P.K. University

Doctor of Philosophy (Ph.D.)

Course Work Syllabus

Department of Pharmacy

Implemented from June 2022

Examination Scheme of Course work of PhD in Pharmacy

Pre-PhD Course Work Scheme for PhD in Pharmaceutical Sciences

Course Code	Subject	Credit Hours	Credit Point Theory	Hrs./Week	Exam Hrs.	Marks
PY-1001	Research Methodology	2	2	2	3	50
PY-1002	Pharmaceutical Sciences	4	4	4	3	100
					Total	**150**

04.06.22
(Dr Reegunta Bharadwaj)

04/06/2022
(Dr. Ram Narayan Prajapati)

04/6/22

4/6/22

PRINCIPAL
Institute Of Pharmacy
PK University, Chhpun (M.P.)

P.K. University
Paper PY-1001
Department of Pharmacy
Ph.D. Course Work Syllabus

Subject: Research Methodology (PY-1001)

Credit: 02
Marks: 50
Exam: 03

Objectives:

- To enable candidate to understand and work methods and concepts related Research.
- To enable the candidate to develop research proposal and to work with research problem.
- To develop broad comprehension of research area.

Unit: - I Overview of Research (Concept, type and methods of research)

Meaning, Concept, nature steps types and characteristics of research, Types and approaches,
Ethics in Research and Plagiarism, Scientific Inquiry, Qualitative and quantitative methods of research like Descriptive, Historical, Case study, Ethnography, Ex-post facto, documentary and content analysis, survey field and laboratory experimental studies. Characteristics of methods and their implications in research area.

Unit: -II Sampling Methods

Biostatistics: Definition, application, sample size, importance of sample size, factors influencing sample size, dropouts, statistical tests of significance, type of significance tests, parametric tests(students "t" test, ANOVA, Correlation coefficient, regression), non-parametric tests (wilcoxan rank tests, analysis of variance, correlation, chi square test), null hypothesis, P values, degree of freedom, interpretation of P values.

Unit: III Development of Research Proposal & Research Paper/Thesis Writing

Research proposal and its elements, Formulation of research problem-criteria of sources and definition, Development of objectives and characteristics of objectives, Development of hypothesis and applications.

Basic concepts of research paper writing and report generation, review of literature, Concepts of Bibliography and References, Outlining and need to write a Research Paper. Primary and secondary data, methods of primary data collection, classification of secondary data.

Unit: IV Correlation and regression:

Graphical presentation of two continuous variables; Person's product moment correlation coefficient, its statistical significance. Multiple and partial correlation. Linear regression; Regression line, coefficient of determination, interval estimation and hypothesis testing for population slope. Introduction to multiple linear regression model, Optimization techniques in experimentation.

Unit: V Computer Application

Basic Knowledge of Computer, Use of Internet for Research Purpose, Research publishing tool-MS Word, Adobe acrobat, Graphics tool-MS Excel, Presentation tool-MS Power, Data Analysis Software and Analysis Techniques point. Application of Internet in research: INFLIBNET, Use of Internet, sights (DOAJ), Use of E Journals, Use of E library, use of EBSCO HOST online database of Academic Libraries. Introduction to reference management software: EndNote, Mendeley etc.

REFERENCES:

1. Research Methodology: Methods and Techniques_ C.R. Kothari, New Age publisher.
2. Research Methodology: R.N.Trivedi and D.P. Shukla, college Book Depot, Jaipur.
3. Research Methodology: D. Chakreborty, Lotus press.
4. Research Methodology for Life Sciences: N. Arumugam, Saras publication.

5. Random Data Analysiss and Measuments procedures: Bendat and picrsol, Wiley Intemcience.

6. Research Methodology; Bin Taylor, G. Sinha and T. Ghoshal, prentice Hall of India Pvt. Ltd.

7. An Introduction to Computational Biochemistry: C. StanandT. Sal.

8. Cox, J. And Urban, P. "Quick Course in Microsoft Office. Galgotia Publications, New Delhi, 1990.

9. Jain, Satish: "Introduction to Computer Science and basic Programming." BPB Publications, New Delhi, 1990.

10. Rajaraman, V., "Fundamental of Computers", Prentice Hall of India, New Delhi, 1996.

11. Saxena, S., "A First Coursein Computers", Vikas Publishing House Pvt. Ltd., New Delhi, 1998.

P.K.University
Paper PY-1002
Department: Pharmacy
Pre-PhD Course Work Syllabus

Subject: Pharmaceutical Sciences (PY-1002)

Credit: 04
Marks: 100
Exam Hrs: 03

Objectives

After completion of course the candidate shall be able to know-

- Fundamentals of controlled drug delivery systems & basic concept of drug designing.
- The analysis of various drugs in single and combination dosage forms.
- Different approaches for extraction of crude drug.
- Theoretical and practical skills of the different analytical instruments.
- Animal handling and animal modeling for different pharmacological activity.

