PROGRAMME STRUCTURE AND SCHEME OF EXAMINTION

(Ph.D. PHARMACOLOGY) (COURSE WORK) (CBCS-2025-2026) (AS PER NEP-2020)

SEMESTER -I (YEAR-I)											
Semester	Course Code	Title of the Paper(s)	Course Type	Credits					Marks		
				L	T	P	D	C	EA	IA	TM
	PHM- 101	RESEARCH METHODOLOGY	CC	4	0	0	0	4	80	20	100
	PHM-102	RESEARCHAND PUBLICATION ETHICS	CC	2	0	0	0	2	80	20	100
	PHM-103	ANALYTICAL TECHNIQUES IN PHARMACOLOGY	CC	3	0	0	0	3	80	20	100
	*PHM-104-109	OPTIONAL ELECTIVE / MINOR COURSE (Choose one course)	OE/MC	3	0	0	0	2	80	20	100
	PHM-121	CREDIT SEMINAR	CC	0	3	0	0	1	80	20	100
	SUB-TOTAL			12	3	0	0	12	400	100	500
		Optional Elective (OE)/ Minor Course (MC) Compulsory Course (CC) Opt (Any one courses) **OPTIONAL Course* *PHM 104 - HUMAN STUDIES *PHM-105 - ANIMAL STUDIES *PHM-106 – PHARMACOGENOMICS AND PHARMACOGENETICS, ANTIMICROBIAL RESISTANCE, ETHNOPHARMACOLOGY *PHM-107 – PHARMACOVIGILANCE/ MATERIOVIGILANCE *PHM-108–GENERAL PRINCIPLES IN DRUG THERAPY *PHM -109 – SYSTEMIC PHARMACOLOGY (ANS, CNS, Endocrine, CVS related drugs and newer targets), BIOINFORMATICS, etc									
		CC/CT: Compulsory Course or Core Theory/ CP: Compulsory or Core Practical / OE: Optional Elective/ MC: Minor Course/ L: Lecture/ T:Tutorial/ P:Practical/ D: Dissertation/ C: Credit/ EA: External Assessment/ IA: Internal Assessment / TM: Total Marksc									

PROGRAMME STRUCTURE AND SCHEME OF EXAMINTION

(Ph.D. PHARMACOLOGY) (COURSE WORK) (CBCS-2025-2026) (AS PER NEP-2020)

SEMESTER – II-VI (Year-1-3)											
Semester	Course Code	Title of the Paper(s)	Course Type	Credits					Marks		
				L	T	P	D	C	EA	IA	TM
SEMESTER-II	PHM- 122	SYNOPSIS SEMINAR	CC	0	3	0	0	3	…	…	…
SEMESTER-II	PHM-131	DISSERTATION	RP/D	0	0	0	15	15	…	…	…
SEMESTER-III	PHM-131	DISSERTATION	RP/D	0	0	0	15	15	…	…	…
SEMESTER-IV	PHM-131	DISSERTATION	RP/D	0	0	0	15	15	…	…	…
SEMESTER-V	PHM-131	DISSERTATION	RP/D	0	0	0	15	15	…	…	…
SEMESTER-VI	PHM-131	DISSERTATION	RP/D	0	0	0	15	15	…	…	…
	SUB-TOTAL			0	3	0	75	78	…	…	…

GRAND TOTAL OF ALL SEMESTERS – (I-VI)											
Semester	Course Code	Title of the Paper(s)	Course Type	Credits					Marks		
				L	T	P	D	C	EA	IA	TM
SEMESTERS – (I-VI)	GRAND TOTAL OF ALL SEMESTERS (I-VI)			15	6	0	75	96	480	120	600
	CC/CT: Compulsory Course or Core Theory; RP/D: Research Project/ Dissertation; L: lecture; T:Tutorial; P:Practical;D:Dissertation; C:Credit; EA: External Assessment ; IA: Internal Assessment; TM: total Marks										

