



HEALTH SCIENCES

(MEDICINE, DENTISTRY, PHARMACY, HOMEOPATHY & ALLIED HEALTH SCIENCES)

RESEARCH METHODOLOGY -SYLLABUS

Total Lecture Hours: 60

Credits: 4

Unit-I Research Methods

Meaning of Research-Objectives of Research-Motivation in Research – Types of Research – Significance of Research –Research and Scientific Method– Criteria of good Research – Problem Encountered by Researchers in India – What is Research Problem? Selecting the Problem – Defining the Problem – Technique involved in Defining the Problem- Research Design – Different research design – Basic principles of Experimental Designs – Significance of Report Writing – Different Steps in writing Report – Layout of the Research Report – Types of Reports – Oral Presentation Mechanics of Writing a Research Report – Precautions for Writing Research Reports-Research metrics and Indexing.

Unit – II Research Ethics & IPR

Perspective of Ethics, Personal vs professional ethics: Moral Reasoning – Ethical theories, Deontological, Utilitarianism – Ethical leadership (integrity and ingenuity) – framework for ethical decision making – Michael Macdonald model & Storch model, Plagiarism software. CDSCO, CPCSEA Guidelines. ICMR Guidelines 2017, ICH-GCP guidelines, GLP guidelines, Research Misconduct.

Introduction to intellectual property and intellectual property rights Types, patents, copy rights, trade marks, design rights, geographical indications – importance of IPR – Patentable and non patentables – patenting life – legal protection of biotechnological inventions – world intellectual property rights organization (WIPO)

Unit – III Microscopy and Analytical Instrumentations

Principle, structure and applications of Bright field, Dark field, Phasecontrast, Fluorescent, Electron microscopy (TEM & SEM), Confocal microscope and Foldscope. Atomic force microscope (AFM). pH meter-determination of pH, Colorimetry, Spectroscopy techniques – UV – Visible, Fluorescence, FT –IR, Atomic absorption, NMR, Mass spectrometry, MALDI ToF, IR spectrum, X-ray crystallography. RT PCR, HPLC, GCMS instruments .

Unit –IV Clinical Trials

Introduction, composition, procedures & records, Informed consent, responsibility & rules applicable to investigators and sponsors, reporting of adverse events and other related ethical issues. Clinical Trial Guidelines. Biosafety and Bioequivalence studies.



Unit – VBiostatistics

Principles and practice of statistical methods in biological research – Data collection, presentation of Data – Measures of central tendency – Mean, Median, Mode, Correlation coefficient, Standard deviation, student 't' test, chi-square test. Analysis of variance (ANOVA) and its uses. Basics of computers – types, servers, operating systems – Windows, UNIX and Linux. Finding scientific articles – Pubmed. Outline of SPSS and Mathematica. Parametric and Non parametric test, Qualitative analysis, Questionnaire designing and validation, Interview, FGD.

REFERENCES

1. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
2. Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International. 418p.
3. Arora, P.N. & Malhon, P.K. 1996. Biostatistics. Imalaya Publishing House, Mumbai.
4. Jogdand SN. 2004. Gene Biotechnology Published by Himalaya Publishing House, Mumbai.
5. Baxevanis, A.D. & Ouellette, B.F.F. 2001. Bioinformatics: A practical guide to the analysis of genes and proteins – Wiley Inter science – New York.
6. John G Webster. 2004. Bioinstrumentation .Student edition, John Wiley & sons, Ltd.
7. Kleinsmith, L. J. & Kish, V.M. 1995. Principles of Cell and Molecular Biology. 2nd edn., McLaughlin, S., Trost, K., Mac Elree, E. (eds.), Harper Collins Publishers, New York.
8. Keith Wilson & John Walker. 2003. Practical Biochemistry Principles & techniques. 5th edition, Cambridge university press.
9. Palanivelu P. 2001. Analytical biochemistry and separation Techniques A Laboratory manual. 2nd edition, Published by Tulsi Book Centre, Madurai, Tamilnadu.
10. Ramadass, P. and A. Wilson Aruni 2009. Research and Writing - Across the Disciplines. MJP Publishers, Chennai – 600 005.