

**Punyashlok Ahilyadevi Holkar Solapur University, Solapur**



**Name of the Faculty: Science & Technology**

**CHOICE BASED CREDIT SYSTEM**

**Syllabus: Zoology (GE)**

**Name of the Course: B.Sc. I Sem. I & II (Liberal Science)**

**(Syllabus to be implemented from June 2022)**



**Punyashlok Ahilyadevi Holkar Solapur University, Solapur**  
**B. Sc. First Year (Liberal Science)**  
**Semester-I**

**Generic Elective: ZOOLOGY (Paper-I)**

Teaching Scheme:

Lectures – 3 Hours/week, 2 Credits

Practical – 4 Hours/week, 4 Credit

Examination Scheme:

UA – 40 Marks

CIE – 10 Marks

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**About Course:**

This course provides a broad overview of Zoology and to produces expert hands that would have sufficient knowledge and expertise to solve the urgent problems of the region by using Zoology. The course structure is basic science centric where students learn core science and are taught necessary fundamental subject for that purpose.

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**Course Prerequisite:**

Student shall have knowledge of basic biology to continue with the understanding at the higher level of graduation as defined in the National Education Policy.

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**Preamble:**

The systematic and planned curricula for first year students shall motivate and encourage them for pursuing higher studies in Zoology and for becoming an entrepreneur.

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**Course Objectives:**

The objectives of B. Sc. Zoology course are:

- To provide an intensive and in depth learning to the students in field of Vermitechnology.
  - Beyond simulating, learning, understanding the techniques, the course also addresses the underlying recurring problems of disciplines in todays' scientific and changing world.
  - To develop awareness and knowledge of different organization requirement and subject knowledge through varied branches and research methodology in students.
  - To train the students to take up wide variety of roles like researchers, scientists, consultants, entrepreneurs, academicians, industry leaders and policy.
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**Course Outcomes:**

- I. Students can construct their own compost farm & thereby can get monthly income of Rs. 7000-8000.
  - II. Students/ farmers by using vermicomposting in their field can increase the crop yield.
  - III. Students residing in cities can produce vermicomposting in small scale for garden/household plants.
  - IV. They can get the jobs in educational institutes as vermicomposting/vermiculture technician.
  - V. The candidate can generate income by supplying vermiwash, and vermicomposting.
  - VI. By developing and propagating vermicomposting technology he/she will directly or indirectly help to prevent environmental pollution, by using vermicomposting in the field and thereby increasing crop yield he will help to solve food problems.
  - VII. It will lead towards organic farming and healthy food.
  - VIII. In today's world, recycling of garbage has become necessary in order to sustain our health and environment. So, let's join for Three R's of Recycling Reduce, Reuse, Recycle, i.e. certificate course in vermicomposting technology.
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# **Punyashlok Ahilyadevi Holkar Solapur University, Solapur**

## **B. Sc. First Year (Liberal Science) Semester-I**

### **Generic Elective: ZOOLOGY (Paper-I)**

#### **PAPER I: Fundamentals of Vermitechnology**

**(Total credits 2.0, Contact Hrs 30.0)**

#### **Unit I- Organic Solid Waste Management**

**15 hrs**

1. Introduction to vermiculture
2. Classification and study of different species of earth worms. Morphology, anatomy and Physiology of earthworms.
3. Selection of suitable earthworm species for vermicomposting
4. Vermitechnology: Organic solid waste management by vermicomposting. Definition, meaning, history, economic important, their value in maintenance of soil structure.
5. Conventional method of compost preparation.
6. Biotransformation: Conversion of organic waste into vermicompost by various methods.
7. Solid waste management.

#### **Unit II: Biology of Earthworm:**

**15 hrs**

1. Biology of *Eisenia foetida*, *Eudrilus eugeniae* and *Perionyx excavatus*.
2. Types of Vermicomposting – Raised bed method; heap method; pit method; pot method; NIDEP method. vermiculture,
3. Physical, chemical and biological properties of vermi-compost.
4. Role of earth worms in soil fertility.
5. vermi-cast – vermi-technology and applications
6. Nutritional composition (macro and micronutrients) of vermicompost.
7. Diseases and enemies of earthworms.

**Total -30 hrs**

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## **PAPER II: Applied Vermitechnology** **(Total credits 2.0, Contact Hrs 30.0)**

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### **Unit-I Vermicomposting:**

**15 hrs**

1. Small Scale or indoor vermicomposting
2. Large scale or outdoor vermicomposting.
3. Effects of vermicompost on soil properties.
4. Raw materials for composting – requirements and methods of vermicomposting.
5. Maintenance of composting – Collection of vermicomposting –
6. Efficiency of vermicomposting.
7. General problems in production of vermi-composting.

### **Unit II Introduction to vermiculture and vermiwash**

**15 hrs**

1. Vermiculture: Chemical Composition, and its uses.
2. Vermiwash: Chemical Composition and its uses.
3. Prospects of vermi-culture as self-employment venture.
4. Commercialization of vermicompost.
5. Vermicomposting of Agricultural and Urban Solid Wastes,
6. Recycling of industrial wastes through vermicomposting.
7. Various government schemes for Vermicomposting.

### **References:**

- 1) A Textbook of Vermicompost, Vermiwash & Biopesticides: Dr. Keshav Singh, Dr. Gorakh Nath et al.
- 2) Earthworm Management in Tropical Agroecosystems: Lavelee et al. CABI Publisher
- 3) Sara S- Vermitechnology-M. Seetha Lakshmy:
- 4) Vermitechnology: A. Mary Violet Christy ([www.mjppublishers.com](http://www.mjppublishers.com))
- 5) Worm Farming: How to start a worm farm: Danny Gansneder
- 6) Biology and Ecology of Earthworms: Edwards C.A. and Bohlen P.J. (1996)

**B. Sc. First Year (Liberal Science)  
Semester-I (Practical)**

**Generic Elective: VERMITECHNOLOGY**

Teaching Scheme:

Practical – 4 Hours/week, 4 Credit

Examination Scheme:

UA – 80 Marks

CIE – 20 Marks

Practical-I

1. Key to identify different types of earthworms.
2. Study of systematic position, habit habitats and external characters of *Eisenia foetida*.
3. Field trip- collection of native earthworms and their identification
4. Study of life stages and development of *Eisenia foetida*
5. Study of life stages and development of *Eudrilus eugeniae*
6. Comparison of Morphology and life stages of earthworm *Eisenia foetida* and *Eudrilus eugeniae*
7. Preparation of Vermiculture, vermiwash and vermicompost and study of equipments/ tools.
8. Collection of organic waste
9. Preparation of vermibeds, maintainance of vermicompost unit and climatic condition.
10. Study of hatching of earthworm cocoon.
11. Study of rearing of earthworms
12. Decomposition of organic raw material
13. Preparation of decomposting pit by garden waste/ kitchen waste/ coconut waste.
14. Vermicompost analysis: Macro and micro nutrients and microbial analysis of vermicompost
15. Study of different methods of vermicomposting
16. Vermiculture, vermicompost and vermiwash preparation
17. Vermicompost Product finishing, packing and sale.
18. Proposal writing for funding agency for starting Vermicompost Unit.
19. Project on vermicompost treatment on plant growth (Field work/ by pot method).
20. Any other practical set by Department.