

Department: Biology

Programme: B.Sc. Microbiology

Semester – III		
Course Code	Course Title	Credits
21UMBIDC101	DSE-Zoology Zoology– Sustainability and Conservation	3 Credits

**Course Description:**

The course “**Zoology – Sustainability and Conservation**” is specially designed to understand the sustainability basic concept of Conservation of natural resources. Students can learn the importance of diversity, its importance and effect of biodiversity loss. It enlightens how to maintain and conserve the environment for the future generation. It is also enlightens that what we need to do for our faith, feature and sustainability for the human society and human fate. It also deals with the Agro-biodiversity and food security, too.

**Course Purpose:**

This course is required for Sustainability of Environment, Biodiversity and human welfare. With this course, the students can understand the needs of Sustainable planning and biodiversity conservation. The goal of the course is to inspire the knowledge across SDGs(Sustainable Development Goals) By this course students get the complete awareness regarding the Sustainable living and care of Environment and diversity.

**Course Outcomes:** Upon completion of this course, the learner will be able to

CO No.	CO Statement	Blooms taxonomy Level (K <sub>1</sub> to K <sub>6</sub> )
CO <sub>1</sub>	Describe a basic knowledge and understanding on Sustainable management and UN agenda 2030 and also vision 2050 for sustainability.	K <sub>1</sub> and K <sub>2</sub>
CO <sub>2</sub>	Illustrate basics of biodiversity conservation, Endemism and Hotspots of biodiversity.	K <sub>2</sub> and K <sub>3</sub>
CO <sub>3</sub>	Develop understanding and functioning of Agro-biodiversity, and importance of Food security.	K <sub>2</sub> and K <sub>1</sub>
CO <sub>4</sub>	Observe identification and effects of Biodiversity loss, Threats and Indian position about it. They also develop application toward awareness and skill to practice the tourism toward protected areas.	K <sub>1</sub> and K <sub>4</sub>
CO <sub>5</sub>	Observe the use of biodiversity and its instrumentation.	K <sub>3</sub> and K <sub>3</sub>

<b>Course Content</b>	<b>Hours</b>
<b>Unit -I: Sustainable Management</b>	9Hrs
<ul style="list-style-type: none"> <li>• Introduction of Sustainable Management.</li> <li>• Sustainable development and Green Climate Fund.</li> <li>• Introduction to Corporate Social Responsibility and ISO 14001.</li> <li>• 2030 Agenda.</li> <li>• Vision 2050.</li> </ul>	
<b>Unit-II Basic concepts of Biodiversity</b>	9 Hrs
<ul style="list-style-type: none"> <li>• Biodiversity – Definition and Types.</li> <li>• Biodiversity Hotspots and Endemism.</li> <li>• Biodiversity and Wetland management.</li> <li>• Marine Environment and its biodiversity.</li> <li>• Biodiversity declining and causes.</li> </ul>	
<b>Unit- III Sustainability and Food Security</b>	9 Hrs
<ul style="list-style-type: none"> <li>• Scope and importance of agricultural biodiversity.</li> <li>• Agro Ecosystems and Natural ecosystems.</li> <li>• Issues in sustainable agriculture.</li> <li>• Food Security – Concept and measurement.</li> <li>• Food Security and sustainability in India</li> </ul>	
<b>Unit- IV Biodiversity loss and Conservation</b>	9 Hrs
<ul style="list-style-type: none"> <li>• Extent of Biodiversity Loss</li> <li>• Biodiversity Threats</li> <li>• The Indian Scenario</li> <li>• Protected Areas.</li> <li>• Countering Biodiversity Loss.</li> </ul>	
<b>Unit-V Sustainable use of Biodiversity</b>	9 Hrs
<ul style="list-style-type: none"> <li>• Sustainable use of Biodiversity.</li> <li>• National Instruments Relating to Biodiversity Management.</li> <li>• International Instruments Relating to Biodiversity Management.</li> <li>• Gender and Biodiversity in India</li> <li>• Conservation Measures of Biodiversity.</li> </ul>	

**Textbook:**

- Jain A. K., Textbook of Physiology, Avichal Publishing Company, 6<sup>th</sup> edition.(for Unit 2 to 5)
- Vander A, Sherman J. and Luciano D. (2014). Vander's Human Physiology: The Mechanism of Body Function. XIII Edition, Mcgraw Hills.(for Unit 2 to 5)
- Jordan E.L. and Verma P.S., Textbook of Chordates, S. Chand Publication, New Delhi.(for Unit 1)

**Reference books**

- Tortora, G.J. & Grabowski, S. (2006). Principles of Anatomy & Physiology. XI Edition John Wiley & sons.
- Victor P. Eroschenko. (2008). diFiore's Atlas of Histology with Functional correlations. XII Edition.Lippincott W. & Wilkins.

1. Raven, P.H., Johnson, G.B., Losos, J.B., Singer, S.R. (2005). Biology.Tata McGraw Hill, Delhi.
2. Campbell, N.A., Reece J.B., Urry L.A., Cain M.L., Wasserman S.A. Minorsky P.V., Jackson R.B. (2008). Biology, Pearson Benjamin Cummings, USA.8th edition.
- 3.Agnes Arber (1999). Herbal plants and Drugs.Mangal Deep Publications.