BABA FARID UNIVERSITY OF HEALTH SCIENCES

DEPARTMENT OF PHARMACOLOGY

PHM 101: : RESEARCH METHODOLOGY
(Semester – I)

L + T + P + D:**4+0+0+0** **Relative weightage**

Credits : **4** Internal Assessment/ Exam : **20**

Contact hours : **56** End – Semester Examination : **80**

Unit	Contents	Lectures
I	History, myths and ethnic practices, need, importance and impact of research; types of research; Research process	5
II	Synopsis Writing: Selecting research problem, formulation of research projects; survey of literature; research infrastructure; experimental designs; sampling designs; recording of observations; measurement and scaling techniques; GLPs.	8
III	Formulation and types of hypotheses; collection, maintenance, storage and analysis of data; measures of central tendencies and relationships and error analysis; Parametric and Non-parametric tests, tests of significance.	7
IV	Compilation and presentation of results, writing of manuscripts, research reports and thesis; organization of reference material using endnote; bibliography; plagiarism; IPR and patent application, entrepreneurship.	8
V	Financial support and various funding agencies; Multidisciplinary and multi-institutional research; writing research protocol for external funding.	6
VI	Computer and informatics; introduction word processing, excel, power point presentation, graph and figure plotting; web browsing; information resources and various databases.	8
VII	Demonstration of departmental research activities and instrumentation.	14

BABA FARID UNIVERSITY OF HEALTH SCIENCES

DEPARTMENT OF PHARMACOLOGY

PHM 102: : RESEARCH AND PUBLICATION ETHICS
(Semester – I)

L + T + P + D : **2+0+0+0** **Relative weightage**

Credits : **2** Internal Assessment/ Exam : **20**

Contact hours : **28** End – semester Examination : **80**

Unit	Contents	Lectures
I	Philosophy and Ethics: Introduction to philosophy: definition, nature and scope, concept, branches. Ethics: definition, moral philosophy, nature of moral judgements and reactions.	4
II	Scientific conduct: Ethics with respect to science and research. Intellectual honesty and research integrity. Scientific misconducts: **Falsification, Fabrication and Plagiarism (FFP)**. Redundant publications: duplicate and overlapping publications, salami slicing. Selective reporting and misrepresentation of data.	5
III	Publication Ethics: definition, introduction and importance. Best practices/ standards setting initiative and guidelines: COPE, WAME etc. Conflicts of interest. Publication misconduct: definition, concept, problems that lead to unethical behaviour and vice versa, types. Violation of publication ethics, authorship and contributorship. Identification of publication misconduct, complains and appeals. Predatory publishers and journals.	7
IV	Open access Publishing: Open access publications and initiatives. SHERPA/ RoMEO online resource to check publisher copyright and self-archiving policies. Software tools to tools viz. JANE, Elsevier, Journal finder / journal suggestion Publication misconduct: Group discussions: Subject specific ethical issues, FFP, authorship. Conflicts of interest. Complaints and appeals: examples and fraud from India and abroad. Software tools: Use of plagiarism software like Turnitin, urkund and other open-source software tools.	7
V	Databases and Research Metrics: Databases: Indexing databases. Citation databases: Web of science, scopus etc. research metrics: impact Factor of journal as per journal citation report, SNIP, IPP, Cite score. Metrics: h-index, g-index, i10index, altmetrics.	5

BABA FARID UNIVERSITY OF HEALTH SCIENCES

DEPARTMENT OF PHARMACOLOGY

PHM 103: : ANALYTICAL TECHNIQUES IN PHARMACOLOGY
(Semester – I)

