

## Syllabus and Examination pattern for Post - Graduate Medical Courses

### NOTIFICATION

Ref. :

- (1) *Medical Council of India Regulation on Graduate Medical Education, 1997.*
- (2) *Amendment of the regulations on graduate medical education notified by Government of India from time to time :*
  - a. *Gazette Notification dated 29.05.1999.*
  - b. *Notification no. MCI-37 (2)/2001/Med-922, dated 12.04.2001.*
  - c. *Notification no. MCI-26 (3)/2003/Med-18503, dated 26.09.2003.*
  - d. *Notification no. MCI-26 (3)/2003/Med-20958, dated 15.10.2003.*

*In exercise of the powers, conferred under section 26 of Krishna Institute of Medical Sciences Deemed University, the Board of Management in its meeting held on 27<sup>th</sup> June, 2006, has been pleased to approve the Bye-law pertaining to Post Graduate Medical courses as given in schedule here to Annexed.*

*The Bye-law as above shall be effective for the students admitted to Post Graduate Medical courses from the academic year 2006-07 onwards.*

**By Order  
Registrar**

1. This byelaw shall be called Syllabus and Examination pattern for Post-Graduate Medical Course.

### **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 in fields of Pharmacology and therapeutics.

#### **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 analysis 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 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 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 teamwork
- 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 - including Biochemistry and Microbiology
4. Teaching duties

**Second year**

1. Teaching duties
2. Prescription scrutiny, clinical case presentation.
3. Dissertation work
4. Rotation in labs - including Biochemistry and Microbiology.

**Third year**

1. Dissertation completion
2. Teaching duties
3. Rotation in labs - including Biochemistry and Microbiology. (Antibiotic sensitivity testing)

**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 evaluations 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:**

- All aspects related with drug trials.... ICH -GCP guidelines, ICMR/DCGI guidelines
- Role of DCGI
- Protocol designing
- Basic statistics
- Laws related to drug research including herbal drugs,
- Taking informed consent etc.
- Ethics
- ADR Monitoring
- 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

- a. Functions of drug store,
- b. Role of pharmacist in drug store
- c. ABC/VED classification of drugs
- d. Use of computers in drug store, routine administration

### 4. Teaching/Academics/personality development related topics

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

### 5. Clinical case discussions

Post diagnosis discussions on 5 cases from clinical side.  
Documentation of these cases in logbook.

### 6. Computer simulated dog BP exercise:

Identification of unknown drug on 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 (Experiments, journals, thesis work, seminars)
- The content of the logbook 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 seminars during the entire tenure and topics could be divided as per the following format

Year	Topics
1 <sup>st</sup>	General Pharmacology Systemic Pharmacology
2 <sup>nd</sup>	Systemic / clinical / experimental pharmacology
3 <sup>rd</sup>	Recent advances in pharmacology.

The student should also present articles from Journals.

- Presentation of Journal article/Seminar should be evaluated by teachers on 4 points eg completeness, use of A. V aids, understanding, and overall performance. The purpose of this exercise should be to make the student aware of his/her 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

## 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 postgraduate 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 to be repeated for three years]. The subject of dissertation duly signed by the postgraduate student and countersigned by the postgraduate guide, head of the dept and head 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.

### 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 & Pharmcotherapeutics. 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. 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. Guides 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. 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**

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

## Examination Pattern

### Final Examination

#### Theory

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

#### Paper I -

History, Screening and evaluation of drugs (Animal and Clinical), clinical pharmacology, General pharmacology, biostatistics.

#### Paper II -

Systemic pharmacology.

#### Paper III -

Applied pharmacology including therapeutics.

#### Paper IV -

Recent advances.

#### Note: S.A.R not expected in any paper

In each question paper, questions 1 & 2 will be long answer questions (LAQ) of 30 marks each and questions 3 & 4 will be two short notes per question with the option of 2 out of 3 (20 marks each).

- 1) Question 1 and 2 - LAQ (30 marks each)
- 2) Question 3 & 4 - Short notes (10 marks each)

#### Marking scheme of theory examination

	Marks for individual question				Total marks	Minimum Marks per paper
	Q.1	Q.2	Q.3	Q.4		
	LAQ 1	LAQ 2	SN 1 & SN2	SN1 & SN2		
Paper I	30	30	20	20	100	40
Paper II	30	30	20	20	100	40
Paper III	30	30	20	20	100	40
Paper IV	30	30	20	20	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 %.

#### Practical Examination

The Practical Examination will have long exercises, short exercises and viva-voce.

Long exercises will carry 150 marks.

Short exercises will carry 75 marks.

Dissertation presentation and viva pertaining to it will carry 25 marks and rest of the viva 150 marks.

This examination will be of 2 days duration.

#### Day 1 - Long Exercises -

- a) Identification of unknown drug using Rabbit's isolated small intestine preparation (100 marks)

- b) Bioassay on Frog rectus/Guinea pig ileum preparation (50 marks)

**Day 2 - Short exercises and Viva-Voce -**

- a) Demonstration of experimental technique and equipment handling (25 marks).
- b) Criticism and comments on protocol (25 marks)
- c) Solving therapeutic problem or criticism of promotional literature or proprietary preparations (25 marks).
- d) Viva-Voce:
- 1) Dissertation presentation and viva (microteaching for repeaters if needed) (25 marks)
  - 2) Viva-voce examination (150 marks).

**Marking scheme for Practical examination.**

For long and short exercises and for viva, total marks will be 400. The candidates have to score 40% under each of these heads. However, to declare as 'passed' the aggregate marks should be 200 out of 400.

	Maximum marks	Minimum marks for passing
Long exercises	150	60
Short exercises	75	30
Viva voce	175	70
<b>Total marks</b>	<b>400</b>	<b>200</b>

Final Marking Scheme For MD Examination In Pharmacology And Therapeutics.

Heads of Passing	'Maximum Marks'	Minimum Marks for passing
Theory	400	200
Practical and Viva voce	400	200
<b>Total Marks</b>	<b>800</b>	<b>400</b>