UNIVERSITY OF SARGODHA
OFFICE OF THE REGISTRAR
(ACAD BRANCH)

NOTIFICATION

On the recommendations of Academic Council made in its 22nd (3/2024) meeting held on 30.09.2024, the Syndicate in its 69th (1/2025) meeting held on 17.01.2025 has approved the revised curricula of following programs for implementation w.e.f. **Spring 2026.**

I.	M.Phil in Pharmacology	(Annex-'**A**')
II.	M.Phil in Pharmaceutics	(Annex-'**B**')
III.	M.Phil in Pharmacy Practice	(Annex-'**C**')
IV.	M.Phil in Pharmaceutical Chemistry	(Annex-'**D**')
V.	M.Phil in Pharmacognosy	(Annex-'**E**')
VI.	Ph.D in Pharmacology	(Annex-'**F**')
VII.	Ph.D in Pharmaceutics	(Annex-'**G**')

(WAQAR AHMAD)
Additional Registrar (General)

No. SU/Acad/25/1162

Dated: 29.10.2025

Distribution:

- Principal, College of Pharmacy
- Controller of Examinations
- Director Academics

C.C:

- Dean, Faculty of Pharmacy
- Director, QEC
- Secretary to the Vice-Chancellor
- PA to Registrar
- Notification File

'A'

UNIVERSITY OF SARGODHA
Faculty of Pharmacy, College of Pharmacy

1. **Nomenclature of the Programs:**
   - Master of Philosophy in Pharmacology (M.Phil. Pharmacology)
2. **Department Brief:**
   The College of Pharmacy, Faculty of Pharmacy, is offering postgraduate programs in various disciplines of Pharmacy. Master of Philosophy in Pharmacology is one of major fields of the Pharmaceutical Research. The learning objectives of this program is to provide opportunities to the students to understand pharmacological basis of pharmacokinetics, pharmacodynamics, adverse drug effects and drug interaction monitoring in laboratory animals and clinical studies and identifying cost effective alternative therapeutics.

3. **Program Structure:**

Duration	Minimum 2-Years (4-Semesters), Maximum 4-Years (8-Semesters)
Entry Requirements:	Candidates having minimum 2nd division in annual system or CGPA 2.0/4.0 in Pharm.D. or B.Pharm. or equivalent degree in semester system /annual system from HEC recognized Institutions. Departmental Test (50% qualifying marks)
Intra and Inter-disciplinary fields allowed for admission	*Intra disciplinary admissions are allowed only for Pharm.D. graduates as per PCP policy.* *Inter-disciplinary admissions are allowed in M.Phil. in pharmacology for graduates of medical and Allied health Sciences as eligible criteria notified by the university.*
Degree Completion Requirements:	Total Credit Hours of Course Work: 26 Total Credit Hours of research and Thesis: 06 Total Credit Hours of Program: 32
Program Mode (select one)	Thesis Track

4. **List of Deficiency Courses of Level-6:** *(for inter-disciplinary admissions only; Pharmacology of undergraduate level (at least 06 cr. Hr.) must be passed)*

Sr. No.	Course Code	Course Title	Credit Hours	Prerequisite
1	N/A	N/A	N/A	N/A

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5. List of Mandatory/Compulsory/Core Courses for Semester 1:

Sr. No.	Course Code	Course Title	Credit Hours	Prerequisite
1.	PHRM-7101	Biostatistics	3(3-0)	Enrollment as per regulations of the University, PCP and HEC
2.	PHRM-7102	Drug design and development	3(3-0)	--do--
3.	PHRM-7103	Pharmaceutical Analytical Techniques	3(3-0)	--do--
4.	PHRM-7104	Research Methodology	3(3-0)	--do--
5.	URCG-5129	Understanding of Holy Quran / Fehm-e-Quran-I / Ethics-I	1(1-0)	--do--

