | M.M.R. |
| Tuberculin purified protein derivative | | |
| **Vaccines-** | | |
| Typhoid (TAB), Pertussis, Meningococcal, Influenza, B.C.G., A.R.V. (Semple), Hepatitis B, O.P.V., Mumps, Measles, Rubella, Tetanus toxoid, D.P.T. | P.C.E.V. H.D.C.V. | P.V.R.V I.P.V (Salk's Vaccine) Hepatitis A Typhoid-Ty 21a |
| **Immunoglobulin** | | |
| Anti tetanus Ig, Rabies Ig, Anti-D-Ig, Ig Human Normal, Anti Snake Venom, Diphtheria Anti toxin, | | Anti Gas Gangrene Serum |

## H) RESPIRATORY SYSTEM

- Drugs used for bronchial asthma (n=1)

| | | |
|---|---|---|
| Salbutamol, Terbutaline, Aminophylline, Theophylline, Sodium Cromoglycate, Beclomethasone | | Leukotriene Inhibitors (Zafirlukast, Montelukast), Salmeterol, Budesonide |

- Pharmacotherapy of cough (n=1)

| | | |
|---|---|---|
| Dextromethorphan, | Ammonium Salts, Bromhexine | Ambroxol, Acetylcystine, Codeine |

- Therapeutic Gases
  Oxygen

## I) CHEMOTHERAPY INCLUDING CANCER CHEMOTHERAPY: (N=21 ± 2)

- General considerations (n=2)
- Antimicrobial agents (n=8)

  - Sulphonamides & Cotrimoxazole

| | | |
|---|---|---|
| Sulfadiazine, Sulfacetamide, Silver Sulfadiazine, Trimethoprim, Cotrimoxazole | Sulfamethoxazole | Sufadoxine |

  - Quinolone derivatives

| | | |
|---|---|---|
| Nalidixic Acid, Ciprofloxacin, Ofloxacin, Norfloxacin, Levofloxacin | | Pefloxacin, Gatifloxacin, Sparfloxacin |

- β Lactams

Penicillins

| | | |
|---|---|---|
| Benzyl penicillin, Benzathine penicillin G, Phenoxy methyl penicillin, Procaine penicillin G, Cloxacillin, Ampicillin Amoxycillin, Amoxycillin + Clavulanic Acid. | Carbenicillin, Methicillin, Sulbactum | Mecillinam, Ticarcillin, Piperacillin, Mezlocillin. |

- Cephalosporins

| | | |
|---|---|---|
| Ceftazidime, Ceftriaxone, Cephalexin | Cefotaxime, Cefadroxil. | Cefepime. Other □- Lactams (Imipenem + Cilastatin), |

- Aminoglycosides

| | | |
|---|---|---|
| Streptomycin, Gentamicin, Kanamycin, Amikacin, Neomycin, Framycetin Neomycin + Bacitracin | | |

- Macrolides

| | | |
|---|---|---|
| Erythromycin | Roxithromycin, Azithromycin, Clarithromycin | Miscellaneous Antibiotics Clindamycin, Vancomycin |

- Tetracyclines & Chloramphenicol

| | | |
|---|---|---|
| Tetracycline, Doxycycline, Chloramphenicol | | Minocycline, Demeclocycline. |

- Urinary antiseptics

| | | |
|---|---|---|
| | | Nitrofurantoin, Methanamine |

- Anti-Tuberculosis agents; Anti-leprotic agents (n=3)

| | | |
|---|---|---|
| Isoniazid (H), Rifampicin (R), Pyrazinamide (Z), Ethambutol (E), H+ E, H+ R, H + R + Z, H + R + Z + E | | Rifabutin, Thiacetazone + Isoniazid Ethionamide |
| Dapsone, Clofazimine | | Minocycline |

- Antiprotozoal agents: (n=3)

Antiamoebic & Other antiprotozoal

| | | |
|---|---|---|
| Metronidazole, Diloxanide furoate, Tinidazole, Furazolidone, | Sodium Stibogluconate, Pentamidine | Secnidazole |

