Syllabus for
MD (Pharmacology) Programme

Atal Medical & Research University

A state University established by the Govt of H.P

Atal Medical & Research University, H.P.

(A State Govt. University)

(SLBS Govt. Medical College & Hospital Campus, Ner Chowk, Mandi, H.P.)

Minutes of meeting of PG Board of Studies (Pharmacology) held on 20th May, 2023 in COE Office, AMRU at 11:00 AM

A meeting of PG Board of Studies (Pharmacology) was held on 20th May, 2023 at 11:00 AM at COE Office, AMRU under the Chairmanship of Dr. Parveen Kumar Sharma, Professor & HOD, Pharmacology, SLBSGMC&H, Mandi.

Following members attended the meeting:

1. Dr. Parveen Kumar Sharma, Professor & HOD, Pharmacology, SLBSGMC&H, Mandi -cum-Chairperson.
2. Dr. Jayant Kumar Kairi, (External Expert), Professor, Dept. of Pharmacology, Kalpana Chawla Govt. Medical College and Hospital, Karnal (Haryana) nominated by the Hon'ble Vice Chancellor -cum-Member (through video conference)
3. Dr. Atal Sood, Professor, Dept. of Pharmacology, Dr. RPGMC, Tanda-cum-Member.
4. Dr. P.K Kaundal, Associate Professor (Regular) and Professor (Designated), Dept. of Pharmacology, IGMC, Shimla -cum-Member.
5. Dr. Aanchal Rehalia, Assistant Professor (Regular), Associate Professor (Designated), Dept. of Pharmacology, IGMC Shimla-cum-Member.

The meeting started with the Chairperson welcoming the members.

The following decisions were taken:

1. Syllabus for degree of MD Pharmacology prescribed by NMC was discussed with among the members, few suggestions of members were added and final draft was approved.
2. Examination pattern of MD Pharmacology prescribed by NMC was discussed and accepted with few additions.
3. The teaching schedule to be followed by the PG department has been reviewed.
4. Logbook was discussed & finalised.

The meeting ended with a vote of thanks to the chair.

Dr. Parveen Kumar Sharma,
Professor & HOD, Pharmacology,
SLBSGMC&H, Mandi.

Dr. Jayant Kumar Kairi, (External Expert),
Professor, Dept. of Pharmacology,
Kalpana Chawla GMC&H, Karnal (Haryana).

Dr. Atal Sood,
Professor, Dept. of Pharmacology,
RPGMC, Tanda.

Dr. P.K Kaundal,
Associate Professor (Regular) and Prof. (Designated), Dr.
Dept. of Pharmacology, IGMC, Shimla.

Dr. Aanchal Rehalia,
Assistant Prof. (Regular), Associate Prof. (Designated),
Dept. of Pharmacology, IGMC, Shimla.

Theory Examination

There shall be four theory papers of 100 marks each. For passing the exam, a student must score a minimum of 40 marks in each paper and a minimum of 200 aggregate marks in all papers. Each question paper shall have 10 questions of 10 marks each. One question in each paper shall have five sub-parts of two marks each and one question shall have 2 sub-parts of five marks each.

The course contents should cover the following broad topics:

Paper-1

1. History of Pharmacology and medicine
2. Basic and molecular pharmacology
3. Drug receptors and Pharmacodynamics
4. Pharmacokinetics (Absorption, Distribution, Biotransformation, Excretion &kinetic parameters)
5. Drug delivery systems
6. Therapeutic Drug Monitoring
7. Over the counter drugs, essential medicines, P-drug, commonly used Over-The-Counter (OTC) drugs, generic drugs, drugs banned in India
8. Biochemical Pharmacology
   - Basic principles and applications of simple analytical methods
   - Principles of quantitative estimation of drugs, endogenous compounds and poisons using Colorimetry, Spectrophotometry, flame photometry, High Performance Liquid Chromatography (HPLC) and enzyme-linked immunosorbent assay (ELISA).

Paper-2

9. Drugs acting on synaptic and neuroeffector junctional sites
10. Autonomic pharmacology
11. Drugs acting on central nervous system
12. Drugs modifying renal functions
13. Drugs acting on cardiovascular system and hemostatic mechanisms
14. Reproductive Pharmacology
15. Agents affecting calcium homeostasis
16. Autacoids and related pharmacological agents (analgesics) and drugs

used in Rheumatoid arthritis and Gout

17. Drugs acting on Gastrointestinal system
18. Pharmacology of drugs affecting the respiratory system
19. Chemotherapy- General principles and various antimicrobials
20. Chemotherapy of neoplastic disease
21. Drugs used in Autoimmune disorder and Graft versus Host Disease
22. Dermatological pharmacology
23. Ocular pharmacology
24. Use of drugs in special population
25. Immunomodulators - immunosuppressants and immunostimulants
26. Pharmacology of drugs used in endocrine disorders
27. Heavy metal poisoning
28. Non-metallic toxicants - air pollutants, pesticides etc.
29. Research methodology and biostatistics
30. Pharmacogenomics, pharmacovigilance, pharmacoeconomics and pharmacoepidemiology
31. Principles of rational use of drugs and rational prescribing
32. Dietary supplements and herbal medicines
33. Pathophysiological basis and management of common poisonings
34. National programmes for infectious and vector borne diseases including the regimes.