Unit-01 Oral Controlled drug delivery systems

Design and fabrication of diffusion controlled, dissolution controlled, osmotic, gastro-retentive delivery systems, biodegrable polymeric delivery systems. Controlled drug delivery polymers, roles of polymers in drug delivery, pharmacokinetic / pharmacodynamics basis of oral controlled drug delivery.

Unit-02 Drug Design:

Approaches to drug design, method of variation, biochemical and physiological approaches. Lead compound - Search & Optimization: Search of lead compound from natural products and other sources, selection of test compounds. Methods of lead optimization – synthesis of analogs, variation of substituents, extension of structure, ring versus chain structures, bioisosterism, ring contraction and expansion. Hansch analysis, Free-Wilson analysis, Craig plot, Topliss scheme, CoMFA analysis.

Unit-03 Extraction:

Different techniques adopted for the extraction of phytoconstituents like Maceration, percolation, sonication, soxhlet assisted extraction, ultrasound assisted extraction, super critical carbon dioxide extraction and Microwave assisted extraction.

Unit 04 Animal handling & Common animal models for selected categories of drugs: anti-hypertensive, anti-inflammatory, anti-diabetic, anti-ulcer, anti-oxidants.

Unit-05 Introduction to different analytical techniques for estimation of drugs:

UV-Visible spectroscopy, IR spectroscopy, Atomic absorption spectroscopy, NMR, Mass, Chromatography.

REFERENCES:

1. Principles of Instrumental Analysis - Doglas A Skoog, F. James Holler, Timothy A. Nieman, 5th edition, Eastern press, Bangalore, 1998.
2. Pharmaceutical Analysis- Modern methods – Part B - J W Munson, Volume 11, Marcel Dekker Series
3. Theory and Practice of Industrial Pharmacy By Lachmann and Libermann.
4. The Pharmaceutical Regulatory Process, Second Edition Edited by Ira R.Berry and Robert P.Martin, Drugs and the Pharmaceutical Sciences,Vol.185, Informa Health care Publishers.
5. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded,Marcel Dekker, Inc., New York, 1992.
6. Computer Applications in Pharmaceutical Research and Development, Sean Ekins, 2006, John Wiley & Sons.
7. Computer-Aided Applications in Pharmaceutical Technology, 1st Edition, Jelena Djuris, Woodhead Publishing

8. Cosmetics - Formulation, Manufacture and quality control, PP.Sharma,4th edition
9. Computational and structural approaches to drug design edited by Robert M Stroud and Janet. F Moore
10. Modern Methods of Plant Analysis, Peech and M.V.Tracey, Springer – Verlag, Berlin, Heidelberg.
11. Phytochemistry Vol. I and II by Miller, Jan Nostrant Rein Hld.
12. Recent advances in Phytochemistry Vol. I to IV – Scikel Runeckles, Springer Science & Business Media.
13. Chemistry of natural products Vol I onwards IWPAC.
14. Principles of Drug Design by Smith and Williams, CRC Press, Taylor & Francis.
15. Instrumental methods of analysis – Willards, 7th edition, CBS publishers.
16. Basic and Clinical Pharmacology by B.G Katzung
17. Robbins & Cortan Pathologic Basis of Disease, 9th Ed. (RobbinsPathology)
18. Screening methods in Pharmacology by Robert Turner. A
19. Robbins & Cortan Pathologic Basis of Disease, 9th Ed. (RobbinsPathology)
20. Handbook of clinical Research. Julia Lloyd and Ann Raven Ed. ChurchillLivingstone.
21. Glimpses of Indian Ethano Pharmacology by P. Pushpangadam. Ulf Nyman. V.George Tropical Botanic Garden & Research Institute.
22. Quality control of herbal drugs by Pulok K Mukherjee, Business Horizons Pharmaceutical Publishers, New Delhi.