- Antimalarials

| | | |
|---|---|---|
| Chloroquine, Mefloquine, Quinine, Primaquine, Pyrimethamine+Sufadoxine | Artemether, Artesunate, Artesunate + Lumifantrine | Proguanil, Halofantrine. |

- Anthelmintics (n=1)

| | | |
|---|---|---|
| Mebendazole, Albendazole, Pyrantel pamoate, Diethylcarbamazine, Niclosamide, Praziquantel | | Thiabendazole, Ivermectin, Levamisole, Piperazine. |

- Antifungal agents (n=1)

| | | |
|---|---|---|
| Amphotericin-B, Nystatin, Griseofulvin, Ketoconazole, Miconazole, Fluconazole, Flucytosine | | Tolnaftate |

- Antiviral agents including antiretroviral agents (n=1)

| | | |
|---|---|---|
| Acyclovir, Zidovudine, Idoxuridine | Didanosine | Lamuvidine, Abacavir, Nevirapine, Ritonavir, Indanavir, Saquinavir, Nelfinavir, Efavirenz, Lopinavir + ritonavir, Interferon |

- Pharmacotherapy of STDs (n=1)
- Principles of cancer chemotherapy and their adverse drug reactions (n=1)

***(individual agents and regimes need not be taught)***

| | | |
|---|---|---|
| | Cyclophosphamide, Methotrexate, Vincristine, Vinblastine, Actinomycin D | Mechlorethamine, Chlorambucil, Melphalan, Dacarbazine, 6-Mercaptopurine, Azathioprine, Flurouracil, Cytosine arabinocide, Etoposide, Doxorubicin, Daunorubicin, Bleomycin, Procarbazine, Mitomycin C, Cisplatin, L- Asparginase. |

## J) ENDOCRINOLOGY: (N=11 ± 2)

• Corticosteroids (n=2)

| | | |
|---|---|---|
| Hydrocortisone, Hydrocortisone sodium succinate, Prednisolone, Methylprednisolone, Dexamethasone, Betamethasone, Fludrocortisone. | | |

• Oestrogens & its antagonists (n=1)

| | | |
|---|---|---|
| Ethinylestradiol, Centchroman, Tamoxifen. | Stilbestrol | |

• Progestins & their antagonists (n=1)

| | | |
|---|---|---|
| Medroxyprogesterone acetate, Norethisterone enanthate, Norethisterone, Levonorgestrel | | Norgestrel |

• Contraceptives & Ovulation inducing agents (n=1)

| | | |
|---|---|---|
| Ethinylestradiol+Levonorgestrel, Ethinylestradiol+Norethisterone, Ethinylestradiol + Norgestrel, I.U.C.D with Copper | | Clomiphene Citrate |

• Testosterone & anabolic steroids (n=1)

| | | |
|---|---|---|
| Testosterone propionate, Danazol | | Nandrolone, Finasteride |

**Thyroid**

- Thyroxine and antithyroid agents (n=2)

| | | |
|---|---|---|
| Levothyoxine, Propylthiouracil, Carbamezole, Potassium iodide, Iodine, | | Methimazole, Radioactive iodine |

- Agents affecting calcium balance (n=1)

| | | |
|---|---|---|
| $D_3$ (Ergocalciferol), Calcium Salt, | | Calcitonin |

**Antidiabetic agents:**

- Insulin; Oral antidiabetic drugs (n=2)

| | | |
|---|---|---|
| Insulin Injection, Lente/NPH Insulin, Glibenclamide, Metformin | | New Preparations (Insulin), Chlorpropamide, Acarbose, Ripaglinide, Roglitazone |

## K) AGENTS USED IN GASTROINTESTINAL DISORDERS: (N=5 ± 1)

- Pharmacotherapy of nausea & vomiting (n=1)

| | | |
|---|---|---|
| Metoclopramide, Domperidone, Prochlorperazine, | | Ondansetron, Cisapride, Ipecacuanha |

