Krishna University Pre-PhD Examination
Syllabus for Pharmacy
PAPER-I
RESEARCH METHODOLOGY

UNIT-I:

Definition of Research: Nature and importance of Research, Aims and Objectives of Research, Selection of area of research, Design of experimental program, Applications of research and types, Research process and steps in it,Deductive and inductive reasoning.

Method Development and Validity: Development of various methods, conclusion, internal, construct and external.

Formulating a research problem: Sources, Considerations, Steps in formulation of a problem, formulation of objectives.

UNIT-II:

Literature : Need, Procedure- Search for existing literature, Review the literature selected, Develop a theoretical and conceptual framework, writing up the review, Selection of literature, collection of literature, Manual collection from Library, usage of E-library, collection of literature from web, collection of literature from Scopus, Science direct, Scifinder etc., compiling of literature, software utilization in literature collection,

UNIT-III:

Definition of variables: Concepts, indicators and variables, Types of variables, Types of measurement scales.

Research Modeling: Types of Models, Model building and stages, Data consideration and testing, Data collection methods, Surveys-types and method selection.

Design of Experiments: Objectives, strategies, Factorial experimental design, Designingengineering experiments, basic principles- replication, randomization, blocking, Guidelines fordesign of experiments.

UNIT-IV:

Preamble, the problem, objectives, hypothesis to be tested, study design, setup, measurement procedures, analysis of data, organization of report; Displaying datatables, graphs and charts.

UNIT-V:

Developing an outline, Key elements-Objective, Introduction, Design or Rationale of work, Experimental Methods, Procedures,Measurements, Processing and Analysis of Data obtained, Results, Discussion, Conclusion, Referencing and various formats for referencewriting of books and research papers, Report Writing- Prewriting considerations, Thesis writing,Formats of report writing, Formats of publications in Research journals.Utility of research findings in fulfilling the needs of Society.

REFERENCES:

1. Research Methodology- Methods and Techniques by Kothari C.K.
2. Design and Analysis of Experiments by Montgomery, Douglas C.
3. Management Research Methodology; Integration of Principles, Methods and Techniques by Krishnaswamy, K.N., Sivakumar, Appalyer and Mathiranjan M.
4. Research Methodology- A Step-By-Step Guide for Beginners by Ranjit Kumar.
5. Research Methods by Trochim, William M.K.

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PAPER-II

BROAD AREA OF RESEARCH

UNIT-I: UV-Visible Spectroscopy: Brief review of electromagnetic spectrum, UV-Visible range, energy-wavelength-colour relationships, Interaction of electromagnetic radiation (UV-Vis) with matter and its effects, Chromophores and their interaction with EMR, Beer-Lambert's law, Instrumentation of single beam and double beam spectrophotometers and applications.

UNIT-II: IR Spectroscopy, Identification of functional groups, confirming the molecules with IR, estimating the purity of compound, finger print region

UNIT-III; Mass Spectrometry: Basic principles and brief outline of instrumentation. Ion formation and types, molecular ion, meta stable ions, Fragmentation processes, Fragmentation patterns, Mass spectrum, its characteristics and representation.

UNIT-IV; NMR : Reference, Chemical shift, solvents used in NMR, D_2O exchange, identification of nature of protons and number of protons on particular chemical environment.

UNIT-V; Chromatography: Introduction &classification of chromatographic techniques. Principle, instrumentation and applications of different chromatographic techniques - Paper Chromatography, TLC, Column Chromatography, Ion exchange chromatography.

Validation: Definition, Various parameters for validation– Accuracy, Precision, Robustness, Ruggedness, Limit of Detection (LOD), Limit of Quantification (LOQ) – as perI.C.H, USP and EP guidelines

REFERENCES:

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. A Text book of Pharmaceutical Analysis by Kerrenth A. Connors
4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
6. Organic spectroscopy by William Kemp
7. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
8. Spectrophotometric identification of Organic Compounds by Silverstein
9. Pharmaceutical dosage forms byLiberman, HA &Lachman L Tablets vol I, II & III.
10. Physical Pharmacy by Alfred Martin.
11. Pharmaceutical Dosage forms by Howard. C. Ansel.
12. Modern Pharmaceutics by Gilbert S. Banker and Christopher T. Rhodes.

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PAPER-III

RESEARCH SPECIALIZATION

UNIT-I: Introduction to Solid Dosage Forms: Introduction to oral solid dosage forms.
Preformulation in Solid Dosage Forms: Introduction, Selection of drug substance, Characterization of drug substance: salt form, solubility, particle morphology, flow characteristics, pharmacokinetics and polymorphism, Identification of dissolution procedure, Selection of suitable excipients, Drug and Excipient interaction studies.
Tablets - Types of Tablets –Immediate Release Tablets, Extended Release Tablets, Chewable Tablets, Orally Disintegrating Tablets, Formulation and Evaluation of Tablets.
Capsules- Types of Capsules, Formulation and Evaluation of Capsules.
Emulsions: Types of emulsions, formulation and evaluation of emulsions
UNIT-II; High Performance Liquid Chromatography: Introduction, Principle & Instrumentation, Types of Columns, mobile phase selection and preparation, Column Parameters, Detectors used in HPLC and comparison of sensitivity, selectivity and field of applications of these detectors. Applications of HPLC in Pharmaceutical science.
UNIT-III; Gas Chromatography: Introduction, Principle & Instrumentation – types of Carrier gases used, Types of columns, Column selection, Column efficiency parameters, Detectors used in GC &Applications of GC in Pharmaceutical science.
UNIT-IV; Stability Studies: Introduction, Stability testing of solid dosage forms, Degradation pathways, Physical stability testing, Normal and accelerated stability testing, ICH Guidelines, Development of stability protocols.
UNIT-V; Physicochemical Properties of Drugs: Solubility and dissolution rate of drugs, particle size and effective surface area, polymorphism, pseudopolymorphism, salt form, lipophilicity of drug, Dissociation constant, pKa, Partitioncoefficient.
REFERENCES:

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. A Text book of Pharmaceutical Analysis by Kerrenth A. Connors
4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
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10. Physical Pharmacy by Alfred Martin.
11. Pharmaceutical Dosage forms by Howard. C. Ansel.
12. Modern Pharmaceutics by Gilbert S. Banker and Christopher T. Rhodes.
13. www.ich.org
14. www.fda.gov