

DEPARTMENT OF APPLIED ZOOLOGY
Ph.D. ENTRANCE TEST
RESEARCH METHODOLOGY SYLLABUS

Unit I. *Research Planning and Execution*

Defining of research problem, objective and its importance,
Source of information, Journals, Books, Biological abstracts, Reviews, Data base, Search engines, INFLIBNET, Pubmed, Science direct, e journals, Bibliography,
Background, preliminary observations; Data collection, recording the data, Methods of analysis, presentation of the data.
Methods of writing the finding; Components of thesis, Structure of research article, Presentation of research findings,

Unit II. *Biostatistics and Computers Applications*

Statistical variables, Frequency distribution, Graphical representation of the data.
Probability; ANOVA, Student 't' test; Chi Square test, Correlation and regression analysis;
Nonparametric test-Wilcoxon signed rank test, Mann –Whitney U test, Kruskal Wallis test,
Computer software statistical packages, MS EXCEL, SPSS, MINITAB Packages and their uses.
Dun nets post –hoc test.
Biodiversity Monitoring, sampling techniques and relevant software's.

Unit III. *Cell and Molecular Biology Techniques*

In vitro animal cell culture systems, Primary and secondary cultures, requirements, methodology and applications of each culture systems.
Principle, Methods and applications of Cryopreservation, Histological and Histochemical techniques, flow cytometry
Principle, methods and applications of light and confocal microscopy, electron microscopy
Image analysis, Gel doc system-Methods and applications
Principle methods and application of polymerase chain reaction, DNA sequencing, Blot techniques
Autoradiography, DNA finger printing, FISH, RFLP-Principle, methods and applications.

Unit IV. *Biochemical and Physiology Techniques*

Principle, methods and applications of various type of Chromatography; HPLC, GLC, LCMS
Dialysis and precipitation technique; Ultracentrifugation, Electrophoresis, Electro focussing,
organelle separation-Principle, Methods and applications.

Principle, methods and applications of Spectrophotometry, tracer Techniques, ELISA, RIA Immunodiffusion and Immunoprecipitation.

Electrodes, preamplifiers, DC and AC, Faraday cage oscilloscopy, Analog-digital conversion, Anatomical studies; use of antibodies, GFP Gal 4 lines

Unit V. *Breeding and Maintenance of laboratory Animals*

Introduction to experimental animals –mouse, rats and guinea pigs, hamsters, rabbits

Breeding and maintenance of small laboratory animals-mouse and rat CPCSEA Guidelines and IAEC –Rules and Regulations for animal breeding and maintenance. Human ethical committee Handling, treatment and collection of biological materials from experimental animal, good laboratory practice, Waste disposal

References

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4. Fox J.G and Cohen B. J. (Ed) (1984) Laboratory animal in medicine, Academic press. Inc.,
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6. Jayaraman, K.C. (1981) The freshwater fishes of india-A Hand book
7. Kleinsmith L.J. and Kish V.M (1995) Principles of cell and Molecular Biology, II edition, Harper Collins College publishers.
8. Hassard T.H. (1991) Understanding Biostat. Mosby year book, London
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10. Philip, Sheeler (1987) Cell molecular biology, III edition, John Wiley New York
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12. Maciejowski J. and Zieba J. (1982) Genetics and animal breeding, Elsevier-Scientific publishing company, Poland.
13. Norman T.J. Bailey (1994) Statistical methods in biology, 3rd edition, Cambridge University press.
14. Poole T. B. and Robinson R. (Ed) (1987) The UFAW handbook on the care and management of laboratory animals, VI edition, Longman scientific and technical and IBH publishing Co, Pvt. Ltd., New Delhi.
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