

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

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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.D. (Pharmacology)**

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MD 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 in depth with understanding of the rational use of drugs, clinical pharmacology 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 and Therapeutics, the trained specialist shall be able to

Cognitive domain:

- 1) Apply basic principles of pharmacology and therapeutics to practice rational use of existing drugs and evaluation of new drugs.
- 2) Collect and analyse experimental and clinical data 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 & Pathological features
- 5) Audit drug utilization and drug related adverse events
- 6) Assess emergency situations while carrying out drug trials and institute exergency 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 and clinical research 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 marketing 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) Carry out necessary resuscitative measures in emergency situations arising during drug evaluation
- 5) 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 information 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, peers and paramedical staff
- 7) Realize the importance of team work
- 8) Develop attitudes required for professional responsibilities.

COURSE DETAILS

Duration of the course -36 months [6 semesters]

First year

1. Introduction to pharmacology and its branches.
2. Selection of dissertation topic
3. Rotation in labs
4. Teaching duties

Second year

1. Teaching duties
2. Extra mural posting like student posting
3. Dissertation work
4. Rotation in labs

Third year

1. Dissertation completion
2. Teaching duties
3. Rotation in labs

For this following topics could be included in theory /practicals of MD (pharmacology)

TEACHING LEARNING OPPORTUNITIES

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

1. Experimental Pharmacology

- Animal experiments-ethics, limits, research insights, animal house.
- Screening methods for drug evaluation and experimental models-general and specific screening
- Drug assays
- Methods of assays
- Toxicological screening
- Pharmacokinetics experiments
- Biostatistics
- Principles of analytical instrumentation
- Basics of Computers in pharmacology, data base creation

2. Clinical Pharmacology:

- Would include all aspects related with drug trials....ICH -GCP 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 Monitor
- Therapeutic Drug monitoring
- Pharmacoepidemiology, utilization studies
- Drug estimations in biological fluids
- Sources of drug information. DATA INTERPRETATIONS
- Advances in clinical pharmacology
- Essential drug listing

3. Drug store management

- Functions of drug store,
- Role of pharmacist in drug store ,
- ABC/VED classification of drugs,
- Use of computers in drug store, routine administration,

4. Teaching/Academics/personality development related topics:

- Microteaching/ TOS (teachers oriented sessions)
Teaching experiences: The candidate will be regularly involved in the teaching of undergraduate medical and nursing students
- Conducting mock workshops and conference/s.
- Presentation skills /group discussions
- Knowledge about patents , IPRS etc
- Computer aided learning (CAL) .
- Web searching for medical literature.
- Scientific paper writing etc.

5. Clinical case discussions:

Post diagnosis discussions on cases from clinical s.c.c.
Documentation of these cases in logbook.

6. Computer simulated dog BP exercise:

Identification of unknown drug in Computer simulated dog BP exercise.

7. 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
- **Journal/ seminar presentations in department :**
It should be taken care that each student presents 10 -12 seminars during the entire tenure and topics could be divided as per the following format

Year	Topics
1 st	General pharmacology (2) Systemic pharmacology (2)
2 nd	Physiologic/Clinical Experimental pharmacology
3 rd	Recent pharmacology (4)

- **Evaluation of the journal/seminars** should be done by teachers on 5 points

- Eg presentation, completeness, A-V aids use, understanding, overall performance.
The purpose of this exercise should be to make the student aware of his progress.
- Experimental evaluation system (to be evaluated by guide , signed and pasted in the log book)

Example of evaluation sheet format given below.

Headings	Comments			
Assembly				
cleanliness				
Instruments used				
Technique				
Results/interpretation				
Discussion: Theory				
Discussion: Practical				
Overall remarks	Excellent	Good	Fair	Poor

Desirables:

1) Drug level monitoring

Hands on experience with HPLC, HPTLC , spectrophotometry .

- 2) **CRO visits:** 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.

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

- 3) **Inclusion of topics** like pharmacoconomics , pharmacovigilance, Pharmacogenetics. pharmacoepidemiology. National health programmes and chronopharmacology 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 institute 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 dissertations 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 reasons thereof.

Examination Pattern:

(As per Direction No. 01/2008 dtd. 26/05/2008)

RECOMMENDED READING

Journals

Annual review in Pharmacology Annual Review in Medicine
British Journal of Clinical Pharmacology
British Journal of Pharmacology
Clinical Pharmacology & 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 Publishers (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, KJ 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, Chuchill 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

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

Sample of Log book format attached.

**LOGBOOK
(FORMAT)**

RESIDENCY PROGRAMME

**M.D.(PHARMACOLOGY AND
THERAPEUTICS)**

**MAHARASHTRA UNIVERSITY OF
HEALTH SCIENCES, NASHIK**

PERSONAL BIODATA

PASSPORT
SIZE
PHOTOGRAF

NAME OF THE CANDIDATE –

NAME OF THE INSTITUTE –

YEAR AND ONTH OF REGISTRATION –

NAME OF THE P.G.TEACHER –

FATHER'S NAME –

PERMANENT ADDRESS OF THE CANDIDATE –

DATE OF BIRTH OF THE CANDIDATE –

EDUCATION QUALIFICATIONS

<u>SN.</u>	<u>DEGREE</u>	<u>INSTITUTE/ UNIVERSITY</u>	<u>YEAR OF PASSING</u>
1.			
2.			
3.			
4.			
5.			

SERVICE RECORD

SN.	POSITION	VENUE	FORM	TO	REMARKS
1	INTERNSHIP				

DISSERTATION DETAILS

NAME OF THE TOPIC –

COGUIDE IF ANY –

DATE OF CLEARANCE BY ETHICS COMMITTEE –

POSITING SCHEDULES

FIRST YEAR

S.NO.	FROM	TO	PLACE OF POSTING	REMARKS SIGN. OF I/C

SECOND YEAR

S.NO.	FROM	TO	PLACE OF POSTING	REMARKS SIGN. OF I/C

THIRD YEAR

S.NO.	FROM	TO	PLACE OF POSTING	REMARKS SIGN. OF I/C

JOURNAL CLUBS

TERM AND YEAR	HELD	ATTENDED	REMARKS
1.			
2.			
3.			
4.			
5.			
6.			

SHORT TALKS/SEMINARS CONDUCTED BY THE CANDIDATE

NO.	TOPIC	DATE	REMARKS OF GUIDE
1.			
2.			
3.			
4.			
5.			
6.			
7.			

EXPERIMENTS CONDUCTED BY THE CANDIDATE
[GRAPH IF ANY TO BE PRSSERVED]

NO.	NAME OF THE EXPERIMENTS	DATE	RESULTS	REMARKS OF GUIDE

THIS SHOULD INCLUDE CLINICAL PHARMACOLOGY EXPT.
USE ADDITIONAL SHEETS IF REQUIRED.

CONFERENCES/WORKSHOPS ATTENDED

- 1.
- 2.
- 3.
- 4.
- 5.

PUBLICATIONS IF ANY

1.

2.

3.

4.

SIGN. OF GUIDE.

SIGN. OF HOD