

**Pravara Institute of Medical Sciences
(Deemed to be University)**

Loni Bk - 413 736, Tal. Rahata, Dist. Ahmednagar (M.S.)
NAAC Re-accredited with 'A' Grade (CGPA 3.17)

Established Under Section 3 of UGC Act 1956, Vide Govt. of India
Notification No. F.9-11/2000-U.3, dated 29th September, 2003



**Syllabus
M.Sc. Medical Pharmacology**

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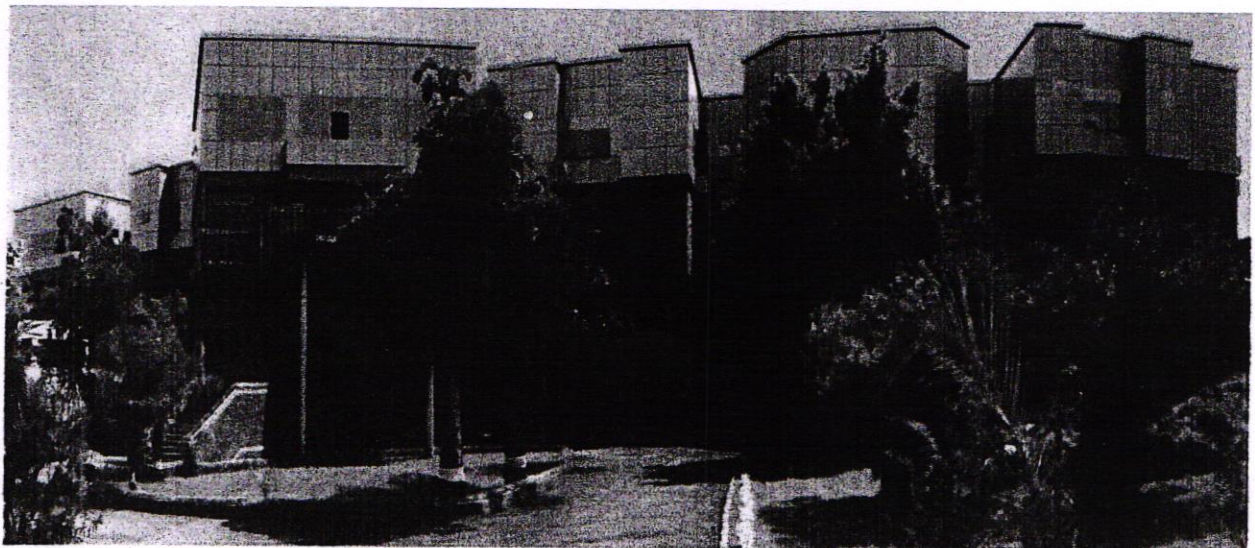
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Syllabus

M.Sc Medical Pharmacology

Approved Vide Academic Council Resolution
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Pravara Institute of Medical Sciences

Deemed University

Loni Bk. 413 736, Tal. Rahata. Dist. Ahmednagar (M.S.)

Medical faculty

Presentation of Syllabus

Department of Pharmacology

M.Sc. Medical Pharmacology

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

Goals:

1. To understand pharmacology with understanding of the rational use of drugs and to prepare 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.

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

Cognitive domain :

1. Apply basic principles of pharmacology and evaluation of new drugs.
2. Collect and analyse experiment and related to drug kinetics or 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 and 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 and Therapeutics as well as nurses and paramedical staff in Medical Colleges, Institutions and other Hospitals.
9. Plan and carry out both laboratory 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 marketin of a new drug in India.

Psychomotor domain:

1. Perform common experimental techniques required for evaluation of new drug with competence.
2. Perform common clinical procedures required for evaluation of drug in normal volunteers and patients with competence.
3. Organize and manage administrative responsibilities for routine day to day work as well as new situations.
4. Use teaching -learning media effectively.

Affective domain :

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 informations 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,pre and paramedical staff.
7. Realize the importance of team work.
8. Develop attitudes required for professional responsibilities

COURSE DETAILS:

Duration of the course- 42 months (7 semesters ,3 and half calender year)

First semester-

1. students shall undergo training programme in anatomy, physiology and biochemistry & Microbiology
2. selection of dissertition topic and submission of protocol for ethical clearance and research committee.
3. Term end test -theory & practical.

Second Semester

1. Introduction to pharmacology and its branches.
2. Dissertation work
3. PG activity

Third semester

1. Rotation in labs.
2. Teaching duties, postgraduate activity.
3. Dissertasion work cont.

Fourth Semister

1. Teaching duties, postgraduate activity.
2. Dissertasion work cont.
3. Experimental pharmacology techniques
4. Term end examination.