**PRACTICALS:**

**DSE–Zoology Practical  
Zoology – Sustainability and Conservation**

<b>21UMBIDC102</b>	<b>Zoology Practicals</b>	<b>6 Hrs/Week</b>	<b>2 Credit</b>
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**Course Description:**

The practical course is framed to give sound knowledge with understanding of “Zoology – Sustainability and Conservation”. This course is specially designed to understand the sustainable management and basic concept of Nature’s Conservation. Students can learn the amazing diversity among animals, plants and agriculture products. It enlightens how each group of organisms are beneficial or harmful and how did they establish themselves in the environment with their special characteristics. It also deals

with the differences and similarities between organisms on the basis of their morphology and anatomy.

**Course Purpose:**

This course practical work is in the laboratory to study through specimen, slide, charge and performing work. They gain introductory experience in appalling each of the following skills and gain greater proficiency in the selection of them depending on their practicals.

- To develop understanding on the diversity of non-chordate and Chordates.
- Understand basics of human anatomical characteristics and structure.
- Develop understanding on histological structures.
- Acquire knowledge of functioning of endocrinology and human health.
- Apply the principals of pathogenic animals and disease.

**Course Outcomes:** Upon completion of this course, the learner will be able to

CO No.	CO Statement	Blooms taxonomy Level (S <sub>1</sub> to S <sub>6</sub> )
CO <sub>1</sub>	Observation, Identification and isolation of microorganism.	S <sub>3</sub>
CO <sub>2</sub>	Know the characters, function and anatomical structure of Agro-biodiversity specially Crop-diversity and Insect diversity and Vertebrate biodiversity.	S <sub>1</sub>
CO <sub>3</sub>	Understand staining and permanent slide preparation techniques.	S <sub>1</sub> & S <sub>3</sub>
CO <sub>4</sub>	Study Endocrinology and human health.	S <sub>4</sub> & S <sub>6</sub>
CO <sub>5</sub>	Demonstrate various pathogenic animas and human disease.	S <sub>2</sub> & S <sub>3</sub>

**Practicals**

1. Isolation of micro organism forms various soil samples.
2. Isolation of micro organism forms various water samples.
3. Herbarium preparation for agro diversity.

4. Study of Legumes agro diversity.
5. Study of Cereals agro diversity.
6. Agro diversity study among Bagayati diversity.
7. Study of Insect diversity part I.
8. Study of Insect diversity part II.
9. Pathogenic insects and its effect on the crop.
10. Animal diversity of Invertebrate animals.
11. Animal diversity of lower Chordate.
12. Animal diversity of Higher Chordate.
13. Preparation of permanent slide by Single staining method.
14. Preparation of permanent slide by Double staining method.
15. Study of Agro ecology to compare natural ecosystem.
16. Biochemical test of Adulteration in powder form agro-product.
17. Biochemical test of Adulteration in addible liquids.
18. Group discussion.
19. Case study.
20. Field visit.

### **Reference books**

- Verma, P.S., Agrawal, V.K. (2005). Ecology, Cell Biology, Molecular Biology, Genetics. New Delhi: S. Chand and Company Limited.
- Lal S. S., Practical book of Chordate., 2014, Rastogi publication, Meerut .
- Jaysurya, Arumugam A., Zoology Practical, 2015, Saras Publication, South India.

### **Pedagogic tools:**

- Chalk and Board
- Power point presentation
- Seminar
- Videos
- By field visit
- e-learning – Facebook page Royal Botany
- By models, specimens, charts, permanent slides
- By workshop

### **Methods of Assessment & Tools:**

Components of CIE: 30 marks : Theory:

Sr. No.	Component	Content	Duration (if any)	Marks	Sub Total
A	Test 1	1 <sup>st</sup> 2 units	1 <sup>1/2</sup> hours	5 (Set for 30)	20
	Test 2	All 5 units	3 hours	15 (Set for 70)	
B	Assignment			05 (Set for 20)	10
C	Class activity			05 (Set for 20)	
<b>Grand Total</b>					<b>30</b>
<b>Assignment</b>		<ul style="list-style-type: none"> <li>• Question answer</li> <li>• Student generated hand book</li> <li>• Essay writing</li> <li>• Case study</li> <li>• Abstract and exclusive study</li> <li>• Power presentation</li> <li>• Chart/model</li> <li>• Poster</li> <li>• Herbarium preparation</li> </ul>			
<b>Class activity</b>		<ul style="list-style-type: none"> <li>• Quiz</li> <li>• One minute game on the base of the topic</li> <li>• Group discussion,</li> <li>• Student talk, etc...</li> </ul>			

Components of CIE: 30 marks : Practical:

Sr. No.	Component	Content	Duration (if any)	Marks	Sub Total
A	Test	60% of Practical course	2 hours	15 (Set for 30)	15
B	Observation books and record	All Practicals	-	05 (Set for 05)	5
<b>Grand Total</b>					<b>20</b>