- Pharmacotherapy of peptic ulcer (n=2)

| | | |
|---|---|---|
| Cimetidine, Ranitidine, Aluminum hydroxide + Magnesium hydroxide | Omeprazole, Sucralfate, Misoprostol | Colloidal Bismuth, Carbenoxolone Sodium |

Antihaemorrhoidal agents-( Local anaesthetic, Astringent & Anti-inflammatory)

- **Management of diarrhoea and constipatio** (n=2)
- Antidiarrheal

| | | |
|---|---|---|
| O.R.S, Sodium hydrogen carbonate, Sulfasalazine, 5-Amino Salicylic acid, Loperamide | Diphenoxylate | |

- Laxatives

| | | |
|---|---|---|
| Senna, Magnesium hydroxide, Bisacodyl, Ispaghula, Liquid paraffin, Castor oil | | Magnesium Trisilicate, Cascara sagrada, Lactulose, DOSS |

## L) MISCELLANEOUS TOPICS – II **(N=8 ± 1)**

- Drug-Drug Interactions (n=1)
- Drug use at extremes of age, in pregnancy & in organ dysfunction (n=2)
- Use of chelating agents in heavy metal poisonings (n=1)

| | | |
|---|---|---|
| Dimercaprol (B.A.L.), Calcium disodium edetate, Desferrioxamine, Activated charcoal | d-Penicillamine, N- acetylcysteine. | Deferiprone |

- Ocular pharmacology (n=1)
- Dermatopharmacology (n=1)

| | | |
|---|---|---|
| Glycerin, Calamine, Silver nitrate, Podophyllum resin, Benzoin compound, Selenium sulfide, Coal tar, Benzoyl peroxide, Benzyl benzoate, Permethrin, Gamma benzene hexachloride | | |

- Diagnostic Agents

| | | |
|---|---|---|
| Fluorescein | | |

- Vitamins (n=1)

| | | |
|---|---|---|
| Retinol, Conc. Vit A sol., Thiamine, Riboflavin, Nicotinamide, Pyridoxine, $B_{12}$, Ascorbic Acid, Hydroxocobalamine, Vitamin B complex & Multi vitamins as per Schedule V | Vitamin E | |

- Antiseptics and disinfectants (n=1)

| | | |
|---|---|---|
| Povidone iodine, Cetrimide, Potassium permanganate, Bleaching powder, Chlorhexidine, Glutaraldehyde, Formaldehyde, Chloroxylenol, Hydrogen Peroxide, Gentian Violet, Acriflavin + Glycerine | | |

## M) RATIONAL PHARMACOTHERAPY: (N=4)

Prescription writing and P-drug concept
Rational Drug Use; Essential Drug List (EDL)

**Criticism with reference to Fixed Drug Combinations (FDCs)**

### 4.3 TERM-WISE DISTRIBUTION

**I Term**

Introduction
General pharmacology
Autonomic pharmacology
Endocrinology

**II Term**

Chemotherapy
Central Nervous System

**III Term**

Agents used in gastro-intestinal disorders
Drugs acting on cardiovascular system including drugs affecting coagulation and those acting on the kidneys
Miscellaneous (including *RS*)

### 4.4 PRACTICALS & TUTORIALS: TOTAL HOURS, NUMBER & CONTENTS

Total hours : 120
Number : 60

Contents :

**I Term practicals (N=10)**

Introduction to Practical Pharmacology, animal study and drug development, Assay (Computer simulated), Effect of drug on blood pressure and respiration (Computer simulated),

Neuromuscular signal transmission (Computer simulated), Mydriatic and miotics (Computer simulated), Effect of drug on ciliary motility of frogs oesophagus (Computer simulated), Study of drug antagonism (Computer simulated), Case studies: Diabetes Mellitus and Organophosphorus poisoning. Dissolution and disintegration, Introduction to Pharmacopoeia. Printed material.