Fifth Semister

1. Dissertasion work cont.
2. Teaching duties, postgraduate activity.
3. Experimental pharmacology techniques
4. Term end examination.

Sixth semister

1. Dissertation completion 6 months before final examination
2. Teaching duties, postgraduate activity.
3. Term end test.

Seventh term

1. Dissertation completion 6 months before final examination
2. Teaching duties, postgraduate activity.
3. Prilim examination -theory & prasctical.

TEACHING LEARNING OPPORTUNITIES

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

- 1. Teaching /Academics/Personality Development related topics:**
 1. Microteaching/TOS (teachers oriented sessions)
 2. Teaching experiences : The candidate will be regularly involved in the teaching of undergraduate medical, dental and nursing students.
 3. Participation & conduction workshop/s and conference/s & CMEs
 4. Journal reporting-Student should present at least 30 in total course.

5. Evaluation of the journal/seminar should be done by teachers on 5 points
Eg. presentations, completeness, A-V aids use, understanding, overall performance.

6. Presentation skills/group discussions

7. Knowledge about patents, IPRS etc

8. Computer aided learning (CAL)

9. Web searching for medical literature

10. Scientific paper writing etc.

2. 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.

-Biostatistics.

-Principles of analytical instruments.

-Basics of Computers in pharmacology, data base creation.

-To know the effects of various drugs on BP in experimental animals.

3.. Clinical Pharmacology :

Would include all aspects related with drug trials.....ICH—GCI guidelines, ICMR Guidelines.

Role of DCI/ DCGI.

Protocol designing.

Basic statistics.

Laws related to drug research including ayurvedic/herbal drugs.

Taking informed consent etc.

Ethics.

ADR Monitoring..

Pharmacoepidemiology, utilization studies.

Drug estimations in biological fluids.

Sources of drug information, DATA INTERPRETATIONS.

Advances in clinical pharmacology.

Essential drug listing

4. Drug store management

1 week posting in drug store & hospital in 4th term.

Functions of drug store.

Role of pharmacist in drug store.

ABC/VED classification of drugs.

Use of computers in drug store, routine administration.

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

Main purpose of the log book should be 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. Example of evaluation sheet format given below :

<i>Heading</i>	<i>Comments</i>			
Assembly				
Cleanliness				
Instruments used				
Technique				
Results/interpretation				
Discussion: Theory				
Discussion: Practical				
Overall remarks	Excellent	Good	Fair	poor

6. seminar presentation in department :

It should be taken care that each student presents at least 30 seminars during the entire tenure and topics could be divided as per the following format

1st term

Postgraduate activity

2nd term

Physiology-2

Biochemistry-1

Anatomy-1

Microbiology - 1

3rd term

Gen. pharmacology- 4

Evaluative methods of drugs - 4

4th term

ANS-2

CNS-2

5th term

CVS-2

Endo-2

6th term

Chemotherapy-2

Autocoids - 1

Anticancer-1

7th term

Recent Advances - 4

DESIRABLES :

1. CRO visits in 4th term : 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.

OR

Incase this is not possible then 10-15 days workshop on clinical pharmacology in reputed institutes would be desirable.

Dissertation Objectives:

1. To make aware the post graduate student about every aspect of research this involves finding research topic, searching literature, research methodology,

Statistics, analysis, scientific writing and many other aspects involved.

2. The topic or project taken need not necessarily bring out /explore something very novel, very big or breakthrough in medical science. The main aim is to train post graduate students for taking up such challenges in the future and learn maximum about the research development during their curriculum.

Dissertation topic along with plan of work is to be allotted by the guide within one year. The study could be prospective or retrospective and to be cleared by appropriate ethic committee. (Topics not be repeated for three years). The subject of dissertation countered by the postgraduate student and head of the dept. of the institutes should be submitted to the university within one year of registration. If the topic is changed, it should be communicated to university within one and half year of registration. Dissertation presentation would be done two times, first presentation before protocol submission and last before final submission.

Four copies of completed dissertation with appropriate certificates should be submitted at the end of fifth semester.

Four examiners will examine these dissertation and report acceptance or otherwise, (three out of four have to accept the dissertation for its final acceptance by the university). If two examiners accept the dissertation, Chairman BOS will take final decision. Non acceptance should be justified with reason thereof.

Examination pattern :

Yearly exam could be taken if needed by the individual department and should not be mandatory.

Final Examination

Theory

Theory will be four question papers of 3 hour duration, each of 100 marks. each question paper will have 4 questions.

