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University of Mysore
(Estd.1916)

Ph. D. in ZOOLOGY

Programme Details

UNIVERSITY OF MYSORE
Department of Studies in Zoology
Manasagangotri, Mysuru-570 006

Regulations and Syllabus
Ph. D. in ZOOLOGY

CHAIRMAN
BOS in Zoology
Department of Zoology
UNiversity of Mysore
Manasagangothri
MYSORE - 570 006

UNIVERSITY OF MYSORE
GUIDELINES AND REGULATIONS
LEADING TO
PH. D. IN ZOOLOGY

Programme Details

Name of the Department	:	Department of Studies in Zoology
Subject	:	Zoology
Faculty	:	Science and Technology
Name of the Programme	:	Ph. D.

PH. D. IN ZOOLOGY

Programme outcome

We have Diverse, modern and contemporary aspects of Zoology being pursued for research to obtain Ph.D. in Zoology. Problems pertaining to Genetics, Evolution, Developmental Genetics, Human Genetics, Biodiversity, Environmental Biology, Reproductive physiology, Stress Biology, Chronobiology, Apiculture, medicinal efficacy of medicinal plants are some of the leading areas from where research projects are taken up.

The respective projects provide an intense and in depth intellectual and hands on exercise, which the candidate will have to go through for successful completion of the degree.

The mandate that the outcome of the project should be published in peer reviewed journals enforces the requirement to carry out a valid project with significant contribution to science.

The Candidate with Ph.D in Zoology will thus have necessary expertise to take up independent jobs as

Scientist in Research Institute
Teaching cum Research posts in higher education centers
Research Scientist in Biomedical Industries
Researcher in Biotechnology Industries
Posts in Sericulture, fisheries and other related offshoots of life science

Pedagogy

We have Diverse, modern and contemporary aspects of Zoology being pursued for research to obtain Ph.D. in Zoology. Problems pertaining to Genetics, Evolution, Developmental Genetics, Human Genetics, Biodiversity, Environmental Biology, Reproductive physiology, Stress Biology, Chronobiology, Apiculture, medicinal efficacy of medicinal plants are some of the leading areas from where research projects are taken up.

According to the specific research problem chosen by the candidate, different methodology will be used encompassing techniques like

- ∑ High end microscopy,
- ∑ Genetic experiments,
- ∑ Molecular biology techniques,
- ∑ Gene expression studies,
- ∑ Biochemical and physiological analysis,
- ∑ Wild life observation,
- ∑ Behavioural analysis,
- ∑ Ecological survey,
- ∑ Biodiversity studies
- ∑ Statistical tools,
- ∑ And many more modern, upcoming tools as per the requirement.

COURSE-I: ADVANCED RESEARCH METHODOLOGY

Course outcome

- ∑ Explain and apply scientific methodologies, as well as techniques for scientific writing, and research methodology to prepare the writing of a scientific report, as well as a degree project.
- ∑ Understand biochemical and bio analytical techniques and its applications of the instruments that are routinely used for the characterization of molecules.
- ∑ Explain wide variety of statistical and graphical techniques, classical statistical tests including databases used in bioinformatics.

COURSE CONTENT

Unit I: Laboratory Biosafety and Animal Ethics (Bioethics);-

a) Laboratory Biosafety National and international guidelines, personal protection handling and disposal of hazardous materials (chemical and physical agents) prevention of biological hazards, spillage and waste disposal good laboratory practices.

b) Animal Ethics (Bioethics): Utility based approach, Measures to prevent cruelty to experimental animals, Hygiene and welfare of animals in captivity, Prenatal diagnosis, genetic manipulations and their ethical issues, diseases of caged animals, Benefits and risk of participating in a clinical trial, Legal and social issues, Plagiarism and ethics.

Unit 2. Model Systems:

Criteria for selection of an animal model: life cycle, colony (culture) maintenance and advantages of microbial (E.coli, Neurospora, Yeast): C. elecans; Insects (Drosophila, mosquito, Silkworm) and mammalian systems (mice, rat, hamster, Guinea pig).

Unit 3. Experimental designs/Methodology:

Necessity of objective wise design – pure versus applied research, nature and scope of research methodologies in classics Zoology/Genetics; Explorative and Ecological studies (survey, sampling, description etc) Literature survey;

Immunohistochemical, Cytological, Genetics and Molecular tools; Identification of research gaps ; Testing theories or generating theories; selection and formulation of hypothesis.

Unit 4, Advanced Microscopy:

Electron microscopy: Principle & types – Transmission and Scanning, Applications Confocal

microscopy: Principle and applications (optical sectioning, 3D imaging and live imaging.

Unit 5. Instrumentation:

a) Realtime PCR
b) HPLC
c) 2D gel electrophoresis.
d) Mass Spectrophotometry
e) RIA
f) ELISA
g) Flow Cytometry

Unit 6. Intellectual Property Rights:

Technology transfer regulation – Patenting, patentability, biological processes and products, patenting regulations of biological processes and products in India, trade secrets, copy right, trade and IPR, GATT and TRIP agreements.

Unit 7. Bioinformatics and Computer application:

a) Bioinformatics: Biological databases: Significance of biological databases. Primary databases: NCBI, PDB, Secondary databases: SCOP, TREMBL, Literature databases: PUBMED, MEDLINE, Sequence Analysis: BLAST, FASTA, Protein databases, Protein 3D structure analysis.
b) Computer application: Operating systems DOS, Windows, Linux Overview, DOS files, Word Processing (Excel), Data Base Concepts Information retrieval, Information systems in India, Information Sources / search aids, search operations. Internet, Web site.

Unit 8. Biostatistics:

a) Statistical concepts Data structure, sampling methods, collection, classification and tabulation of data, graphical and diagrammatic representation, histogram, frequency, polygon, frequency curve, bar graph, Pie-chart, etc.,
b) Testing of hypothesis experimental designs, data transformations
c) Measures of central tendency Mean, median and mode.
d) Measure of dispersion of data Range, semi-interquartile range, mean deviation, standard deviation, standard error, coefficient of variation, confidence limits.
e) Types of distribution of data, Normal, Binomial Poisson.
f) Different Statistical tests-ANOVA, ACOVA and Regression.

COURSE-II: REVIEW OF LITERATURE

Course Outcomes

Σ make an extensive survey of literature using different sources of published works from the similar lines and they need to find the research gaps.
Σ identify the broad area for research and form the proposal by justifying the need and relevance of the topic.
Σ formulate the research problem based on the review and finding the research gaps
Σ present a seminar on review of literature of the concerned area of research.