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

'B'

UNIVERSITY OF SARGODHA
Faculty of Pharmacy, College of Pharmacy

1. **Nomenclature of the Programs:**
   - Master of Philosophy in Pharmaceutics (M.Phil. Pharmaceutics)

2. **Department Brief:**
   The College of Pharmacy, Faculty of Pharmacy, is offering postgraduate programs in various disciplines of Pharmacy. Master of Philosophy in Pharmaceutics is one of major fields of the Pharmaceutical Research. The learning objective of this program is to provide bases to students about pharmaceutical formulations, solving the problems of drug release, drug absorption, drug distribution and innovations in the drug delivery systems.

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. 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*
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:** *(Intra-disciplinary deficiency courses are not required as per uniform syllabus and policy of the council. Inter-disciplinary admissions are not being offered in this field)*

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-7201	Biostatistics	3(3-0)	Enrollment as per regulations of the University and PCP
2.	PHRM-7202	Drug design and development	3(3-0)	--do--
3.	PHRM-7203	Pharmaceutical Analytical Techniques	3(3-0)	--do--
4.	PHRM-7204	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-7205	Advanced Pharmaceutics	3(3-0)	Enrollment as per regulations of the University and PCP
2.	PHRM-7206	Advanced Biopharmaceutics & Pharmacokinetics	3(3-0)	--do--
3.	PHRM-7207	Pharmaceutical Microbiology& Biotechnology	3(3-0)	--do--
4.	PHRM-7208	Drug Delivery Systems	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 Pharmaceutics

Course Code	Course Title	Credit Hour
SEMESTER-1		
PHRM-7201	Biostatistics	3 (3-0)
PHRM-7202	Drug design and development	3 (3-0)
PHRM-7203	Pharmaceutical Analytical Techniques	3 (3-0)
PHRM-7204	Research Methodology	3 (3-0)
URCG-5129	Understanding of Holy Quran / Fehm-e-Quran-I / Ethics-I	1(1-0)
	* For Inter-disciplinary admitted candidates only	N/A
	Total Credit Hours in Semester-1	**13**
SEMESTER-2		
PHRM-7205	Advanced Pharmaceutics	3 (3-0)
PHRM-7206	Advanced Biopharmaceutics & Pharmacokinetics	3 (3-0)
PHRM-7207	Pharmaceutical Microbiology& Biotechnology	3 (3-0)
PHRM-7208	Drug Delivery Systems	3 (3-0)
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		
PHRM-7209	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. Pharmaceutics)

PHRM-7201 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-7202 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).

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-7203 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 ofDispersive and Fourier -Transform IR Spectrometer, Factors affecting vibrational frequenciesand 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-7204 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. Pharmaceutics)

PHRM-7205 ADVANCED PHARMACEUTICS **Cr. Hr. 03**

1. Solubility and Solubilization: Phenomenon, Emerging trends and techniques, Emulsification mechanisms, Role in formulation development.
2. Hydrophilic-Lipophilic Balance: HLB scale and its application with development of various novel drug delivery systems (Practical aspects).
3. Dispersions or Dispersed systems: Introduction, types and applications, Polymeric dispersions.
4. Solid state particles: Particle Size Analysis and Zeta Potential: Introduction, working principle/mechanism, application in formulation analysis and results interpretation for pharmaceutical properties of API.
5. Crystals and Crystallization in drug delivery design: Basics of crystal formation and crystallization, Crystal Growth& Design: Introduction, Role and effect in drug properties.

Recommended Books:

1. Aulton ME. Aulton's pharmaceutics: the design and manufacture of medicines. Churchill Livingstone; 2007.
2. Zinc G. Remington: The Science and Practice of Pharmacy. Philadelphia College of Pharmacy and Science; 2005.
3. Sinko PJ. Martin's Physical Pharmacy and Pharmaceutical Sciences. 6 th Ed. Lippincott Williams & Wilkins; 2010
4. Rowe RC, Sheskey PJ, Quinn ME. Handbook of pharmaceutical excipients. 6th Ed. Pharmaceutical Press; 2009

5. Rienger M, Scott-Blair GW. Rheology. 3rd Ed. Academic Press; 1990
6. Ghosh TK, Jasti BR. Theory and practice of contemporary pharmaceutics. 1st Ed. CRC Press; 2005.
7. Kleemann A, Engel J, Kutscher B, Reichert D. Pharmaceutical substances: Syntheses, Patents, Applications of the most relevant APIs. 5th Ed. Thieme; 2008.
8. Lewis GA, Mathieu D, Phan RTL. Pharmaceutical experimental design: (Drugs & the Pharmaceutical Sciences). 1st Ed. Informa HealthCare; 1998.
9. Lund W. The pharmaceutical Codex: Principles and practice of pharmaceutics. 16th Ed. Co CBS Publishers; 2009.