Paper-3

35. Clinical pharmacology
    - Functioning of the Drugs and Therapeutics Committee.
    - Hospital formulary development.
    - Drug information services.
    - Medication error detection and mitigation advice.
    - Antimicrobial resistance and antibiotic stewardship.
    - Prescription auditing
    - Drug counseling - explain to patients, the effects and adverse effects of drugs, including the need for medication adherence
    - Emergency drugs used in crash cart/ resuscitation

36. Drug development research and Regulations

- Principles of Good Clinical Practice (GCP) and Good Laboratory Practice (GLP) guidelines, and Good publication practices
- Recent regulatory guidelines for drugs/research and clinical trials
- Drug development and research and ethical issues involved in it
- Research protocol development, research study conduct, experimental observations, analysis of data using currently available statistical software
- Emergency use authorization for drugs eg., vaccine development

37. Professionalism & ethics

38. Pharmacometrics - methods of drug evaluation.

39. General screening and evaluation of:

- analgesics, antipyretics, anticonvulsants, anti-inflammatory drugs, antidepressants, antianxiety and antipsychotics, sedatives, muscle relaxants, antihypertensives, hypocholesterolemic agents, anti-arrhythmic drugs, diuretics, adrenergic blocking drugs, local anaesthetics, antifertility agents, antidiabetics, drugs used in peptic ulcer diseases and drugs affecting learning and memory in animals and man.

40. Experimentation

- Bioassay methods
- Animal experiments: Ethical considerations, ethical approval, applicable Regulatory Guidelines, humane animal research (principles of 3Rs) and alternatives to animal experimentation. General and statistical considerations
- Anesthetics used in laboratory animals
- Principles of EC50, ED50, pD2 and pA2 values of drugs
- Describe methods of bioassay for estimation of: Acetylcholine, skeletal neuromuscular junction blockers, adrenaline, noradrenaline, histamine, 5 HT, hormones, insulin, vasopressin/oxytocin, estrogen, progestins, ACTH
- Competitive antagonism - pA2 values
- Immunoassays: Concept, types of bioassays and their application/s
- Animal experiments: Ethical consideration, Ethics Committee and ethical approval

- Regulatory Guidelines and alternatives to animal experimentation.

41. Education

- Salient features of Undergraduate Medical Education Curriculum in India.
- Postgraduate Medical Education Curriculum and Guidelines in India.
- Principles of teaching - learning methods and technology
- Principles of assessment of learners

Paper-4

Recent Advances in all aspects of Pharmacology

Practical/clinical and Oral/viva voce examination

Practical examination shall be of 400 marks, spread over **two** days and include various majorcomponents of the syllabus focusing mainly on the psychomotor domain. A student is required to get a minimum of 200 marks to pass the examination.

Oral/Viva voce examination (100 marks) on defined areas should be conducted by each examiner separately. Oral examination shall be comprehensive enough to test the postgraduate student's overall knowledge of the subject focusing on psychomotor and affective domain.

Practical Examination Exercises:

a) long exercises: (20 marks each; total 60 marks)

- Protocol design for a given scenario
- Case audit for a given case
- Perform experiments or simulated experiments (as per PG Regulations)

  The exercises should be observed, response of student noted and assessed.

  The question related to these exercises can be asked

b) short exercises: (10 marks each; total 20 marks)

- Interpretation of results of a previous tracing - Table exercise
- Demonstration of effects of drugs/interpretation of results in human
- Demonstration of effects of drugs/interpretation of results in small, animals - optional (as per Regulations notified)

  The exercises should be observed and assessed.

c) Assessment of teaching/presentation skills

- e.g., presentation of a UG lecture, making Question paper, Learning

Objectives (30 marks)

- Discussion on dissertation (50 marks)

d) Log Book and Assessment of activities done during the period of training (40 marks)

e) OSPE exercises: Objective Structured Practical Examination (OSPE) (10 stations of 10 marks each; Total 100 marks)

OSPE Stations shall be mixture of observed (observer present) and unobserved stations (without an observer). Few examples are given below:

- Various drug delivery systems
- Calculating pharmacokinetic parameters
- Pharmaceutical calculations
- Statistical exercise
- Pharmacoeconomics
- Critical appraisal of a published paper
- Abstract writing of a published paper
- Evaluation of drug promotional literature.
- Adverse Drug Reaction (ADR) reporting and causality assessment
- Assessment of preclinical toxicity data
- Analysis of rational and irrational formulations
- Selecting a P-drug and writing rational prescriptions
- Analytical instruments - use and interpretation
- Identifying ethics related dilemmas / mistakes in clinical trial documents