6. List of Mandatory/Compulsory/Core Courses for Semester 2:

Sr. No.	Course Code	Course Title	Credit Hours	Prerequisite
1.	PHRM-7105	Advanced Chemotherapy	3(3-0)	Enrollment as per regulations of the University, PCP and HEC
2.	PHRM-7106	Safety Pharmacology and Toxicology	3(3-0)	--do--
3.	PHRM-7107	Advanced Biochemical and Immunological Techniques	3(3-0)	--do--
4.	PHRM-7108	Advanced Neuropharmacology	3(3-0)	--do--
5.	URCG-5130	Understanding of Holy Quran / Fehm-e-Quran-II / Ethics-II	1(1-0)	--do--

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Scheme of Studies

Master of philosophy in Pharmacology

Category	Course Code	Course Title	Credit Hour
	SEMESTER-1		
Compulsory-1	PHRM-7101	Biostatistics	3 (3-0)
Compulsory-2	PHRM-7102	Drug design and development	3 (3-0)
Compulsory-3	PHRM-7103	Pharmaceutical Analytical Techniques	3 (3-0)
Compulsory-4	PHRM-7104	Research Methodology	3 (3-0)
Compulsory-5	URCG-5129	Understanding of Holy Quran / Fehm-e-Quran-I / Ethics-I	1(1-0)
	* For Inter-disciplinary admitted candidates only		As per eligibility criteria
	Total Credit Hours in Semester-1		**13**
	SEMESTER-2		
Compulsory-6	PHRM-7105	Advanced Chemotherapy	3 (3-0)
Compulsory-7	PHRM-7106	Safety Pharmacology and Toxicology	3 (3-0)
Compulsory-8	PHRM-7107	Advanced Biochemical and Immunological Techniques	3 (3-0)
Compulsory-9	PHRM-7108	Advanced Neuropharmacology	3 (3-0)
Compulsory-10	URCG-5130	Understanding of Holy Quran / Fehm-e-Quran-II / Ethics-II	1(1-0)
	Total Credit Hours in Semester-2		**13**
	SEMESTER-3 to 4		
Compulsory-11	PHRM-7109	Research & Thesis	**06**

Note:

1. The Regulations related to MS/M.Phil./M.Sc.(Hons) or equivalent approved by the Syndicate from time to time shall also be applicable.
2. Deficiency Courses are to be decided by Graduate Program Committee in start of each session.
3. Department can change the order of Core/Compulsory and Elective Courses as per availability of resources or demand.
4. Department can change the course offering as per available resources but shall be uniform for one session.

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FIRST SEMESTER (M.Phil. Pharmacology)

PHRM-7101 BIOSTATISTICS Cr. Hr. 03

1. Introduction and applications to Biological and Pharmaceutical Sciences. Samples and Population, Various Types of Sampling.
2. Measures of Central Tendencies and Dispersion, Arithmetic mean, standard deviation, Standard error of the mean, Median, Mode, Range, Variance
3. Test of Hypothesis and Significance: Chi-square, Student 't' and 'F' distribution and their Testing. Analysis of Variance (ANOVA), its classification. P-value and LSD tests.
4. Statistical Analysis and Interpretation of Data with various software
5. Experimental Designs& their Significance:(Advantages& Disadvantages), their Principles Completely Randomized Complete Block Designs (RCB-designs), Latin square Designs (LS-Designs), Computer Methods of Statistical Evaluation.
6. Correlation / Regression Analysis
7. Statistical approaches in developing formulations.
8. Software: Uses of software like GraphPad prism, referencing software like Endnote, Zotero and Mendeley, Microsoft Excel, Analysis of data using the above software

Recommended Books:

1. Daniel WW. Bio-Statistics: Foundation for Analysis in Health Science. 9th Ed. Wiley Publishers; 2009.
2. Nilton JS. Statistical Methods in Biological and health Sciences. 3rd Ed. McGrew Hill; 1998.
3. Hoel PG, Port SC, Stone CJ. Introduction to Statistical Theory. 1st Ed. Brooks Cole; 1972.
4. Samuels M. Statistics for the life sciences. 3rd Ed. Dellen Publishers co; 2002. 5. Zar JH. Biostatistical analysis. 4th Ed. Francis Hal
5. Stanton, A.G (2001) Primer of Biostatistics. McGraw Hill, New York, USA