PHRM-7206 ADVANCED BIOPHARMACEUTICS& PHARMACOKINETICS Cr. Hr. 03

1. Drug Absorption from the Gastrointestinal Tract: Drug Absorption mechanisms and barriers Transport model: Permeability-Solubility-Charge State and pH Partition Hypothesis, Properties of the Gastrointestinal Tract (GIT), pH micro-climate environment, Tight Junction Complexes.
2. Biopharmaceutics& Pharmacokinetic considerations in drug product designing.
3. Correlation of in-vivo data with in vitro dissolution data. IVIVC: Computer-aided in-vitro in-vivo correlation (practice with example of practical data).
4. Drug Product Performance: Biopharmaceutics classification system, generic biologics (biosimilar drug products), clinical significance of bioequivalence studies, special concerns in bioavailability and bioequivalence studies, generic substitution.
5. Pharmacokinetic applications: Modified-Release Drug Products, Targeted Drug Delivery Systems and Biotechnological Products. Pharmacokinetics and pharmacodynamics in drug interactions.

Recommended Books:

1. Schoenwald RD. Pharmacokinetics in drug discovery and Development. 1st Ed. CRC Press; 2002
2. Gibaldi M. Biopharmaceutics and Clinical Pharmacokinetics. 4th Ed. Marcel &DakkerInc; 2008.
3. Shargel L. Applied Pharmacokinetics and Biopharmaceutics. 5th Ed. Appleton & Lange; 2008.
4. Rouland M, Tozer TN. Clinical Pharmacokinetics. 1st Ed. William &Willkins; 1995
5. Yihong Q, Developing Solid Oral Dosage Forms: Pharmaceutical Theory and Practice.2ND Edition. Academic Press; 2016

PHRM-7207 PHARMACEUTICAL MICROBIOLOGY & BIOTECHNOLOGY Cr. Hr. 03

1. Microbiological based Pharmaceutical products
2. Pharmaceutical Biotechnology: **Concepts and Applications.**
3. Antimicrobial Resistance& Testing
4. Validation of Sterilization Procedures in Industry
5. Microbial Spoilage and Preservation of Pharmaceutical Products
6. Designing of Cell lines for evaluation of Pharmaceutical products
7. Epidemic and Pandemic Prone Diseases

Recommended Books:

1. Hugo WB, Denyer SP, Hodges NA, Gorman SP. Hugo and Russell's pharmaceutical microbiology. 7th Ed. Wiley Blackwell; 2004
2. Pommerville JC. Alcamo's Funtamentals of Microbiology. 9th Ed. John Bartlett Publishers; 2010.
3. Singleton P, Sainsbury D. Dictionary of Microbiology and Molecular Biology. 3rd Ed. John Willey & Sons; 2006.
4. Willey J, Sherwood L, Woolverton C. Prescott's Microbiology. 8 th Ed. C Brown Publishers; 2010.
5. Fundamental techniques in cell culture laboratory handbook 3rd Edition
6. Kateryna K, Antibiotic Resistance: Mechanisms and New Antimicrobial Approaches. Academia Press;2016

PHRM-7208 DRUG DELIVERY SYSTEMS Cr. Hr. 03

1. Sustained Release (SR) and Controlled Release (CR) formulations: Introduction, Drug release mechanisms, Drug release study pattern/designing, Release kinetic modeling.
2. Rate Controlled Drug Delivery Systems: Principles & Fundamentals, Types.
3. Activation Modulated Drug Delivery Systems; Mechanically activated, pH activated, Enzyme activated, and Osmotic Activated Drug Delivery Systems. Feedback regulated Drug Delivery Systems; Principles & Fundamentals.
4. Gastro-Retentive Drug Delivery Systems: Principle, concepts advantages and disadvantages, Modulation of GI transit time approaches to extend GI transit.
5. Buccal Drug Delivery Systems: Principle of mucoadhesion, advantages and disadvantages, Mechanism of drug permeation, Methods of formulation and its evaluations.
6. Transdermal Drug Delivery Systems: Structure of skin and barriers, Penetration enhancers, Transdermal Drug Delivery Systems, *Formulation* and evaluation.

Recommended Books:

1. Jain NK. Controlled and Novel Drug Delivery. 2nd Ed. CBS Publishers & Distributers; 2008
2. Vasant V. Rana de Mannfred A. Hollinger, Drug Delivery Systems 2n Edition. CRC PRESS; 2004
3. Cherng-JK , Advanced Pharmaceutics Physicochemical Principles, Boca Raton London New York ; 2004
4. Lorena AY. **Encyclopedia of Pharmaceutical Technology,** Third Edition. Informa Healthcare
5. Yihong Q, Developing Solid Oral Dosage Forms: Pharmaceutical Theory and Practice.2ND Edition. Academic Press; 2016

17-10-2025

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