



HEALTH SCIENCES

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

RESEARCH METHODOLOGY -SYLLABUS

Total 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 Microscopy and Analytical Instrumentations

Principle, structure and applications of Bright field, Darkfield, 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 –III 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 – IV Biostatistics

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.

Unit – V Research and Publication Ethics (Theory) (15 Hours)

PHILOSOPHY AND ETHICS: (3 Hours)

1. Introduction to philosophy: definition, nature and scope, concept, branches 2. Ethics: definition, moral philosophy, nature of moral judgments and reactions.

SCIENTIFIC CONDUCT: (5 Hours)

1. Ethics with respect to science and research 2. Intellectual honesty and research integrity 3. Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP) 4. Redundant publications: duplicate and overlapping publications, salami slicing 5. Selective reporting and misrepresentation of data,

PUBLICATION ETHICS: (7 Hours)

1. Publication ethics: definition, introduction and importance 2. Best practices / standards setting initiatives and guidelines: COPE, WAME, etc. 3. Conflicts of interest 4. Publication misconduct: definition, concept, problems that lead to unethical behavior and vice versa, types 5. Violation of publication ethics, authorship and contributorship 6. Identification of publication misconduct, complaints and appeals 7. Predatory publishers and journals

RESEARCH AND PUBLICATION ETHICS (PRACTICE) (15 HOURS) (INTERNAL)

OPEN ACCESS PUBLISHING: (4 Hours) 1. Open access publications and initiatives 2.

2. SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies 3. Software tool to identify predatory publications developed by SPPU 4. Journal finder/journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggested, etc.

PUBLICATION MISCONDUCT: (4 Hours) (A) Group Discussions: 1. Subject specific ethical issues, FFP, authorship 2. Conflicts of interest, 3. Complaints and appeals: examples and fraud from India and abroad (B) Software tools: Use of plagiarism software like Turnitin, Urkund and other open source VMRF-DU Ph.D Research Methodology



software tools,

DATABASES AND RESEARCH METRICS:(7 Hours) (A) Databases: 1. Indexing databases 2.

Citation databases: Web of Science, Scopus, etc. (B) Research Metrics: 1. Impact Factor of journal as per Journal Citation Report, SNIP, SIR, IPP, Cite Score 2. Metrics: h-index, g index, i10 index, altmetrics.

Introduction to philosophy: definition, nature and scope, concept, branches 2. Ethics: definition, moral philosophy, nature of moral judgments and reactions.

REFERENCES

1. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSAPublishers.
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 PublishingHouse,Mumbai.
5. Baxevanis, A.D. & Ouellette, B.F.F. 2001. Bioinformatics: A practical guide to the analysis of genes and proteins – Wiley Inter science – NewYork.
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. 2ndedn., McLaughlin, S., Trost, K., Mac Elree, E. (eds.), Harper Collins Publishers, NewYork.
8. Keith Wilson& John Walker. 2003. Practical Biochemistry Principles &techniques.5thedition,Cambridge universitypress.
9. Palanivelu P.2001. Analitical biochemistry and separation Techniques A Laboratory maual. 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 – 600005.