

Pre-PhD Course-Work Syllabus
University Department of Pharmaceutical Sciences
Utkal University, Vani Vihar, Bhubaneswar

Objectives:

1. To familiarize scholars with the academic writing, and reading skills.
2. To train them to have independent publications.
3. To acquaint students with research practices.
4. To help them understand the ethical issues associated with research
5. To train them for the job markets available in higher education.

Programme Outcomes:

1. Scholars will be able to understand the various problems in the field of Pharmaceutical & Allied Sciences and to study them.
2. They will be familiarized with research practices and can have independent publications which will not only contribute to the body of knowledge but to the university profile as well.
3. They can fill up research and teaching positions.

Paper-1

Research in Pharmaceutical Sciences: Foundations & Applications

Objective:

To introduce to the students the basics of research, the processes of doing research from designing to operationalizing and to develop among them the skill to write various forms of write-ups to disseminate their research outcomes.

Learning Outcomes:

After going through this paper, the enrolled student will:

1. Get to know the various theoretical foundations that have been laid down by the theories to undertake empirical research in Pharmaceutical Sciences.
2. Develop a clear understanding about the types of research, with their areas of application.
3. Gain knowledge on the entire research process from the conceptualization of an issue till drawing the conclusion along with the operationalization process in the Laboratory and data analysis procedures.
4. Develop competency in writing different types of research papers.

Unit-1-

- IR, NMR and Mass Spectroscopy
- Gas chromatography, HPLC, HPTLC, Supercritical Fluid Chromatography
- Concepts of Stereochemistry in Drug Designing and Development

Unit-2-

- Preformulation Studies in relation to Solid, Liquid and semi -solid and aerosols dosage forms.
- Bio-Pharmaceutics and Pharmacokinetics: Compartmental models, non-linear and non-compartmental pharmacokinetics, Bioavailability and Bioequivalence studies.
- Novel Drug Delivery Systems: Fundamentals, design, fabrication, evaluation and applications of controlled release formulations.

Unit-3-

- Organization of screening for pharmacological activity of new substances with emphasis on evaluation using, in vivo, in vitro, ex vivo, in situ and other possible alternative models.
- Detailed study of drug metabolism, Drug interactions and its correction, therapeutic incompatibility, Pharmacogenomics and Adverse drug reaction.
- High throughput screening

Unit-4-

- Drug Discovery: History of herbs as a source of drugs and drug discovery.
- Extraction and Phytochemical Studies: Modern methods of extraction and choice of solvent for extraction. Methods of Fractionation: Separation of Phytoconstituents by latest techniques.
- Phytochemical Finger printing: HPTLC, LC-MS and GC-MS applications in characterization of herbal extracts.

Paper-2

Writing Reviews

Objective:

To develop among students the ability to search relevant literature, to put them into order in their research write-ups and to present them adequately and critically in their research writings.

Learning Outcomes:

After going through this paper, the student will:

1. Get used to the identification, browsing, and giving proper academic recognition to the literature in his/her own work.
2. Enskill himself/herself in using software to navigate various search engines and locate the grey areas.
3. Develop the writing skill for various skill for various types of academic writing.
4. Master the competency of presenting the reviews in the most systematic manner in his/her write-ups or presentations.

Unit-1-

- Review of Literature- Need of Review, Process of doing a review, Writing a review
- Referencing Style, Foot note & End note, Reference & Bibliography

Unit-2-

- Using Software to prepare a good review of literature
- Review Grid, Identifying the grey areas after the review

Unit-3-

- Writing a book review
- Writing a term paper

Unit-4-

- Presentation of reviews on particular topic

Paper-3

Research and Publications Ethics

Objective:

To train the students to undertake ethical research with honesty, honoring the intellectual property rights of the previous authors and ensuring dignity and honor to the subjects under study.

Learning Outcomes:

After going through this paper, the student will:

1. Get a fair stock knowledge on intellectual honesty and research integrity.
2. Acquaint themselves with the incidences of scientific misconduct which they need to avoid during their research process.
3. Get to know standards of publication ethics and the ways for ensuring plagiarism free research writings.

Unit-1-

- Introduction to Ethics- Definition, moral philosophy, nature of moral judgments and reactions
- Intellectual honesty and research integrity

Unit-2-

- Scientific Misconduct- Falsification, Fabrication and Plagiarism (FFP)
- Redundant Publications: duplicate and overlapping publications, salami Slicing, Selective reporting and misrepresentation of data

Unit-3-

- Publication Ethics- Definition, Introduction and Importance, Best practices/ standards setting initiatives and guidelines- COPE, WAME, etc.
- Publication Misconduct- Definition, concept, problems that lead to unethical behavior and vice versa types, Violation of Publication ethics, authorship and contributorship, Identification of publication misconduct, complaints and appeals, predatory publishers and journals

Unit-4-

- Open access publications and initiatives, Journal finder/ journal suggestion tool viz, JANE, Elsevier Journal Finder, Springer Journal Suggester, etc. Complaints and appeals: Examples and fraud from India and abroad
- Use of Plagiarism software like Turnitin, Urkund and other open-source software tools, conflicts of interest

Paper-4

Basic Statistics and Computer Application

Objective:

To ensure among the students a basic level of knowledge on various statistical tools and techniques for the numerical presentation of their research findings and computer aided drug discovery.

Learning Outcomes:

After going through this paper, the student will:

1. Develop basic competencies in applying rudimentary statistics to treat their research findings.
2. Develop knowledge on basic computer use and their application in drug design and development.
3. Be competent in developing good proposals and making captive presentations.

Unit-1-

- Basic statistics for Pharmaceutical research- Mean, Median, Mode, Standard Deviation, Chi square test, ANOVA and other statistical coefficient in relation to biological activity.
- Introduction to Biological databases (PubMed, PDB, MMDB, NCBL, EMBL, Swiss Prot, KEGG, BRENDA)

Unit-2-

- Computer Application- SPSS, Factorial Design, DOE
- Computer aided Drug Design - BLAST and FASTA, Sequence alignment, Molecular Docking concept and application.

Unit-3-

- Presentation (25 Marks)

Unit-4-

- Proposal Writing (25 Marks)