L + T + P + D : **3+0+0+0** **Relative weightage**

Credits : **3** Internal Assessment/ Exam : **20**

Contact hours : **42** End – semester Examination : **80**

Unit	Contents	Lectures
I	**Immunoassays**:- principle, apparatus, instruments, procedure and applications of the following: a)Enzyme linked immunosorbent assay (ELISA) b)Radioimmunoassay c)Fluorescence Polarization Immunoassay(FPIA)	9
II	**Chromatography**:-Principle, apparatus, instruments, chromatographic parameters, factors affecting resolution and applications of the following: a)**Thin layer chromatography**(TLC) b) **High performance liquid chromatography**(HPLC) c) **Gas chromatography** etc.	7
III	Introduction, principle instruments, process and applications of a) **Mass Spectrometry b)Nuclear Magnetic Resonance (NMR) Spectroscopy c) Spectrophotometry d) Flame atomic emission spectroscopy (**Flame Photometry)	12
IV	Introduction, principle, procedure and applications of the following a) **Western blotting** b) **Southern blotting c) Real Time- Polymerase Chain Reaction (RT-PCR)**	7
V	Introduction, principle, apparatus, instruments, procedure and applications of various techniques **a) High- throughput screening b) Patch- clamp technique c) Limit tests in pharmacology**	7

BABA FARID UNIVERSITY OF HEALTH SCIENCES

DEPARTMENT OF PHARMACOLOGY

PHM 104: :HUMAN STUDIES
(Semester – I)

L + T + P + D : **3+0+0+0** **Relative weightage**

Credits : **2** Internal Assessment/ Exam : **20**

Contact hours : **42** End – semester Examination : **80**

Unit	Contents	Lectures
I	Clinical Trial Phases - Phase 0 trial/ Microdosing studies, Phase I, II, III, IV clinical trials Clinical trial Designs- N-of-1 clinical trials, Non – inferiority, superiority and equivalence trials Vaccine trial	10
II	Randomization – methods, Randomized controlled trial Blinding in clinical trials Bias in clinical trials Controls in clinical trials Placebo in clinical trials	10
III	Research in Vulnerable population- Biomedical research in children, pregnant and lactating women, geriatric population Biomedical research in population with Renal disease/ Liver disease Bioavailability and Bioequivalence studies	8
IV	Good Clinical Practices (GCP) Institutional ethics committee (IEC) Interim analysis in clinical trial Data and safety monitoring board	8
V	Highlights of New drugs and Clinical trial rules 2019 and academic clinical trials, ICMR Clinical trial guidelines, Clinical trial registry of India (CTRI),etc	6

BABA FARID UNIVERSITY OF HEALTH SCIENCES

DEPARTMENT OF PHARMACOLOGY

PHM 105: :ANIMAL STUDIES
(Semester – I)

L + T + P + D : **3+0+0+0** **Relative weightage**

Credits : 2 Internal Assessment/ Exam : **20**

Contact hours : **42** End – semester Examination : **80**

Unit	Contents	Lectures
I	Preclinical studies including a. Pharmacodynamic studies b. Safety Pharmacology studies c. Toxicology studies Veterinary Pharmacovigilance	6
II	Committee for Control and Supervision of Experiments on Animals (CCSEA), Animal housing, Animal handling	6
III	Animal models, Knockout Mouse, Transgenic animals, Nude mouse, Zebrafish, Hybridoma Technology, Alternate to animal models	10
IV	Equipments:-**Analgesiometer, Convulsiometer, 8 arm maze, Rotarod, Kymograph, Dale's organ bath, writing levers-simple writing lever, frontal writing lever, starling heart writing lever, pithing needle, frog mount, Langendorff apparatus, Computer assisted Learning.** Standard Operating Procedures including Introduction, Principle, Parts, Functioning, Method, Observation	10
V	Screening models for anti-inflammatory, Antidiabetic, antihypertensive, Analgesics, Antiepileptic, Antipsychotic, Antidepressant, Antianxiety, Antifertility drugs, Antianginal, etc. **Bioassay, etc.** Effect of various Drugs on blood pressure and Pulse rate by using Computer-Aided Learning	10

BABA FARID UNIVERSITY OF HEALTH SCIENCES

DEPARTMENT OF PHARMACOLOGY

PHM 106: PHARMACOGENOMICS AND PHARMACOGENETICS
(Semester – I)

