

**Syllabus for Ph.D. course work in Zoology**  
**Department of Zoology**  
**Vidyasagar University, Midnapore-721 102**

<b>Course</b>	<b>Course Name</b>	<b>Marks</b>
<b>Course I</b>	<b>Basic Zoology</b>	<b>50</b>
<b>Course II</b>	<b>Applied Zoology</b>	<b>50</b>
<b>Course III</b>	<b>Research Methodology and Research Ethics</b>	<b>50</b>
<b>Course IV</b>	<b>Submission of assignment:</b>	
	<b>a. Review of literature or data generated on the related research topic</b> <b>b. Power point presentation on a research topic</b> <b>OR</b> <b>Analysis of data using MS-Excel or statistical methods</b>	<b>40</b>  <b>10</b>
	<b>Total:</b>	<b>200</b>

# Syllabus for Ph.D. course work in Zoology

## Course I: Basic Zoology

1. Cloning Vector, YAC, BAC	3L
2. Genetic Diseases	3L
3. RFLP marker and its uses	3L
4. Limbic system	3L
5. Stress physiology	3L
6. Fish and Fisheries resources	3L
7. Classification Scheme of Fishes	3L
8. Aquaculture practices and Animal Nutrition	3L
9. Cells and organs involved in immune system	3L
10. Host-Parasite interaction	3L
11. Vector borne diseases and its management	3L
12. Bacterial Microbiology	3L
a. Fermentation -benefits, importance and types	
b. Quorum sensing	
13. Metapopulation	2L
14. T- cell and B-cell development	3L
15. Basic principle of ecosystem functioning: wetland, coast. Forest	3L
16. Environmental management with special reference to EIA	3L
17. Biodiversity and wildlife conservation	3L

## Course II: Applied Zoology

1. Advance electron microscopy	4L
2. Restriction mapping	4L
3. DNA fingerprinting	4L
4. ELISA, Immunohistochemistry	4L
5. Southern blotting hybridization	2L
6. Diagnosis of parasitic diseases	4L
7. Advance technology for the conservation and management of fisheries resources	4L
8. Bioinformatics tools	4L
9. Gene cloning: current perspective	4L
10. PCR: primer designing, methodology and applications	4L
11. Flow Cytometry: concepts and applications	4L
12. Genome editing by Crisper Cas9	4L
13. Biodiversity based biotechnology	4L

## Course III: Research Methodology and Research ethics

### A. Research Methodology: 25L

1. Research definition, importance, meaning and characteristic. Steps in research.
2. Research problem: identification, selection and formulation
3. Sampling: definition, theory, types, techniques and steps. Sample size, advantage and limitation of sampling.
4. Data: definition, sources and types. Data collection method. Analysis of data
5. Review of literature and Bibliography
6. Research report: types, contents, styles and steps in drafting. Editing the final draft and thesis writing
7. Significance of Impact factor, citation index, SCI, H-index, SCOPUS

### Computer application: 15L

1. Operating system: latest version of WINDOWS, LINUX
2. Database management system
3. Internet
4. Office management: MS-word, MS- Excel, MS-PowerPoint
5. Software packages: SPSS, R-statistics, MATLAB, EMBOS

### Statistics:

1. Normal probability distribution
2. Test for goodness for fit for a proposed distribution
3. Correlation of coefficient: Simple linear, Multiple linear and partial
4. Regression: simple, multiple and stepwise

5. Experimental design. Analysis of variance: model, one or two way ANOVA. Multiple comparison tests

**B. Research ethics:**

**10L**

- Research and Publication Ethics (RPE)
- Awareness about the publication ethics and publication misconduct
- Pedagogy

**a. Theory:**

Philosophy and ethics

Scientific conduct

Publication ethics

**b. Practice:**

Open access publication

Publication misconduct

Database and Research metrics

### **Course IV: Submission of assignment**

1. A literature of review or data generated on the related research topic be submitted by each scholar duly signed and recommended by the supervisor (s)
2. Power point presentation on a researchable topic (Selected by Supervisor)
3. Analysis of data using MS-Excel or statistical methods