GENERIC ELECTIVE COURSE [redacted] (BIOMED-GE-[redacted]) PHARMACOLOGICAL SCIENCE

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Pharmacological Science	**4**	**3**	**-**	**1**	**XII Passed**	**Basic knowledge of human physiology**

Learning Objectives:

- This course focuses on the study of drugs and their application in treating various diseases. Students will gain knowledge about different drug formulations and their methods of administration within the body.
- The course covers the fundamental mechanisms through which drugs influence or modify physiological processes to achieve therapeutic effects.
- Additionally, students will develop an understanding of selecting and utilizing drugs to manage microbial infections and address diseases resulting from hormonal imbalances.

Learning Outcomes:

- Students will be introduced to the naming and formulation of drugs, the routes of drug administration, and the factors influencing the choice of one route over another in specific patient conditions.
- The course will cover fundamental concepts of drug absorption, transport, excretion, and the effects of metabolism on drug activity. Topics will include the quantification of drug half-life, bioavailability, and elimination, along with the factors that influence these processes. Students will also explore the primary macromolecular targets of drugs in the body, such as receptors and enzymes and gain insight into measuring drug response, efficacy, potency, and the variables affecting drug action.
- Additionally, students will learn about the mechanisms of action, side-effects and contraindications of various drug classes.
- The course will also address the selection and use of antimicrobial drugs, the challenges associated with their indiscriminate or inadequate use, and the therapeutic applications of hormones and hormone antagonists.

SYLLABUS

Unit I: Introduction to pharmacology (10 hours)

Nomenclature of drugs (Generic, IUPAC and Proprietary name); Drug formulations- Powders, Liquids, Emulsions, Semisolid, Solid dosage forms and Aerosols; Routes of drug administration, their advantages and disadvantages, drug adverse effects.

Unit II: Pharmacokinetics and pharmacodynamics (12 hours)

Pharmacokinetics: Drug absorption, distribution, metabolism, and excretion, bio-availability, Therapeutic window, Kinetics of elimination, biological half-life of drug.

Pharmacodynamics: Various macromolecular targets of drugs (membrane receptor, transporters, enzymes, channels etc.). Dose response curve, Therapeutic Index, Affinity, Efficacy, Potency, Agonist and Antagonist.

Unit III: Mechanism of action of different classes of drugs (15 hours)

Mechanism of action, main side-effects and contraindications of the following drugs-

1. Antipyretics and Analgesics (Paracetamol and Ibuprofen)
2. Anti-inflammatory drugs (Aspirin, Celecoxib)
3. Sedatives (Diazepam)
4. Cholinergics (Bethanechol)
5. Adrenergics (Isoprenaline)
6. Oral hypoglycemic agent (Tolbutamide)

Unit IV : Pharmacotherapy: Antimicrobials and Hormonal Agents (8 Hours)

(a): Anti-microbial therapy

General aspects of anti-microbial therapy, Antibacterial drugs (Ciprofloxacin), Antifungal drugs (Amphotericin B).

(b): Hormones as drugs

Brief introduction; Insulin and Insulin Analogues, Hormone Replacement Therapy (HRT), Estrogen and Progestins.

Practical: **(30 Hours)**

(Wherever wet lab experiments are not possible, the principles and concepts can be demonstrated through any other material or medium including videos/virtual labs etc.)

1. Handling and housing of laboratory animals.
2. Demonstration of different routes of drug administration using rat/mice.
3. Fixing of organ bath and kymograph
4. To record CRC of acetylcholine using guinea pig ileum/ rat intestine (virtually)
5. Study of competitive antagonism using acetylcholine and atropine.
6. Determination of dose ratio.
7. Study the effect of an analgesic by Tail-flick test.
8. Study of effect of an anti-anxiety drug using Plus Maze test.

Essential Readings:

- Tripathi, K.D. (2018). 8th Edition. *Essentials of Medical Pharmacology*. Jaypee Brothers, India, ISBN-13: 9352704996-978.
- Kulkarni, S.K. (2014). 4th Edition, Reprint. *Handbook of Experimental Pharmacology*, Vallabh Prakashan, India, ISBN-13: 978-8185731766.

Suggestive Readings:

- Katzung, B. G., (2021) Basic and Clinical Pharmacology, 15th Edition, McGraw-Hill Education, ISBN: 978-1260452310.
- Ritter, J.M., Flower, R., Henderson, G., *et al*. (2019). 9th Edition (International). *Rang and Dale's Pharmacology.* Relx India Pvt. Ltd, ISBN-13: 978-0702074479.