PHRM-7102 DRUG DESIGN AND DEVELOPMENT Cr. Hr. 03

1. Drug design and development principles and applications
2. Introduction and approaches of Drug discovery, design and development process (steps involved and structure)
3. Molecular modeling techniques in drug design
4. Drug design to Biological Evaluations (including Clinical trials)
5. Computer-aided drug design (CADD), CADD with Artificial Intelligence (AI), Machine Learning (ML) and Deep Learning (DL) Technologies
6. Latest trends in drug discovery, design and development (students will explore through latest research articles).

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Recommended Books:

1. Textbook of Drug Design and Discovery, Edited by Kristian Stromgaard, Povl Krogsgaard-Larsen, Ulf Madsen, 5th Edition
2. Basic Principles of Drug Discovery and Development, Benjamin E. Blass,
3. Modern methods of drug discovery, Alexander Hillisch, Rolf Hilgenfeld,
4. Real World Drug Discovery: A Chemist's Guide to Biotech and Pharmaceutical Research, Robert M. Rydzewsk,

PHRM-7103 PHARMACEUTICAL ANALYTICAL TECHNIQUES Cr. Hr. 03

Analytical techniques (listed below) must be discussed in view of evaluation requirement of drug delivery systems. Only necessary detail of the following techniques (Working Principle and Application) should be included to fulfill the conceptual requirement of the postgraduate students.

1. UV-Visible spectroscopy: Principles and working phenomenon in relation to analysis of pharmaceutical materials.
2. IR spectroscopy: Theory, Modes of Molecular vibrations, Sample handling, Instrumentation of Dispersive and Fourier -Transform IR Spectrometer, Factors affecting vibrational frequencies and Applications of IR spectroscopy
3. Thermal Analysis Techniques:(1) Thermogravimetry (TGA), (2) differential scanning calorimetry (DSC), (3) Differential thermal analysis (DTA).
4. Mass Spectroscopy: Principle, Theory, Instrumentation of Mass Spectroscopy, Different types of ionization.
5. X ray Crystallography: Production of X-rays, Different X ray diffraction methods, Bragg's law, Rotating crystal technique, X-ray powder technique, Types of crystals and applications of X-ray diffraction.
6. Chromatography: Principle, apparatus, instrumentation, chromatographic parameters, factors affecting resolution and applications of the following: High Performance Liquid chromatography (HPLC), Ultra performance Liquid Chromatography (UPLC), Liquid Chromatography Mass Spectrometry (LCMS), Gas chromatography.
7. NMR spectroscopy:Principle, Instrumentation, types and its applications
8. Miscellaneous techniques; PCR, Elisa and other latest techniques.

Recommended Books:

1. Ahu Ahuja S, Scypinski S. Handbook of modern pharmaceutical analysis. 2nd Ed. Academic Press; 2010
2. Armstrong NA, James KC. Understanding experimental design and interpretation in pharmaceutics. 1st Ed. Taylor & Francis Publishers; 1990
3. Beckett AH, Stennlake JB. Practical Pharmaceutical Chemistry. 4th Ed. The Aulton Press; 2001.
4. Brittain HG. Spectroscopy of pharmaceutical solids. 1st Ed. Taylor & Francis; 2006.
5. Heftmann E. Chromatography. 6th Ed. Von NostrondReinheld Co; 2004
6. Kazakevich Y, LoBrutto R. HPLC for pharmaceutical scientists. 1st Ed. John Wiley and Sons; 2007.
7. Snyder LR, Kirkland JJ, Dolan JW. Introduction to modern liquid chromatography. 3rd Ed. John Wiley & Sons Inc; 2009.
8. Stahl E. Thin Layer Chromatography. 2nd Ed. Berlin: Springer Verlag; 1969.