**II Term practicals (N=30)**

Pharmacy: Prescription Writing, Clinical Prescription Writing, Evaluation of analgesics (Computer simulated), Clinical evaluation, Visit to pharmaceutical compony, Clinical trials, Study of drug utilisation pattern in hospitals, Case studies: Methanol poisoning, with standard prescription, Printed material

**III Term practicals (N=20)**

Effect of nitrate on volunteers, Problem solving, Adverse Drug Reactions, Comments on the FDCs, Case studies: - Bronchial Asthma, Hypertension, Diarrhoea, Anaemia, Skin, Drug interaction - book information, Printed material.

The journal should be scrutinized by the teacher concerned and presented during university examination.

## 4.5 BOOKS RECOMMENDED


4.5.1. Pharmacology & Pharmacotherapeutics. Satoskar RS, Bhandarkar SD (Ed), Publisher: Popular Prakashan, Bombay.

4.5.2 Essentials of Medical Pharmacology. Tripathi KD (Ed), Jaypee Brothers, publisher: Medical Publishers (P) Ltd.

4.5.3 Clinical Pharmacology. Laurence DR, Bennet PN, rown MJ (Ed). Publisher: Churchill Livingstone

### 4.6 REFERENCE BOOKS:

4.6.1 Basic & Clinical Pharmacology. Katzung BG (Ed), Publisher: Prentice Hall International Ltd., London

4.6.2 Goodman & Gilman's The Pharmacological Basis of Therapeutics. Hardman JG & Limbird LE (Ed), Publisher: McGraw-Hill, New York

4.6.3 Pharmacology: H.P.Rang, M. M. Dale, J.M. Ritter publisher: Churchill Livingstone

## 5. EVALUATION

### 5.1 METHODS

**Theory, Practical and Viva**

| No | Head | Total Marks |
|---|---|---|
| 1 | Theory ( 2 papers – 40 marks each) | 80 |
| 2 | Oral ( Viva) | 14 |
| 3 | Practical | 26 |
| 4 | Internal Assessment ( Theory – 15, Practicals- 15) | 30 |
| | **TOTAL** | **150** |

**Passing :** A candidate must obtain 50% in aggregate with a minimum of 50% in theory+orals, 50 % in practicals.

### 5.2 PATTERN OF THEORY EXAMINATION

**Nature of Question Paper**

i) Total duration - 4 hrs (each paper of 2 hrs)
ii) Each paper of 3 sections

Suggested Pattern of marking for a paper of 40 marks

| Sections | Nature of questions | Total no. of questions | Marks per question | Total marks |
|---|---|---|---|---|
| A | 1. One line Answer Questions | 8 out of 10 | 1 | 08 |
| | 2. Long Answer Questions | 2 out of 3 | 7 | 14 |
| B | Short Answer Questions(SAQ) | 6 out of 8 | 3 | 18 |
| | | | **TOTAL** | **40** |

## 5.3 TOPIC DISTRIBUTION

**PHARMACOLOGY PAPER I** - includes General Pharmacology including drug-drug interactions; Autonomic Nervous System, Cardiovascular System including drugs affecting Coagulation and those acting on the Kidneys; Haematinics; Agents used in Gastro-Intestinal Disorders; Ocular pharmacology; Drug use at extremes of age, in pregnancy & in organ dysfunction; Diagnostic & Chelating agents; Environmental & Occupational Pollutants; Vitamins

**PHARMACOLOGY PAPER II** - includes Neuro-Psychiatric Pharmacology including Antiinflammatory - Analgesics and Addiction & its management; Pharmacology in Surgery (particularly peri-operative management);

Chemotherapy including Cancer Chemotherapy; Endocrinology; Dermatology; Miscellaneous Topics I (Lipid-derived autacoids; Nitric Oxide; Allergy - Histaminics & Antihistaminics including anti - vertigo; Anti Asthmatics; Anti-tussive agents; Immunomodulators; Vaccines & sera; Drugs acting on the uterus)

## 5.4 MARKING SCHEME

Each paper of 40 marks as shown in the above table.

