**Syllabus for Integrated M.Phil-PhD 2019**

**Paper II: Recent Advances in Zoology Max. Marks: 100 Time allowed: 3 hours Min. Marks: 50**

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| **Unit I: Advanced Trends in Applied Zoology** |  |

1.1 Latest techniques in Fish- cultures & its products

1.2 Parasites & predators as biocontrol agents of pests

1.3 Conservation of Biodiversity; in-situ and ex-situ

1.4 Recent advancements in the diagnosis and control of parasitic diseases (Protozoan and Helminth)

**Unit II: Nanotechnology, Recombinant DNA Technology & Advanced Genetics**

2.1 Introduction to Nanotechnology and its applications in animal science

2.2 Production of monoclonal antibodies and biomolecules hormunes through rDNA technology

2.3 DNA forensics: DNA profiling methods, technical and ethical issues of DNA profiling

2.4 Epigenetics: epigenetic alterations to the genome, epigenetics and imprinting, epigenetics
 and cancer

**Unit III: Recent Techniques in Zoology**

3.1 PCR and blotting techniques, DNA fingerprinting and its applications

3.2 Phylogenetic systematics – molecular markers used in the diagnosis of taxa

3.3 Centrifugation, electrophoresis and their applications

3.4 Application of remote sensing in animal sciences

**Unit IV: Latest Advances in Immunology**

4.1 Hypersensitivity: mechanism & types of reactions

4.2 Autoimmune diseases: causes and control

 4.3 Tumour immunology: host immune response to tumours & tumour escape mechanisms

 4.4 Tumour immune therapy: non-Specific and antigen specific treatment

**Syllabus for Integrated M.Phil-PhD 2019**

**Paper I: Research Methodology – Parasitology Max. Marks: 100 Time allowed: 3 hours Min. Marks: 50**

**Unit I: Parasitological Techniques**

 Light and Electron Microscopy; Microtomy; Micrometry and Photo Micrography;
 Fixatives with methods of fixation, preservation and staining techniques, Faecal,
 blood and urine examinations for diagnosis of parasitic diseases

**Unit II: Scientific Writing**

 Research, Types and Formulations; Meaning of Research, Objective of Research, Motivation in Research; Research methods vs Methodology. Types of research – Descriptive vs Analytical, Applied vs Fundamental, Quantitative vs Qualitative, Concepttual vs Empiral; Research Process, Criteria of good Research, Formulating the research problem; Selecting the problem; Importance of literature review in research; Sources of Literature Review- primary and secondary sources, reviews, treatise, monographs, patents, journals, books and internet resources; Identifying research gap areas from literature review. Hypothesis, important considerations while making a hypothesis.

**Unit III: Research Ethics**

 Ethics in Research Introduction to Bioethics, Ethical issues concerning various fields
 of biology; Embryonic stem cells and cloning, gene therapy and designer babies,
 genetically modified animals and crops. Ethical limits of animal use and welfare;
 Medical research ethics, Plagiarism and academic integrity; Mentor and mentee
 responsibilities and relationships, Record keeping , data, responsible authorship and
 Publications, Conflict of intrest

**Unit IV: Bio-Statistics**

 Method of data collection and presentation of data; Measures of central tendencies
 and dispersion; Correlation and regression analysis; Types of errors in testing
 hypothesis, level of significance, p-value, tests of significance (T-test, F-test, chi-

 square test and non-parametric test (one & two sample) Analysis of variance

 (ANOVA)- one way and two way; Probability and probability distribution –
 Normal, Binomial and Poisson.

**Syllabus for Integrated M.Phil-PhD 2019**

**Paper I: Research Methodology – Wildlife Max. Marks: 100 Time allowed: 3 hours Min. Marks: 50**

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| **Unit I: Field Methods**  |  |

 Sampling design and data collection, Vegetation sampling methods for wildlife
 habitat evaluation, Methods of wildlife population estimation: sample counts, drive
 counts, line transect method, point counts, pugmark census, pellet group count and
 counts of dens and burrows; Recording basic field observations through field signs
 like foot prints, feeding signs and animal droppings; Capture of wild animals; Use

 of camera, binoculars and GPS in Wildlife study; Quantitative methods of sampling
 behaviour : ad libitum, focal animal and scan sampling; Time-activity budgets,
 ethograms; Faecal analysis for evaluation of food and feeding in ungulates and
 carnivores

 **Unit II: Scientific Writing**

 Research, Types and Formulations; Meaning of Research, Objective of Research, Motivation in Research; Research methods vs Methodology. Types of research – Descriptive vs Analytical, Applied vs Fundamental, Quantitative vs Qualitative, Concepttual vs Empiral; Research Process, Criteria of good Research, Formulating the research problem; Selecting the problem; Importance of literature review in research; Sources of Literature Review- primary and secondary sources, reviews, treatise, monographs, patents, journals, books and internet resources; Identifying research gap areas from literature review. Hypothesis, important considerations while making a hypothesis.

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**Syllabus for Integrated M.Phil-PhD 2019**

**Paper I: Research Methodology – Ichthyology Max. Marks: 100 Time allowed: 3 hours Min. Marks: 50**

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| **Unit I: Fish Biology and Biochemistry**  |  |

 Methods used for estimation of Physico-Chemical parameters in waterbodies:
 Dissolved Oxygen, Free Co2, transparency, total alkalinity, pH. Nitrite, nitrate and
 phosphorous. Estimation of Fish diversity, age, fecundity, Collection, prevalence
 and estimation of zooplankton in water body; Methods used in determination of
 moisture, protein, fat, ash and hematological parameters (Hb, RBC, PCV, WBC,
 ESR and Erythrocyte indices)

**Unit II: Scientific Writing**

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 **Syllabus for Integrated M.Phil-PhD 2019**

**Paper I: Research Methodology – Entomology Max. Marks: 100 Time allowed: 3 hours Min. Marks: 50**

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| **Unit I: Collection, Preservation and rearing of Insects**  |  |

Methods of collection and preservation of insects; Insect mounting techniques – temporary and permanent; Methods of insect rearing, Management and maintenance of insectaries; Chemical composition of various mountants and fixatives, Methods for preparation of cleansing agents, Berle’s mountant Bio-chemical composition of various preservatives.

**Unit II: Scientific Writing**

 Research, Types and Formulations; Meaning of Research, Objective of Research, Motivation in Research; Research methods vs Methodology. Types of research – Descriptive vs Analytical, Applied vs Fundamental, Quantitative vs Qualitative, Concepttual vs Empiral; Research Process, Criteria of good Research, Formulating the research problem; Selecting the problem; Importance of literature review in research; Sources of Literature Review- primary and secondary sources, reviews, treatise, monographs, patents, journals, books and internet resources; Identifying research gap areas from literature review. Hypothesis, important considerations while making a hypothesis.

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