DISCIPLINE SPECIFIC CORE COURSE -12 (BIOMED-DSC-12) PHARMACOLOGY

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)	Biomedical Science
		Lecture	Tutorial	Practical/ Practice			
Pharmacology **BIOMED-DSC-12**	**4**	**3**	**-**	**1**	**XII Passed**	**Basic knowledge in Functioning of human body.**	**Biomedical Science**

Learning objective

- This course is concerned with the study of drugs and how they can be used in the treatment of various diseases.
- The students will be able to learn about various formulations and administration of drugs in the body. The course provides basic mechanisms by which various drugs modify/affect physiology of the body leading to the treatment of various diseases.
- Students will also get an insight into making choice and functioning of drugs given to treat microbial infections, and various diseases due to imbalance of hormones in the body.

Learning outcomes

- Students will be familiarized with the naming and formulation of drugs; routes of drug administration and conditions under which one route is preferred over another in patients; various macromolecular targets (receptors, enzymes, etc.) of drugs in the body.
- They will also learn basic mechanisms of absorption, transport, excretion of drugs and effects of metabolism on drug action; basics of quantification of half-life, bio-availability and elimination of drugs in the body and factors affecting them; an insight into measurement of response, efficacy and potency of drug, and factors affecting action of the drugs.
- Students will also be imparted knowledge of the classification, mechanism of action, uses and contraindication of various classes of drugs. Assessment of the choice of antimicrobial drugs; problems arising from indiscriminate/inadequate use of antimicrobial drugs. Use of hormones and hormone

antagonists as drugs in endocrine system related disorders; hormone replacement therapy and its application.

SYLLABUS OF BIOMED-DSC-12

Unit-I: Introduction to pharmacology (07 hrs)

Nomenclature of drugs, various dosage forms of drugs (solid, liquid, semi-solid and inhalation forms) routes of drug administration, their advantages and disadvantages, various macromolecular targets of drugs (membrane receptor, transporters, enzymes, channels etc.).

Unit-II: Pharmacokinetics and pharmacodynamics (09 hrs)

Drug absorption, distribution, metabolism, and excretion, bio-availability, excretion and kinetics of elimination, biological half-life of drug and its significance, drug-drug interactions.

Unit-III: Mechanism of action of different classes of drugs (18 hrs)

General aspects; classification and mechanism of action of following classes of drugs along with side effects and contraindication of the drugs mentioned against each class should also be covered.

(a) General Anesthetics: Halothane
(b) Sedatives and Hypnotics: Diazepam
(c) Cholinergics: Bethanechol, Rivastigmine
(d) Skeletal Muscle Relaxants: Succinylcholine
(e) Adrenergics: Isoprenaline, Propranolol
(f) Dopaminergics: L-Dopa, Carbidopa
(g) Diuretics: Furosemide
(h) Analgesics and Antipyretics: Aspirin, Celecoxib

Unit-IV: Chemotherapy of microbial disease (05 hrs)

General aspects of anti-microbial therapy, Antibacterial (Quinolones: Ciprofloxacin).

Unit-V: Hormones and hormone antagonists (06 hrs)

Brief introduction to hormones; insulin and oral hypoglycemic agent (tolbutamide, metformin), HRT, estrogen and progestins (progesterone, hydroxylprogesterone caproate).

Practical **(30 hrs)**

(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 of laboratory animals.
2. Routes of drug administration (Oral, I.M.)
3. To study the presence of acetaminophen in given sample.
4. To study the stages of general anesthesia.
5. To determine partition coefficient of general anesthetics.
6. Effect of analgesic (Tail-flick test).
7. Anti-anxiety effect of Valium (Plus maze test).
8. Fixing of organ bath and kymograph.
9. To record CRC of acetylcholine using guinea pig ileum/ rat intestine.
10. Determination of dose ratio.
11. Study of competitive antagonism using acetylcholine and atropine.

Essential reading

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

Suggestive readings

- 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.
- **Katzung, B. G.**, (2021) Basic and Clinical Pharmacology, 15th Edition, McGraw-Hill Education, ISBN: 978-1260452310