## 5.5 NATURE OF PRACTICALS AND DURATION

| **Practical Heads** | **Marks 26** |
|---|---|
| **i) Prescription writing** | **7** |
| One Long | (*5*) |
| One Short | (*2*) |
| **ii) Criticism** | **6** |
| Prescription & rewriting the wrong prescription | (*3*) |
| Fixed dose formulation | (3) |
| **iii) Clinical Pharmacy** | **5** |
| **iv) Spots ( 8 nos.)** | **8** |

## 5.6 VIVA: DURATION AND TOPIC DISTRIBUTION

**Pharmacology Viva Total Marks - 14 ,** distributed as follows:

**Viva I –7 marks .** Two examiners will examine each candidate covering topics of the theory paper I.

**Viva II –7 marks.** Two examiners will examine each candidate covering topics of the theory paper II.

## 5.7 PLAN FOR INTERNAL ASSESSMENT

**Marks for Internal Assessment:**

| | |
|---|---|
| Theory: | 15 |
| Practical: | 15 |

Pattern for computation of 'Internal Assessment' in the subject of Pharmacology. (Applicable to the batch joining in June 2004)

**THEORY:**

There will be three mid term examination, one in each term in addition to 4th and 5th term examinations and preliminary examination. Each mid term examination will be of 15 marks each. They will be of following types:

| | | |
|---|---|---|
| Ist Mid Semester | - | MCQ Paper |
| IInd Mid Semester | - | Practical & Viva/MCQ |
| IIIrd Mid Semester | - | Journal & Viva/MCQ |

The best two performances of each student will be included in the already existing internal assessment exam and final grading will be given as under:

| Subject | Practical | Theory |
|---|---|---|
| Pharmacology | 40+40+40=120/10 =12+3(Journal)=15 | 50+50+40+40+15+15 =210/14=15 |

Terminal and prelim examination pattern will be as follow:

| **EXAMINATION** | **No. of Papers** | **Pattern** | **Duration of each paper** | **Total Marks** |
|---|---|---|---|---|
| **1ST TERMINAL** | One-50 Marks | MCQs – 28 (14 Marks)<br>SAQs–10/12 (20 Marks)<br>LAQs-2/3 (16 Marks) | 2 Hours 30 Minutes | 50 |
| **2ND TERMINAL** | One-50 Marks | MCQs – 28 (14 Marks)<br>SAQs–10/12 (20 Marks)<br>LAQs-2/3 (16 Marks) | 2 Hours 30 Minutes | 50 |
| **PRELIMINARY (As per final University pattern)** | Two- 40 Marks each | One line answer question-8/10 (08 Marks)<br>SAQs–6/8 (18 Marks)<br>LAQs-2/3 (14 Marks)<br>(Total – 40 Marks paper) | 2 Hours each paper | 80 |
| **TOTAL** | | | | **180** |

Final internal assessment in THEORY shall be computed on the basis of actual marks obtained out of 180, reduced to marks out of 15.

**PRACTICAL:**

Internal assessment of PRACTICALS shall be computed on the basis of three term ending examination and marks allotted to practical Journal.

| EXAMINATION | PATTERN | MARKS | TOTAL |
|---|---|---|---|
| **1ST TERMINAL** | Viva<br>Spots | 30<br>10 | 40 |
| **2ND TERMINAL** | Viva<br>Spots<br>Clinical Pharmacy<br>Prescription writing | 20<br>10<br>5<br>5 | 40 |
| **PRELIMINARY EXAM (As per University pattern)** | Viva<br>Prescription writing<br>Criticism<br>Clinical Pharmacy<br>Spots | 14<br>7<br>6<br>5<br>8 | 40 |
| | | **TOTAL** | **120** |

Actual marks obtained out of 120 shall be reduced to out of 12.
Add marks obtained out of 3 for Practical Journal.
Total internal assessment marks for Practical shall be out of (12+3) 15.

**Total Internal Assessment**: Theory --- 15
Practical --- 15
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30