SYLLABUS

The course contents should cover the following broad topics:

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. Therapeutic Drug Monitoring
6. Drugs acting on synaptic and neuroeffector junctional sites
7. Autonomic pharmacology
8. Drugs acting on central nervous system
9. Drugs modifying renal functions
10. Drugs acting on cardiovascular system and hemostatic mechanisms
11. Reproductive Pharmacology
12. Agents affecting calcium homeostasis
13. Autacoids and related pharmacological agents (analgesics) and drugsused in Rheumatoid arthritis and Gout
14. Drugs acting on Gastrointestinal system
15. Pharmacology of drugs affecting the respiratory system
16. Chemotherapy- General principles and various antimicrobials
17. Chemotherapy of neoplastic disease
18. Drugs used in Autoimmune disorder and Graft versus Host Disease
19. Dermatological pharmacology
20. Ocular pharmacology
21. Use of drugs in special population
22. Immunomodulators - immunosuppressants and immunostimulants
23. Pharmacology of drugs used in endocrine disorders
24. Drug delivery systems

25. Heavy metal poisoning
26. Non-metallic toxicants - air pollutants, pesticides etc.
27. Research methodology and biostatistics
28. Pharmacogenomics, pharmacovigilance, pharmacoeconomics andpharmacoepidemiology
29. Over the counter drugs, essential medicines, P-drug, commonly used Over-The-Counter (OTC) drugs, generic drugs, drugs banned in India
30. Principles of rational use of drugs and rational prescribing
31. Dietary supplements and herbal medicines
32. Pathophysiological basis and management of common poisonings
33. National programmes for infectious and vector borne diseases including theregimes.
34. Professionalism & ethics
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 ofdrugs, 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 LaboratoryPractice (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, experimentalobservations, analysis of data using currently available statistical software
- Emergency use authorization for drugs eg., vaccine development

37. Pharmacometrics - methods of drug evaluation.

38. 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 learningand memory in animals and man.
  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 ethicalapproval

- Regulatory Guidelines and alternatives to animal experimentation.

39. Biochemical Pharmacology

- Basic principles and applications of simple analytical methods
- Principles of quantitative estimation of drugs, endogenous compounds andpoisons using Colorimetry, Spectrophotometry, flame photometry, High Performance Liquid Chromatography (HPLC) and enzyme-linked immunosorbent assay (ELISA).

40. 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

MAPPING OF PROGRAMME OUTCOMES [POs] AND COURSEOUTCOMES [COs] OF PG PROGRAMMES

No	
PO 1	Knowledge and Skills
PO 2	Planning and problem solving abilities
PO 3	Communication
PO 4	Research Aptitude
PO 5	Professionalism and Ethics
PO 6	Leadership
PO 7	Societal Responsibilities
PO 8	Environment and Sustainability
PO 9	Lifelong Learner

PHARMACOLOGY

Course Code	Course Title
01230301	MD Pharmacology

PROGRAMME OUTCOMES

CO No.	At the end of the course, the learner should be able to:	Mapped Programme Outcomes
CO 1	Acquire knowledge on generic drugs and prescriptions, rational use of drugs, prescription auditing, antimicrobial stewardship programs and strategies for containment of antibiotic resistance	PO1,PO2,PO3,PO4 , PO5, PO6, PO7, PO8, PO9
CO 2	Demonstrate knowledge of basics of research methodology, research protocol development, conduct the study, record observations, analyze data, interpret results for dissertation writing and disseminate these results to have the potential ability to pursue further specializations and eventually be competent to guide students	PO1,PO2,PO3,PO4 , PO5, PO6,PO7,PO8, PO9
CO 3	Describe the principles of teaching – learning technology towards application and take interactive classroom lectures, modules for problem based learning (PBL), case discussions, small group discussions, seminars, Journal club and research presentations	PO1,PO2,PO3, PO4, PO5, PO6,PO7,PO9
CO 4	Demonstrate knowledge about computer assisted learning (CAL) softwares, mannequins and various instruments and ability to use them efficiently to promote learning	PO1,PO2,PO3, PO4, PO5, PO6,PO7,PO9

CO 5	Acquire knowledge on animal toxicity studies, in vitro and in vivo animal experiments, ADR monitoring, legal and ethical issues involved in drug development and research	PO1,PO2,PO3,PO4 , PO5, PO6,PO7,PO8, PO9

CO No.	At the end of the course, the learnershould be able to:	Mapped Programme Outcomes
CO 6	Acquire knowledge on pharmacogenetics, pharmacogenomics, pharmacoeconomics, pharmacoepidemiology, pharmacovigilance & pharmacometrics	PO1,PO2,PO 3,PO4, PO5, PO6,PO7, PO9
CO 7	Demonstrate skills of presentation in the form of paper and poster at academic meetings, publications and writing research projects for funding agency, analyze and evaluate research paper	PO1,PO2,PO 3,PO4,PO5, PO6,PO7, PO9
CO 8	Complete two months of industrial internship posting to acquire hands-on knowledge of preparing investigator's brochure, report SAEs, perform causality assessment and report ADR as per PvPI, evaluate promotional drug literature, prepare drug information sheet and to prepare documents for regulatory bodies like DCGI, CDSCO, CPCSEA, FDA etc.	PO1,PO2,PO 3,PO4, PO5, PO6,PO7, PO9