L + T + P + D : **3+0+0+0** **Relative weightage**

Credits : **2** Internal Assessment/ Exam : **20**

Contact hours : **42** End – semester Examination : **80**

Unit	Contents	Lectures
I	Epigenetics: Introduction, Epigenetic inheritance, Epigenetics and Cancer, Examples of epigenetics and targeting epigenetics in drug discovery	6
II	Pharmacogenomics and Pharmacogenetics: Introduction, Pharmacokinetic variability vis-a-vis Genetic variability, Pharmacodynamic variability vis-a-vis Genetic variability, Pharmacogenetic and Pharmacogenomic in drug development and clinical research, Pharmacogenomics and drug development process-View of pharmaceutical industries,Steps towards personalized medicine and Challenges in them	10
III	Toxicogenomic: Introduction, Technologies in toxicogenomic, Toxicogenomics,Toxicogenomic components, Scope of toxicogenomic, Examples of Toxicogenomic, Applications of toxicogenomics and Limitations of toxicogenomics Structure activity relationships	10
IV	**Gene Therapy** :- Introduction, History, Types, carrier of gene, delivery methods, Current treatment modalities, Adverse effects of gene therapy, future prospects of gene therapy, ethical dilemmas, Challenges, strengths of gene therapy **Stem Cell Therapy** :- Introduction, Types and sources of stem cells, cultivation process, stem cells and cloning, uses of stem cell therapy, Ethical issues and Indian status of using stem cell therapy.	10
V	**Bioinformatics:**- Introduction, goals, Field, Applications and Limitations **Proteomics:-** Introduction, types, Analytical techniques, Challenges, applications in proteomics **Metabolomics**:- Introduction, Steps, Approaches, Applications of metabolomics.	6

BABA FARID UNIVERSITY OF HEALTH SCIENCES

DEPARTMENT OF PHARMACOLOGY

PHM 107: :PHARMACOVIGILANCE, MATERIOVIGILANCE, VACCINE VIGILANCE
(Semester – I)

L + T + P + D : **3+0+0+0** **Relative weightage**
Credits : 2 Internal Assessment/ Exam : **20**
Contact hours : **42** End – semester Examination : **80**

Unit	Contents	Lectures
I	Adverse Drug Reactions, Types of Adverse Drug Reactions Causality Assessment: - Introduction, WHO scale, Naranjo scale for causality Assessment	10
II	Pharmacovigilance: Introduction, Pharmacovigilance program of India, History, Aims and Objectives, Pharmacovigilance methods, Pharmacovigilance reporting and functioning, data collection and utilization, CDSCO and its role in Pharmacovigilance, ADR monitoring centers and their role, ADR monitoring of AYUSH drugs, National Pharmacovigilance program for ASU drugs, PharmEcovigilance, Adverse effect reporting of cosmetoceutics and Personal Care Products(CPCPs)- Cosmetovigilance	10
III	Hemovigilance: -Introduction, Historical aspects, Goals of Hemovigilance, Current status of Hemovigilance in India, Reactions and Scoring in hemovigilance, Roles and responsibilities of HVPI units, Characteristics of successful hemovigilance systems, The problems and difficulties with hemovigilance	4
IV	Materiovigilance: - Introduction, Definition of medical device, Materiovigilance definition, Materiovigilance programme of India, National Coordination Centre, other committees and their roles, Roles and responsibilities medical device adverse events monitoring centers (MDMCs)	8
V	Vaccine Vigilance:- Introduction, National AEFI guidelines and surveillance in India, Types of AEFI, recording and reporting of AEFI, Elements to consider when conducting vaccine pharmacovigilance	10

BABA FARID UNIVERSITY OF HEALTH SCIENCES

DEPARTMENT OF PHARMACOLOGY

PHM 108: GENERAL PRINCIPLES IN DRUG THERAPY
(Semester – I)

