Syllabus for PhD in Pharmacology, SMIMS

1. Basic and molecular pharmacology

2. Drug receptors and Pharmacodynamics

3. Pharmacokinetics (Absorption, Distribution, Metabolism and Excretion)

4. Biotransformation

5. Pharmacogenomics and Pharmacogenetics

6. Autonomic Pharmacology

7. Drugs acting on Smooth muscles

8. Clinical pharmacology

9. Drug development and Regulations

10. Clinical Pharmacokinetics

11. Drugs acting on Synaptic and Neuroeffector Junctional sites

12. Drugs acting on Central Nervous System (Sedative, Hypnotics, Antiepileptics, General Anesthetics, Local Anesthetics, Skeletal Muscle Relaxants, Antipsychotic, Antidepressants, Drugs used in Parkinson's disease and other neurodegenerative disorders, opioid agonists and antagonists, Drugs of abuse)

13. Drugs modifying renal function

14. Drugs acting on cardiovascular system and haemostatic mechanisms (Antihypertensives, Antianginal, Antiarrhythmics, Drugs used in heart failure,

Drugs used in Dyslipidemias, Fibrinolytics, Anticoagulants, Antiplatelets

15. Reproductive Pharmacology

16. Agents effecting calcification and bone turnover

17. Autacoids and related pharmacological agents (NSAIDs) and drugs used in Rheumatoid arthritis and Gout

18. Gastrointestinal drugs

19. Pharmacology of drugs affecting the respiratory system (drugs used in Bronchial Asthma and COPD)

20. Antimicrobial, antiparasitics, disinfectants, antiseptics

21. Chemotherapy of neoplastic disease

22. Antiviral drugs

23. Drugs used in Autoimmune disorder and Graft versus Host Disease

24. Dermatological pharmacology

25. Ocular pharmacology

26. Use of drugs in pregnancy

27. Perinatal and Pediatric Pharmacology

28. Geriatric Pharmacology

29. Immunomodulators - immunosuppressants and immunostimulants

30. Pharmacology of drugs used in endocrine disorders (drugs used in diabetes mellitus, hypothalamic and pituitary hormones, thyroid and antithyroid drugs, adrenocorticid hormones and their antagonists, gonadal hormones and their inhibitors)

31. Drug delivery systems

32. Heavy metal poisoning

33. Non-metallic toxicants - air pollutants, pesticides etc.

34. Research methodology and biostatistics

35. Literature search.

36. Pharmacogenomics, Pharmacovigilance (ADR reporting), pharmacoeconomics (cost effectiveness study) and pharmacoepidemiology

37. Over the counter drugs

38. Dietary supplements and herbal medicines

39. Pharmacometrics - methods of drug evaluation.

40. General screening and evaluation of:

a. Analgesics, antipyretics, anticonvulsants, anti-inflammatory drugs, antidepressants, antianxiety and antipsychotics, sedatives, muscle relaxants, antihypertensives, hypocholesterolaemic agents, antiarrhythmics, diuretics, adrenergic blocking drugs

b. Drugs used in peptic ulcer diseases/Prokinetic agents/ antiemetics, Antitussives, /anti-asthma agents, Local Anaesthetics, Oxytocics, antifertility agents, Antidiabetics

c. Behavioral pharmacology models and evaluation of drugs affecting learning and memory

41. Bioassays

a. Bioassay methods

b.Animal experiments: Ethical considerations, ethical approval, applicable regulatory Guidelines (CPCSEA), humane animal research (principles of 3Rs) and alternatives to animal experimentation. General and statistical considerations

c. Anesthetics used in laboratory animals

d. Principles of EC50, ED50, pD2 and pA2 values of drugs

e. Describe methods of bioassay for estimation of:

Acetylcholine, skeletal neuromuscular junction blockers, adrenaline, noradrenaline, histamine, 5-HT, hormones, insulin, vasopressin/oxytocin, estrogen, progestins, ACTH

f. Competitive antagonism - pA2 values

g. Immunoassays: Concept, types of bioassays and their application/s

h. Animal experiments: Ethical consideration, ethical approval

i. Regulatory Guidelines (CPCSEA) and alternatives to animal experimentation

42. Biochemical Pharmacology

a. Basic principles and applications of simple analytical methods

b. 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).

Recommended Books (latest editions)

1. Goodman & Gilman's The Pharmacological Basis of Therapeutics, ed. Laurence

Brunton, Bruce A. Chabner, Bjorn Knollman.

2. Essentials of Medical Pharmacology, by KD Tripathi

3. Basic and Clinical Pharmacology, by Bertram G. Katzung and Anthony J. Trevor

4. Drug Discovery and Evaluation: Pharmacological Assays Editors: Vogel, Hans

6.Clinical Pharmacology by Laurence, Bennett and Brown

7. Rang and Dale's Pharmacology by H.P. Rang

8. Koda Kimble and Youngs Applied Therapeutics by Brian K Alldredge and Robin L Corelli