



**YENEPOYA UNIVERSITY**

**Deralakatte, Mangaluru -575018**

**REGULATIONS AND CURRICULUM GOVERNING**

**POST GRADUATE PROGRAM**

**M.Sc. IN MEDICAL PHARMACOLOGY**

**(CURRICULUM - EFFECTIVE FROM 2010-11)**

**ATTESTED**  


**Dr.Gangadhara Somayaji K.S.  
Registrar  
Yenepoya(Deemed to be University)  
University Road, Deralakatte  
Mangalore-575 018, Karnataka**



Office of the Registrar  
University Road  
P.O. Nithyananda Nagar  
Deralakatte  
Mangalore - 575018  
Ph:0824-2204667/68/69/71  
Fax: 0824-2203943

Ref: No. YU/REG/ACA/3-ACM/2009

31.10.2009

**NOTIFICATION**

Sub: Starting of M.Sc. in pre & para clinical departments

Ref: Resolution of the Academic Council at its 3<sup>rd</sup> meeting held on 31.10.2009  
vide agenda - 3

\*\*\*\*\*

The Academic Council at its 3<sup>rd</sup> meeting and subsequently the Board of Management at its 9<sup>th</sup> meeting held on 31.10.2009 have resolved to approve the proposal to start following M.Sc. in pre & para clinical departments:-

1. M.Sc Medical Anatomy
2. M.Sc Medical Physiology
3. M.Sc Medical Biochemistry
4. M.Sc Medical Pharmacology
5. M.Sc Medical Microbiology

This notification is issued for implementation with effect from the academic year 2010-2011.

To:  
The Principal - YMC

Copy to:

1. Controller of Examinations
2. File copy

  
I/c **REGISTRAR**  
Registrar  
YENEPOYA  
(Deemed to be University)

---

## GUIDELINES FOR M.SC MEDICAL PHARMACOLOGY

### COURSES

1. **Preamble :** Masters in pharmacology [Medical]

M.Sc [Medical]

**2. Criteria for admission:**

The Candidates must have passed B.Sc with 50% marks and with one subject of biological sciences or BAMS or BHMS or BPT or BPHARM or any other professional graduates from a recognized university of our country.

**3. Duration of course:** A 3 year course. 1<sup>st</sup> year preliminary Basic Medical Sciences like Human Anatomy, Human Physiology & Biochemistry would be taught. Final MSc (2 years) - Medical Pharmacology would be studied by the student.

**4. Goals:** To be a good Academician and Researcher in Pharmacology

**5. Objectives :**

1. To gain knowledge in Medical Pharmacology namely in the field of Pharmacokinetic / Pharmacodynamic / Clinical pharmacology [Pre Clinical and Clinical trial], Adverse drug reactions and Drug information services.
2. At the end of the course He/She should be able to teach undergraduate students of Medical /Dental/Physiotherapy and Nursing, **principles of pharmacology**.
3. To conduct pre clinical trials and undertake research projects

**6. Course content:**

**i. Sections:**

1. Introduction and Historical background of Pharmacology
  2. General Pharmacology
  3. Drugs Acting on Autonomic Nervous System
  4. Autacoids and Related Drugs
  5. Respiratory System Drugs
  6. Hormones and Related Drugs
-

- 
7. Drugs Affecting Blood and Blood Formation
  8. Drugs Acting on Kidney
  9. Drugs Acting on Cardiovascular System
  10. Gastrointestinal Drugs
  11. Drugs Acting on Central Nervous System
  12. Antimicrobial Chemotherapy
  13. Parasite Chemotherapy
  14. Cancer Chemotherapy
  15. Immunopharmacology
  16. Toxicology
  17. Drugs in PREGNANCY and Pediatrics
  18. Geriatric Pharmacology
  19. Dermatological Pharmacology
  20. Ophthalmic Pharmacology
  21. Dental Pharmacology
  22. The Vitamins
  23. Study tour

**Topic in each section with name:**

- 1. Introduction and Historical background of Pharmacology**      **1 hr.**
- 2. General Pharmacology**      **20 hrs**

Introduction, Drug Delivery Systems, Routes of Drug Administration, Pharmacodynamics, Pharmacokinetics, Drug Interactions, Adverse Drug Reactions, Drug Development, Gene-Based therapy

- 3. Drugs Acting on Autonomic Nervous System**      **10 hrs**

General Consideration, Parasympathomimetics, Anticholinergic Agents, Sympathomimetics, Adrenoceptor Blocking Drugs, Skeletal Muscle Relaxants

---

---

#### **4. Autocoids and Related Drugs**

**5 hrs**

Introduction, Histamine and Antihistaminic Drugs, 5-Hydroxytryptamine Receptor, Agonists and Antagonists, Renin-Angiotensin system and Kinins, Eicosanoids and Platelet Activating Factor, Analgesics, Antipyretics and Antiinflammatory

