

KANNUR UNIVERSITY

Ph.D Coursework

Syllabi for Zoology

PAPER 1—RESEARCH METHODOLOGY

Unit-1. Objectives and types of research: Motivation and objectives—Research methods vs Methodology. Types of research—Descriptive Vs. Analytical, Applied Vs. Fundamental, Quantitative Vs. Qualitative, Conceptual Vs. Empirical.

Unit-II-- Research Formulation-Defining and formulating the research problem—Selecting the problem- Necessity of defining the problem- Importance of literature review in defining a problem- Literature review—Primary and secondary sources—reviews, treatise, monographs- parents- Web as a source- Searching the web- Critical literature review- Identifying gap areas from literature review- Development of working hypothesis,e-journals- books and thesis related to the topic.

Unit-III—Research design and methods- Research design- Basic Principles - Need of research design- Features of good design- Important concepts relating to research design- Observation and Facts,Laws and Theories, Prediction and explanation ,Induction Deduction, Development of Models, Developing a research plan- Exploration,, Description, Diagnosis, Experimentation, Determining experimental and sample designs.

Unit IV- Data collection and analysis: Execution of the research- Observation and collection of data- Methods of data collection- Sampling Methods- Data processing and Analysis strategies- Data analysis with statistical packages- Hypothesis-testing – Generalization and Interpretation- basic elements of modeling and stimulation.

Unit-V-- Reporting and thesis writing- Structure and components of scientific reports-Types of report- Technical reports and thesis- Significance-Different steps in the preparation- Layout(introduction, Review,Experiments, Results and Discussion,Conclusion and References), Structure and Language of typical reports- illustrations and tables- Bibliography, referencing and footnotes- Oral presentation- Planning- Preparation-Practice- Making presentation- Use of visual aids- Importance of effective communication.

Unit VI- Application of results and ethics- Environmental impacts- Ethical issues- ethical committees- Commercialisation- Copy right- royalty- Intellectual property rights and patent law- Trade related aspects of Intellectual property Rights- Reproduction of published material- plagiarism- Citation and acknowledgement- Reproducibility and accountability-Publication,Citation index ,impact factor.

References:

1. Garg,B.L .,Karadla, R., Agarwal.F and Agarwal.G.K.,2002. An introduction to Research Methodology, RBSA publishers.
2. Kothari,C.R.,1990. Research Methodology: Methods and techniques,New age International.418P.
3. Sinha,S.C and Dhiman,A.K,2002. Research Methodology, ESS ESS Publications, 2 Volumes.
4. Trochim,W.M.K 2006, Research methods : the concise knowledge base, Atomic Dog publishing, 270P.
5. Wadehra, B.L.2000.Law relating to patents , trade marks, copyright designs and geographical indications. Universal Law Publishing.

Additional reading.

1. Anthony,M., Graziano, A.M. and Raulin,M.L.,2009. Research Methods: A process if Inquiry,Allyn and Bacon.
2. Carlos,C.M.,2000. Intellectual property rights, the WTO and developing countries: the TRIPS agreement and policy options. Zed Books,NewYork.
3. Coley,S.M. and scheinberg, C.A., 1990, "Proposal writing", sage publications.
4. Day,R.A., 1992. How to write and publish a scientific paper, Cambridge University press.
5. Fink, A.,2009. Conducting Research Literature Reviews: From the internet to paper. Sage publications.
6. Leedy,P.D and Ormrod,J.E., 2004 practical Research: Planning and Design,prentice Hall.
7. Satarkar,S.V.,2000. Intellectual property rights and copy right. ESS ESS publications.

KANNUR UNIVERSITY

Ph.D. Course Work in Zoology

Paper-II – Core Subject : Zoology

Unit.1. Systematics: Collection, Preservation and Curation of Specimens; Taxonomic key; Zoological Nomenclature and International Code of Zoological Nomenclature; Modern trends in Systematics; DNA bar coding.

Unit.2. Biodiversity: Assessment of biodiversity- Sampling techniques and Quantitative methods.

Unit.3. Biostatistics. Concept of Sampling; Standard deviation; Standard error of mean; Probability distribution; Test of hypothesis; t-test, Chi square test and ANOVA; Correlation and Regression analysis.

Unit.4. Instrumentation: Principles of Microscopy- Fluorescent, Confocal and Electron microscopy.

Techniques used for purification and characterization of biomolecules: Centrifugation, Ultrafiltration, Chromatography, Electrophoresis, Spectrophotometry, NMR, Autoradiography, X-ray Crystallography, PCR and Blotting.

Unit.5. Histology and Histochemistry: Fixation and Sectioning of tissues, cells and embryos; Immunohistochemistry; Immunofluorescence; Histochemical staining and Microbial staining techniques.


Unit.6. Bioinformatics: Biological data bases; Application of molecular and computational tools for phylogeny.

Unit.7. Ethical, legal, social and scientific issues in Biological Research: Guidelines for bio-safety, functioning of Institutional Animal Ethics Committee and Institutional Ethics Committee; CPCSEA guidelines for Experimentation, ICMR guidelines for experiments involving humans, DBT guidelines for bio-safety practices.

Unit.8. Research Project proposals and Funding agencies: Preparation of Research Project proposal; Brief mentioning of funding agencies such as DST, UGC, DBT, CSIR, ICMR, DAE, DRDO, and KSCSTE.

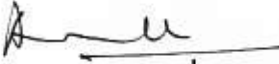
References:

1. Biodiversity, Prabodh K. Maiti & Paulami Maiti
2. The Biology of Biodiversity, M Kato
3. Biodiversity and Environment, S K Agarwal *et. al.*
4. Principles of Systematic Zoology, Ernst Mayr & Peter D Ashlock
5. Introduction to Taxonomy, T C Narendran
6. Elements of Biostatistics in Health Science, W Daniell


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7. Statistical methods for Research, S Singh *et. al.*
8. Statistical Methods, S P Gupta
9. Histochemical Techniques, Gabe M
10. Histochemistry, Pearse
11. Histochemistry in focus, K Shyamasundari & K Hanumantha Rao
12. Cell Biology, De Robertis
13. Fixation in Histochemistry, Stoward P J
14. Research Methodology, G R Basotia & K K Sharma
15. Scientific Thesis Writing and Paper Presentation, N Gurumani
16. Biological Instrumentation and Methodology, P K Bajpai
17. Techniques and Methods in Zoology, Ghatak K L
18. Instrumentation and Techniques, Chatwal & Chatwal
19. Experimental Biology, Abhijith Dutta
20. Research Methodology, C H Chaudhary
21. Fundamentals of Biostatistics, Khan & Khanum
22. Animal Tissue Techniques, Humason
23. Bioinformatics, David W Mount
24. Bioinformatics Computing, Bryan Bergeron


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