BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Hyderabad Campus
AUGS/ AGSR Division

First Semester 2022-2023
Course Handout

08.08.2021

In addition to part I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

CourseNo. : PHAG619
CourseTitle : Screening Methods and Techniques in Pharmacology
Instructor-in-Charge : Srinivasa Prasad K
Teamof Instructors : Deepika, Sonam and Pravesh

Course Description : Ethics in animal research, CPCSEA guidelines, Biochemical assays, qualitative and quantitative estimation of receptor specific drugs, animal handling, breeding, nutrition and diet manipulation for testing, methods and techniques involved, therein. Design and development of new animal models and evaluation techniques for co-morbid illnesses and their standardization, toxicological, teratogenic, carcinogenic studies, data analysis, normalization in tabular and graphical formats

1. Scope and Objective of the Course:

Theobjective of this course is to understand the principles of experimental pharmacology with special emphasis on *in-vitro* cell culture techniques and *in vivo* experimentation. Basics of animal handling, breeding, diet manipulation, dose calculation-Human equivalent dose, development of new animal models and evaluation techniques for various diseases and their standardization will be covered. The course also includes toxicological, teratogenic, carcinogenic studies, and data analysis

2. Text Books(TB):

N. S. Parmar, Shiv Prakash, “Screening Methods in Pharmacology”- Alpha Science International, 2006 , Reprint 2011-Narosa publications

3. Reference Books(RB):

1. H Gerhard Vogel, “ Drug Discovery and Evaluation- Pharmacological Assays” –II Edition, Springer,2002

2.Laurence L Brunton, “Goodman and Gilman’s Pharmacological Basis of Therapeutics”- XII Edition, Mc-Graw Hill, New York,2011

4. Course Plan:

Module No	Lecture session	Ref	Learning Outcome
1: Introduction, Drug Discovery Process	L 1-3: Definition, Scope and common terms used Strategies in Drug discovery and evaluation	RB:2; Class notes	Understanding of the newer drug discovery strategies.
2: General introduction of Animals used for research	L 4-8: Animal handling, breeding and diet manipulation for testing, methods involved Laboratory Animals , Dose calculation-Human equivalent dose	Ch-T-3-4 Class notes	Learning of CPCSEA guidelines,animals handling, breeding, diet requirement and advantage /disadvantage of specific Lab animals/species used for research
3: Introduction of Screening Methods for New chemical Entities/drugs	Evaluation of Drugs Acting on : L: 12-16: **a)** Central Nervous System Disorder (Anxiety, Depression, memory deficit/AD, PD, Brain Stroke and epilepsy, anxiety) L:17-22: **b)** CVS Disorder: (Hypertension, arrhythmia, I/R -injury, hypertrophyetc) L : 23-27: **c)** Respiratory System (Asthma andCOPD) **d)** Gastric/pepticulcer UlcerativeColitis **e)** Evaluation of Analgesics ,Anti-inflammatory and Antipyretic Drugs **f)** Evaluation ofDrugs acting on CTZ, diabetes, obesity	Ch-T-**(**5,7,8,9,11, 13) R 1: chapter A,C,D,J,K	Understand the pathology and preclinical testing, evaluation/ methodologies for new chemical entities/ clinical drugs for various disorders/diseases

4:Drug resistance and pharmacological intervention	L 27-30: Approaches to study development of resistance, cancer, tuberculosis and Malaria	Class Notes	Study and understand the principle of drug resistance development, Newer approaches/methods to mange resistance, In vitro and In Vivo models
5: Introduction to Toxicity studies	L 31-35: a) OECDGuidelines b) Acute oral toxicity studies c) Terotogenicity, Carcinogenicitystudies (Annexure III)	RB-2: Class Notes	Understand the guidelines used in toxicological studies
6: Introduction to Pharmacogenomics /genetics	L 8-11: Pharmacogenetics, Stem cell and Gene Therapy, Genetic manipulation of animals i.e knock in/knock down, Optogenetics	Class notes	Understanding of concept of transgenic animals, and recent development in the treatment of hereditary diseases.

List of Practicals*:

1. Introduction to lab safety , equipments and brief guidelines to animal care
2. laboratory animals, routes of administration and handling
3. Stereotaxic surgery – Basic routines
4. Microinjection into auditory cortex
5. Evaluation of skeletal muscle relaxant property of mice by rotarod apparatus
6. In vivo screening of drugs acting on cardiovascular system by Electrocardiogram
7. In vivo recording of motor nerve activity post injury
8. Neuroinflammation models and methods of analysis – Evaluation of analgesic property by tail flick method tail flick, hotpate/
9. Tissue sectioning and histology
10. Fear conditioning apparatus (Active avoidance) and Passive avoidance
11. Conditioned place preference test
12. Actimeter/open field test
13. Evaluation of anxiolytic activity using Elevated plus maze

subject to IAEC approval

6. EvaluationScheme:

Component	**Duration**	**Weightage (%)**	**Date & Time**	**Nature of component (Close Book/ Open Book)**
Mid-Semester Test	90 Min.	25	02/11 1.30 - 3.00PM	Closed Book – 10% Open book – 15%
Comprehensive Examination	3 h	35	23/12 FN	Closed -20% and Open Book – 15%
Assignments*, quiz(es)#		20	surprise quizzes	Closed book
Lab component		20	Continuous	Open Book – 10% Closed book – 10%

Assignment topics will be announced during class. Laboratory component will be marked on the basis of viva-voce, research design/ problem solving/ numericals, home assignment, quizzes and lab manual. Regularity in attendance will be one of the criteria in deciding the borderline cases at the time of final grading as well as make-up's.
It is not necessary that all the grades (i.e. A to E) would be awarded.
In borderline cases subjective judgment will be exercised for pull-up's (max. 2%). Basic guiding factors will be attendance regularity, consistency in performance (above average) or/and steady improvement throughout the semester

8. Chamber Consultation Hour: 6:00 PM-8:00 PM [Email: ksprasad@hyderabad.bits-pilani.ac.in]

9. Notices: Notices pertaining to this course will be posted on Google classroom or send via emails.

10. Make-up Policy: Make-Ups are not given as a routine. Only medical situations with hospitalization dependent upon the genuineness of the circumstances under which a student fails to appear in a scheduled evaluation component. In such circumstances, prior permission should be obtained from the Instructor-in-Charge. The decision of the Instructor-in-Charge in the above matter will be final

Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor - in -Charge
PHA G619