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PHRM-7104 RESEARCH METHODLOGY Cr. Hr. 03

1. Principles and theory of Research, Research Methods: Concepts and Fundamentals
2. Research ethics and ethical approval process
3. Research Proposal/Synopsis: Introduction, preparation and presentation
4. Literature Survey/Review: Basics & types, Literature review methods, Introduction to various Pharmaceutical Journals, Data bases, Journals ranking
5. Writing techniques of Thesis/Dissertation
6. Paper writing and publishing the paper, all components of thesis writing, Conflict of interest
7. Referencing: Introduction, referencing types/styles and methods. Reference tools/software (Endnote: Introduction & its practical application).

Recommended Books:

1. Shyama PM,A Guide to Research Methodology, 1st Edition CRC Press;2019
2. Mukherjee S, A Guide to Research Methodology: An Overview of Research Problems, Tasks and MethodsCRC Press, 2020
3. Prabhat P ,Research Methodology: Tools And Techniques, Bridge Center; 2015
4. Vogel, Hans Gerhard (2008).Drug Discovery and Evaluation: Pharmacological Assays.Springer-Verlag Berlin Heidelberg.3rd edition.

SECOND SEMESTER (M.Phil. Pharmacology)

PHRM-7105 ADVANCED CHEMOTHERAPY Cr. Hr. 03

1. General Principles of antimicrobial therapy

2. Classification, mechanism of action, therapeutic uses and untoward effects of
   - Antibacterial (Sulfonamides, trimethoprim-sulfamethoxazole, quinolones, agents for UTIs, penicillins, cephalosporins, and other β-lactamantibiotics, aminoglycosides,protein synthesis inhibitors and miscellaneous antibacterial agents)
   - Chemotherapy of Tuberculosis, Mycobacteriumavium Complex, and Leprosy
   - Antifungals
   - Chemotherapy of protozoal infections (Amebiasis, giardiasis, trichomoniasis)
   - Anthelmintic
   - Anticancer (General principles of cancer chemotherapy,cytotoxic agents, and natural products in cancer chemotherapy)
   - Antimalarial
   - Antiviral agents (Non-retroviral)
   - Antiretroviral agents and treatment of HIV infection
   - Pharmacological management of dengue fever

3. Antimicrobial resistance: A global challenge

4. Animal models:Screening methods to determine anticancer, antibacterial and antifungal activities in animal models

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Recommended Books:

1. Hardman JG, Limbird LE, Molinoff, PB, Ruddon RW, Gilman AG (2020), Goodman and Gilman's The Pharmacological basis of therapeutics (13th Ed). McGraw-Hill Book Company, New York, USA.
2. Humphrey P. Rang, Maureen M. Dale, James M. Ritter, Rod J. Flower, Graeme (2020). Rang & Dale's Pharmacology, 7th Edition, USA

PHRM-7106 SAFETY PHARMACOLOGY AND TOXICOLOGY Cr. Hr. 03

1. A Historical View and Vision into the Future of the Field of Safety Pharmacology
2. In Vitro Early Safety Pharmacology Screening: Perspectives Related to Cardiovascular Safety
3. Safety Pharmacology in Drug Discovery and Development
4. CNS Adverse Effects: From Functional Observation Battery/Irwin Tests to Electrophysiology
5. Preclinical Abuse Potential Assessment
6. Overview of Respiratory Studies to Support ICH S7A
7. Biophysics and Molecular Biology of Cardiac Ion Channels for the Safety Pharmacologist
8. Sensitivity and Specificity of the In Vitro Guinea Pig Papillary Muscle Action Potential Duration for the Assessment of Drug-Induced Torsades De Pointes Liability in Humans
9. Haemodynamic Assessment in Safety Pharmacology
10. High Definition Oscillometry: Non-invasive Blood Pressure Measurement and Pulse Wave Analysis
11. Gastrointestinal Safety Pharmacology in Drug Discovery and Development
12. Renal Safety Pharmacology in Drug Discovery and Development
13. Inclusion of Safety Pharmacology Endpoints in Repeat-Dose Toxicity Studies
14. Safety Pharmacology Evaluation of Biopharmaceuticals
15. Safety Pharmacology Studies for Human Pharmaceuticals

