

General Pharmacology (Practical)

Course code: BP309P

B. Pharm, Semester III

*As per the new Pharmacy Council of India (PCI) syllabus 2026
(NEP 2020)*

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Preface

General Pharmacology (Practical), BP309P, sits at the point where the theory of drug action becomes a set of measurements. A drug is not fully understood until its effect can be graded against dose, its safety expressed as a number, and its handling in the body reduced to parameters that decide a dose. That is the work of this course, and this manual is built to support it end to end.

The syllabus is unusual in that most of its exercises are performed on validated computer simulations and software rather than on live animals. This is deliberate and modern. The 6Rs of humane experimentation, the CCSEA rules, and the international OECD and ICH guidelines have moved undergraduate teaching decisively toward *in silico* and simulation methods wherever the learning outcome can be met without an animal. The experiments that follow therefore teach the reasoning, the data, and the calculation of classical pharmacology while respecting that shift.

Every experiment in this book follows one fixed structure so that a student always knows where to look: **Aim, Requirements, Principle, Procedure, Observations, Calculations, Result, Precautions, and Viva-Voce**. Two kinds of table appear throughout. A table marked **Specimen data** is worked out in full, so the method of calculation can be learned from a complete example. A table marked **For student's observations** is left blank, to be filled during the laboratory session and defended in the viva. Read the specimen table first, reproduce its calculation, then use the blank table for your own readings.

The manual has been kept deliberately concise. Depth has been placed in the data tables, the worked calculations, and the viva questions rather than in long descriptive passages, so that the book works as both a textbook to study from and a record book to write in.

Authors

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Course objectives

The objectives of this course are to:

1. Understand the historical and foundational aspects of experimental pharmacology.
2. Develop knowledge and practical awareness of ethical and regulatory standards in laboratory animal care and use, as outlined in the CCSEA guidelines.
3. Acquire skills in pharmacological data acquisition and analysis.
4. Interpret and construct dose–response curves (DRCs) and calculate pharmacological indices such as LD₅₀, threshold and ceiling dose, slope of the DRC, and PD₂.
5. Calculate pharmacokinetic parameters and analyse the role of pharmacokinetic parameters in drug effects and the dosing schedule.

Course outcomes

On successful completion of this course, the student will be able to:

CO	Statement
CO1	Identify and describe the pharmacological actions of drugs on different physiological systems and understand their therapeutic relevance.
CO2	Design basic pharmacological experiments and analyse the results to determine drug efficacy and safety.
CO3	Apply the knowledge of drug mechanisms and interactions to predict clinical outcomes.
CO4	Develop skills for documentation, data collection, and report preparation of experimental pharmacological investigations.
CO5	Understand the importance of pharmacology in drug development, clinical research, and its application in medical practice.

List of experiments

1. To describe the contributions of renowned pharmacologists and their discoveries based on pharmacological experiments (Any 5 Noble Laureates whose research contributed to the development of Pharmacology).
 2. To study various laboratory safety precautions, hazards, personal hygiene, commonly used tools, devices and instruments in experimental pharmacology.
 3. To study common experimental animals including transgenic animals along with their applications in the pharmacological experiments in current drug discovery paradigm.
 4. To study concept of 6Rs along with the maintenance and experimentation on laboratory animals as per the CCSEA guidelines.
 5. To demonstrate collection/isolation of DNA and RNA using computer simulations and audiovisual aids.
 6. To study important anaesthetics and euthanasia procedures for experimental animals.
 7. To demonstrate different routes drug administration using computer simulation and understand the significance of each route along with the maximum administrable dose.
 8. To study preparation of different types of physiological salt solutions (PSS), cell culture media and to understand the role of each ingredient used in PSS preparation.
 9. To study the instrumentation used for isolated tissue experiments (students organ bath assembly) and recent development in recording of the responses of isolated tissues.
 10. To record the dose response curve of any two agonists on suitable isolated tissue preparation using computer simulation experiment.
 11. To study the potentiating effect of physostigmine on DRC of acetyl choline through interactive computer simulation.
 12. To study antagonizing effect of d-tubocurarine on the DRCs of acetylcholine through interactive computer simulation.
 13. To determine of PD₂ of given agonists using isolated tissue preparation using computer simulation experiment.
 14. To study and determine various pharmacokinetic parameters (C_{max}, T_{max}, K_e, t_{1/2}, V_d, Cl_t, AUC, AUMC) from given hypothetical data.
 15. To estimate LD₅₀ using hypothetical data through computer-simulated experimentation (as per OECD 425 guideline) using software.
 16. Software based quantification of micronucleus test and chromosomal aberration test
 17. Software based prediction of teratogenicity.
 18. Use of UV-Spectrophotometer for studying drug-protein interactions.
- *PCI recommended software's shall be used for performing experiments.

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