L + T + P + D : **3+0+0+0** **Relative weightage**

Credits : 2 Internal Assessment/ Exam : **20**

Contact hours : **42** End – semester Examination : **80**

Unit	Contents	Lectures
I	Pharmacokinetics:- Absorption, bioavailability, first pass metabolism, distribution, volume of distribution, drug doses, Loading dose, Maintenance dose, metabolism, enzyme inducers and enzyme inhibitors, excretion, half life , clearance, Kinetics of eliminations	8
II	Pharmacodynamics:- Receptors , types, affinity, efficacy, potency, enzyme inhibition, Agonist, Partial agonist, antagonist, Inverse agonist, Types of antagonism, Therapeutic index, Steady state concentration, , Dose-response relationship, Drug therapy in geriatric , Pediatric, Pregnancy and lactation	8
III	Generic drugs, Off label use of drugs, Over the counter use of drugs, Spurious drugs, P-drug concept, Rational use of drugs, polypharmacy, medication adherence Pharmacoeconomics	10
IV	Essential Medicine concept, Evidence based medicine, Therapeutic drug monitoring	6
V	Antimicrobials, Antitubercular drugs, Antifungal drugs, Anti-HIV agents, anti-helminthic, Antimicrobial resistance, effects on environment “Eco pharmacology”, Antimicrobial stewardship program of India, National TB control program, PVPI, MVPI, Hemovigilance, Vaccinovigilance	10

BABA FARID UNIVERSITY OF HEALTH SCIENCES

DEPARTMENT OF PHARMACOLOGY

PHM 109: SYSTEMIC PHARMACOLOGY
(Semester – I)

L + T + P + D : **3+0+0+0** **Relative weightage**

Credits : 2 Internal Assessment/ Exam : **20**

Contact hours : **42** End – semester Examination : **80**

Unit	Contents	Lectures
I	Antidiabetics, insulin, Corticosteroids, drugs acting on Bronchial asthma, Cough Immunological Disorders	4
II	Cardiovascular System:- Antihypertensives, Antianginal, Cardiac glycosides, Antiarrythmic drugs and recent advances , guidelines and national programs related to drug use	8
III	Central Nervous system:- Antiepileptics, Sedative-hypnotics, Antiparkinsonian, Antipsychotics, Antidepressants, Antianxiety, Opioids, CNS Stimulants, Substance abuse, Drug dependence,recent advances, and guidelines	12
IV	Gastrointestinal drugs:- Peptic ulcer, Gastroesophageal Reflux Disease, Antiemetic, prokinetic, Drugs for constipation and diarrhea and national programmes	6
V	Antimicrobial agents, Antifungal, Anti-HIV, anthelminthic, Anticancer drugs, Targeted drug therapy, recent advances and programs related to anticancer drugs Anti-HIV drugs, National AIDS control program, antileprosy drugs, NLEP, ATT, National program of TB, Antimicrobial stewardship program	12

BABA FARID UNIVERSITY OF HEALTH SCIENCES

DEPARTMENT OF PHARMACOLOGY

PHM 121: :CREDIT SEMINAR
(Semester – I)

L + T + P + D : **0+3+0+0** **Relative weightage**

Credits : 1 Internal Assessment/ Exam : **20**

Contact hours : **42** End – semester Examination : **80**

Unit	Contents	Lectures
I	Power point presentation on different research projects and research papers (Analysis skills) **Introduction to Journal club**: Overview of the purpose and format of a journal club. Importance of staying current with literature in the field. **Selection of articles**: criteria for selecting research articles (relevance, impact, methodology, etc).Collaborative-decision making on article selection.	9
II	Group discussion on relevant topics. **Article presentation**: rotating responsibility for presenting selected articles. Guidelines for preparing and delivering effective presentations.	8
III	**Discussion and Critique**: Structured discussion on the research question, methods, results and conclusions of each article.Critical evaluation of strengths, weaknesses and implications of the research. **Integration with Current Knowledge**: Connecting findings from the articles to existing literature and theoretical frameworks. Identifying gaps in current research and proposing future directions.	9
IV	**Written Summaries**: Individual or group-written summaries of presented articles, including critique and reflections. **Final Presentation**: Synthesizing key insights gained from the journal club discussions. Presenting a summary of learning outcomes and contributions to the field.	9
V	**Assessment**:- Participation in discussion and presentations. Quality of article critiques and written summaries. Final presentation and reflection on learning outcomes.	7