Drugs: Drugs for the Treatment of Rheumatoid Arthritis and gout

#### **5. Respiratory System Drugs**

**5 hrs**

Pharmacotherapy of Cough, Pharmacotherapy of Bronchial Asthma

#### **6. Hormones and Related Drugs**

**10 hrs**

Introduction, Thyroid and Antithyroid Drugs, Pancreatic Hormones and Antidiabetic Drugs, Adrenocortical Steroids and their synthetic Analogs, Female Hormones, Male Hormones, Oxytocics and Uterine Relaxants

#### **7. Drugs Affecting Blood and Blood Formation**

**5 hrs**

Hematinics, Coagulants, Anticoagulants, Thrombolytic and Antiplatelet Drugs

#### **8. Drugs Acting on Kidney**

**2 hrs**

Diuretics

#### **9. Drugs Acting on Cardiovascular System**

**10 hrs**

Drug Therapy of Heart Failure, Calcium Channel Blockers, Potassium Channel Openers, Drugs for Myocardial Ischemia, Antihypertensive Drugs and the Drug therapy for Hypertension, Drug therapy of shock, Lipid Lowering drugs.

#### **10. Gastrointestinal Drugs**

**5 hrs**

Drug Therapy of Peptic Ulcer, Emetics and Antiemetics. Drugs Affecting Gastrointestinal Motility

#### **11. Drugs Acting on Central Nervous System**

**10 hrs**

Introduction, General Anesthetics, Local Anesthetics, Therapeutic Gases, Alcohol, Antiepileptic Drugs, Drugs Effective in the Therapy of

---

---

parkinson's Disease, Anxiolytic and Hypnotic Drugs, Drug Therapy of Affective Disorders, Antipsychotic Agents, Psychostimulants and Psychedelic Agents, Nootropic Agents, Opioid Analgesics and Antagonists, Substance abuse and Dependence, Central Nervous System Stimulants

**12. Antimicrobial Chemotherapy** **10 hrs**

General Principles of Antimicrobial Action, Sulphonamides, Trimethoprim-sulphonamide, Quinolones and Agents, used for urinary tract infection, Penicillin, Cephalosporines and other B-Lactam antibiotics, Tetracyclines, Chloramphenicol, Aminoglycosides, Macrolide and Miscellaneous Antimicrobials, Antituberculosis Drugs, Chemotherapy of Leprosy, Antifungal Drugs, Antiviral Drugs, Antiseptics and Disinfectants

**13. Parasite Chemotherapy** **2 hrs**

Introduction, Antimalarial Drugs, Drugs used in the Treatment of Amebiasis, Giardiasis and Trichomoniasis, Anthelmintic Drugs

**14. Cancer Chemotherapy** **2 hrs**

Introduction, Antineoplastic Agents

**15. Immunopharmacology** **2 hrs**

Introduction, Immunomodulators: Immunosuppressive Agents and Immunostimulants

**16. Toxicology** **3 hrs**

Heavy Metals and Antagonists, General Principles of Treatment of acute Poisonings and Environmental and Occupational Toxicology

**17. Drugs in Pregnancy and Pediatrics** **3 hrs**

Drugs in Pregnancy, Drug Therapy in Pediatrics, Vaccines and sera

**18. Geriatric Pharmacology** **3 hrs**

Drug Therapy in Geriatrics

**19. Dermatological Pharmacology** **3 hrs**

Drug used in Dermatological Disorders

---

---

---

**20. Ophthalmic Pharmacology** **3 hrs**

Drug used in the Management of Ophthalmic Diseases

**21. Dental Pharmacology** **3 hrs**

Commonly Used Drugs in dentistry

**22. The Vitamins** **3 hrs**

Vitamins

**\* 23. Postings**

One month postings in Yenepoya Research Center.

**Details of distribution of topics in each paper will be as follows:**

**Paper 1: General Pharmacology including Biostatistics**

- Sources of drugs, Dosage forms, Special drug delivery system, Route of administration, Pharmacokinetics- Absorption, Distribution, Metabolism, Excretion, Pharmacodynamic-Mechanism of drug action, Combination of drugs and their effects
- Adverse drug reaction, Drug interaction, Factors modifying drug action, Dose
- Biostatistics- Meta-analysis, ANOVA, T-test, Randomization, P Value, Chi square test, Standard error & deviation

**Paper 2: Clinical Pharmacology**

- Clinical pharmacology- BA, BE studies, TDM, HPLC, Pharmacovigilance, Pharmacogenetics, Pharmaco-epidemiology, Pharmaco-economics, P-drugs, Essential drugs, Gene therapy, stem cell therapy, Drug shelf life
- Preclinical studies, Clinical trials- Placebo, Micro-dosing, Package insert
- Regulatory bodies- FDA, IAEC/CPCSEA, Human ethics committee, Drug schedules.
- Experimental pharmacology- Bioassay, Dose response curve, Radioimmunoassay
- Drug screening method- Analgesics, Anti-inflammatory, Anti epileptic, Anti depressant, Anxiolytic, Antihypertensive, Anti-diabetic, Anti-asthamatic, Local anaesthetic, Antiemetic, Anti-anginal, Peptic ulcer.