Paper I – Experimental Aspects of Pharmacology & Toxicology Biostatistics

Paper II – Theoretical Aspects of Pharmacology and Toxicology

Paper III- Applied pharmacology

Paper IV- Recent Advances in Pharmacology & Toxicology

- 1) Question 1, 20 marks
- 2) Question 2, 20 marks
- 3) Question 3 20 marks
- 4) Question 4 Short notes (10 marks each) No choice

Marking scheme of theory examination

	<i>Total marks</i>	<i>Minimum marks per Paper</i>
Paper I	100	40
Paper II	100	40
Paper III	100	40
Paper IV	100	40
	Total Marks 400	200

[The candidate should score minimum 40 marks per paper and 200 of total 400 marks in theory i.e. 50%.]

Pravara Institute of Medical Sciences (DU), M.Sc.(Pharmacology) Practical Examination

Syllabus

Max.Marks: 400

- 1) Long Experiment (one) 100 marks.
Isolated tissue experiment including Bioassay
Determine the conc. of drug using suitable isolated tissue preparation.
- 2) Short Experiments (Two) 50 min. each 100 marks.
 - a) Drug screening procedures
 - b) Drug evaluations
 - c) Protocol design
- 3) Technique Demonstrations (Two) 75 marks.each
 1. Oral feeding 35 marks
 2. Blood collection in lab. animals/
. I.V. injection in experimental animals 40 marks

Total :75 marks
- 4) Equipments and Instruments used in Pharmacological Experiments and drug research 50 marks.
Explain the principle of working & uses of commonly used instruments and equipments in pharmacology.
- 5) Grand viva - 75 marks Total Practical marks 400

Marking scheme for Practical Examinations

For long and short exercise and for viva, total marks will be 400 . The candidates have to score 50% mark .Total marks for passing should be 200 out of 400.

FINAL MARKING SCHEME FOR MSc. EXAMINATION IN PHARMACOLOGY.

<i>Heads of passing</i>	<i>Maximum Marks</i>	<i>Minimum marks for passing</i>
Theory	400	200
Practical and viva voce	400	200
Total Marks	800	400

RECOMMENDED READING

Journals

Annual Review in Pharmacology. Annual Review in Medicine

British Journal of Clinical Pharmacology

British Journal of Pharmacology

Clinical Pharmacology and Therapeutics.

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

Books:

1. Goodman & Gilman's The pharmacological Basis of Therapeutics. Hardman JG & Limbird LE(Ed), Publisher: McGraw-Hill, New York.
2. Basic & Clinical Pharmacology .Katzung BG(Ed) ,Publisher: Prentice hall International Ltd, London.

3. Avery's Drug Treatment . TM Speight & NHG Holford (Eds), Adis International
4. Principles of Drug Action. The Basis of Pharmacology WB Pratt & P Taylor (Eds) Churchill Livingstone, Edinburgh.
5. Pharmacology & Pharmacotherapeutics. Satoskar RS, Bhandarkar SD (Ed), Publisher : Popular Prakashan, Bombay.
6. Essentials of Medical Pharmacology .Tripathi KD (Ed), Jaypee Brothers, Publisher : Medical Publisher (P) Ltd.
7. Clinical Pharmacology .Laurence DR, Bennet PN, Brown MJ (Ed) . Publisher Churchill Livingstone.
8. A textbook of Clinical Pharmacology .Roger HJ, Spector RG, Trounce JR (Ed) Publisher : Hodder and Stoughton Publishers.
9. Harrison's Principles of Internal Medicine, AS Fauci, JB Martin, E Braunwald, DL Kasper, K J Isselbacher, SL Hauser, JD Wilson, DL Longo (Eds), McGraw Hill New York.
10. Guide to Good Prescribing. TPGM de vries, RH Henning, HV Hogerzeil, DA Fresle, WHO Geneva.
11. Critical appraisal of epidemiological studies and clinical trials-Mark Elwood. Oxford Press.
12. Pharmacology. Rang HP ,Dale M, Ritter JM. 4th ed Edinburgh, Churchill Livingstone, 1999.

Pertaining to Evaluation of drugs

1. Evaluation of Drug Activities :Pharmacometrics. DR Laurence & AL Bacharach (Eds), Academic Press, London.
2. Selected Topics in Experimental Pharmacology. UK Sheth, NK Dadkar & UG Kamat. Kothari Book Depot, Mumbai.
3. Fundamentals of Experimental Pharmacology. MN Ghosh (Ed), Scientific Book Agency, Calcutta.

Pertaining to Biostatistics

Introductory Medical Statistics. Mould RF (Ed), Adam Hilger, Bristol and Philadelphia, 1989.