BABA FARID UNIVERSITY OF HEALTH SCIENCES

DEPARTMENT OF PHARMACOLOGY

PHM 122: :SYNOPSIS SEMINAR
(Semester – II)

L + T + P + D : **0+3+0+0** **Relative weightage**

Credits : **3** Internal Assessment/ Exam : **20**

Contact hours : **42** End – semester Examination : **80**

Unit	Contents	Lectures
I	Power point presentation on different research projects and research papers (Analysis skills) **Introduction to Journal club**: Overview of the purpose and format of a journal club. Importance of staying current with literature in the field. **Selection of articles**: criteria for selecting research articles (relevance, impact, methodology, etc).Collaborative-decision making on article selection.	9
II	Group discussion on relevant topics. **Article presentation**: rotating responsibility for presenting selected articles. Guidelines for preparing and delivering effective presentations.	8
III	**Discussion and Critique**: Structured discussion on the research question, methods, results and conclusions of each article.Critical evaluation of strengths, weaknesses and implications of the research. **Integration with Current Knowledge**: Connecting findings from the articles to existing literature and theoretical frameworks. Identifying gaps in current research and proposing future directions.	9
IV	**Written Summaries**: Individual or group-written summaries of presented articles, including critique and reflections. **Final Presentation**: Synthesizing key insights gained from the journal club discussions. Presenting a summary of learning outcomes and contributions to the field.	9

V	**Assessment**:- Participation in discussion and presentations. Quality of article critiques and written summaries. Final presentation and reflection on learning outcomes.	7

BABA FARID UNIVERSITY OF HEALTH SCIENCES

DEPARTMENT OF PHARMACOLOGY

PHM 131: : RESEARCH PROJECT/ DISSERTATION
(Semester – II-VI)

L + T + P + D : **0+0+0+75** **Relative weightage**

Credits : **75** Internal Assessment/ Exam : **…**

Contact hours : **1050** End – semester Examination : **…**

Unit	Contents	Lectures
I	Each student will be assigned a topic for dissertation/ projectwork that will involve observational or interventional study. It will be supervised by a faculty member. The course will have to be completed within the IV semester. Students will prepare project report and submit it. After primary evaluation by supervisor, students will present project work in the seminar before external examiner and committee of the faculty members.	1050
II	**Introduction to Research**: Overview of research methodologies and approaches. Formulating research questions and hypotheses. Conducting a literature review and identifying gaps in current knowledge. **Research design and methodology**:-Choosing appropriate research methods (quantitative, qualitative or mixed methods). Designing a study protocol and developing research instruments (surveys, interviews, experiments, etc.). Ethical considerations in research (informed consent, confidentiality, etc.)	
III	**Data Collection and Analysis**: Collecting data using selected research methods. Analyzing data using appropriate statistical or qualitative analysis techniques. Interpreting findings and discussing implications. **Writing the Research Project** / **Dissertation**: Structuring the research document (introduction, literature review, methodology, results, discussion, conclusion). Academic writing conventions, citation styles (APA, MLA, etc.), and formatting guidelines. Editing and revising drafts based on feedback.	

IV	**Presentation and Defence**: Preparing and delivering a research presentation. Defending the research project or dissertation before a committee or audience. Incorporating feedback and finalizing the document for submission.	
V	**Assessment**: Proposal development and approval. Progress reports and milestone achievements. Final research project or dissertation document. Presentation and defence evaluation	