---

---

**Paper 3: Systemic Pharmacology**

- ANS, CVS, Diuretics, Blood, CNS, Autacoids, RS.
- Drug acting on uterus, GIT, Endocrine, Immune Pharmacology, Gout, RA, Vaccine, Vitamins – antioxidants, Enzymes
- Antibacterial, Antifungal, Antiviral, Cancer chemotherapy, Therapeutic gases- hyperbaric oxygen, Antiseptics & Disinfectants
- Drugs used in extreme ages-Paediatric, geriatric, Drugs used in pregnancy & lactation.
- Ocular pharmacology, Drugs used in Dermatology.
- Toxicology- Heavy metal poisoning, animal bites, Hepato toxic drugs, Nephro toxic drugs.

**Questions related to recent advances in pharmacology will asked in any of the three papers**

**ii. Practical****List of experiments Pharmacology**Experimental Pharmacology

Discussion of the following

1. Bioassay- Bracketing, three point assay
2. Graphs- Effect of drugs on isolated frog heart (2)

Effect of drugs on frog rectus abdominus muscle (2)

Effect of drugs on dog's BP (3)

Rabbit eye experiments (3)

Animal handling and technique demonstration

Instrument handling

Clinical Pharmacology

Chemical test

Journal article criticism

Promotional literature criticism

Project presentation

\*Computer assisted learning (CAL) modules for experimental

pharmacology.

**Screening methods for**

- i. Antiepileptic drugs
  - ii. Anti ulcer drugs
  - iii. Anti inflammatory drugs
- 
-



- 
- iv. Analgesics
  - v. Anti anxiety drugs
  - vi. Anti depressant drugs
  - vii. Principles in Biostatic
  - viii. Principles in preclinical screening of drugs
  - ix. Principles in Research methodology

A short Research project to be undertaken during their course

### **Clinical Pharmacology**

- i. \*ADR reporting, Prescription auditing exercises.

### **7. Teaching hours:**

#### **Scheme of teaching:**

- i. Total no. hours: Lecturers – 120 hrs [60 hrs / year]  
Tutorials - 10  
Seminars – 10
- ii. Practical / Demonstrations – 10
- iii. Tests after completion of each section of lectures  
Theory Viva voce  
3 Internal Assessments would be conducted 2 in the Final year  
MSc  
Revision classes – 10
- iv. Research project – 1

### **8. Scheme of Examination:**

Internal Assessment examination:

Total Marks: Theory- 100 marks + Practical-50 marks

Number of Internal Assessment exams to be conducted:

Theory: (3) Final year MSc

Practical: (3) Final year MSc

---

---

	Portions	Theory	Practical
I Internal exam	General Pharmacology, ANS, CVS and Diuretics	100	50
II Internal exam	CNS, Blood, Autacoids, RS, GIT	100	50
III Internal exam	Hormones, Chemotherapy	100	50

## 9. University examination

**Eligibility-** A minimum of average 40% marks in internal assessment is mandatory for appearing in the university exam.

### a. Theory:

Question paper pattern: 3 papers 100 mark each paper.

Total Marks: 300.

**[Passing marks 50% of total ie; 150/300]**

Internal assessment- 25 marks

### b. Practical examination:

Exercises in practical exams:

Bio Assay	: 20 marks
Graph	: 10 marks
Animal Handling	: 10 marks
Instrument	: 10 marks
Chemical test	: 10 marks
Journal article criticism	: 10 marks
Promotional literature criticism:	10 marks
Research project	: 20 marks
<b>Total marks</b>	<b>: 100 marks</b>

Internal assessment – 25 marks

c. **Viva voce:** 50 marks.

d. **Examiners:** No. of external examiner : 2  
No. of Internal examiner: 2

g. **Examination days:** 2 days.

---

### 10. List of recommended test books

1	Principles of Pharmacology, 3 <sup>rd</sup> ed. HL Sharma and K.K. Sharma
2	Pharmacology and Pharmacotherapeutics, 25 <sup>th</sup> ed. by R.S. Satoskar and others
3	Essentials of Medical Pharmacology, 8 <sup>th</sup> ed. by K.D. Tripathi
4	Practical manual of Experimental and Clinical Pharmacology by Bikash Medhi, Ajay Prakash -2 <sup>nd</sup> Edition
5	Basic and clinical Pharmacology, by Bertram G. Katzung, 14 <sup>th</sup> ed.
6	Fundamentals of experimental Pharmacology, by Ghosh M.N.
8	Handbook of Experimental Pharmacology, by S.K. Kulkarni
9	Evaluation of drug activities and Pharmacometrics, by D.R. Laurence and A.L. Bacharach, Vol. 1 & 2
10	Brody's Human Pharmacology, 4 <sup>th</sup> ed. by Brody

### 10. List of recommended reference books

1. The Pharmacological basis of therapeutics, by Good Man and Gill Man, 13<sup>th</sup> ed.
2. Martindale. The complete drug reference Vol. I & II.
3. The MERCK INDEX
4. Remington. The science and practice of Pharmacy – Vol. I & II.