Toxicology

Immunochemical Techniques (Proteomics, Metabolomics, Bioinformatics), Cell Culture Techniques, Molecular Techniques, Classes of toxicants (Exposure Classes, Toxicants in Air, Water, Soil, Domestic, and Occupational Settings), Toxicant processing *in vivo*, Absorption and distribution of toxicants, Metabolism of toxicant, Reactive Metabolites, Chemical and Physiological Effects on Xenobiotic Metabolism, Elimination of Toxicants, Toxic action (acute toxicity), Chemical Carcinogenesis and Mutagenesis, Teratogenesis, Organ toxicity, Applied toxicology, Environmental toxicology, New approaches in toxicology (Perspectives on Informatics in Toxicology) and Future Considerations

Recommended Books:

1. Basic & clinical pharmacology [edited by] Bertram G. Katzung, Anthony J. Trevor.
2. Introduction to basics of pharmacology and toxicology Springer book
3. Principles of safety pharmacology, Springer
4. Textbook of pharmacology and toxicology Abby Calvin
5. A textbook of modern toxicology 4th edition Edited by Ernest Hodgson North Carolina State University Raleigh, North Carolina. Wiley, A JOHN WILEY & SONS, INC., PUBLICATION.

PHRM-7107 ADVANCED BIOCHEMICAL AND IMMUNOLOGICAL TECHNIQUES Cr. Hr. 03

1. Real Time PCR analysis
2. RNA extraction, cDNA synthesis, polymerase chain reaction (PCR) product preparation, Gel electrophoresis, radioimmunoassay assays, radio-labeling, fluorescent spectroscopy, ELISA.
3. Bloating techniques: Western bloating, Eastern bloating, and northern bloating.
4. Preparation of Disease induced Animal Models
5. Antidiabetic evaluation techniques. Determination of blood glucose, lipid profiles, liver function tests and kidney. Techniques to produce animal models of chemically and stress induced gastro-intestinal ulcers for anti-ulcerogenic evaluation. Antimicrobial assay techniques. Langendorff's isolated rabbit heart perfusion technique, Invasive and non-invasive BP apparatus, tissue organ bath, cardioprotective activity, diuretic activity, anti-hyperlipidemic activity, antiarrhythmic activity.

Recommended Books:

1. Vogel, Hans Gerhard (2008). Drug Discovery and Evaluation: Pharmacological Assays. Springer-Verlag Berlin Heidelberg.3rd edition.
2. (Note: Latest article research articles will also be included, related to the above mentioned pharmacological techniques)

PHRM-7108 ADVANCED NEUROPHARMACOLOGY Cr. Hr. 03

1. Chemical transmission and drug action in the central nervous system:
   - Chemical signaling in the nervous system
   - Targets for drug action
   - Drug action in the central nervous system
   - Blood–brain barrier
2. Neurodegenerative diseases: Alzheimer's disease, Parkinson's disease
3. Pharmacology of CNS drugs: CNS stimulants, CNS depressants, Narcotic Analgesics, Neuroleptics, Antidepressants, Anti-parkinsonians, Anti-epileptics, General and local anesthetics, Drug addiction, dependence and abuse

Recommended Books:

1. Hardman JG, Limbird LE, Molinoff, PB, Ruddon RW, Gilman AG (2020), Goodman and Gilman's The Pharmacological basis of therapeutics (13th Ed). McGraw-Hill Book Company, New York, USA.
2. Humphrey P. Rang, Maureen M. Dale, James M. Ritter, Rod J. Flower, Graeme (2020). Rang & Dale's Pharmacology, 9th Edition

17-10-2025

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