



बिरसा मुंडा ट्रायबल युनिवर्सिटी Birsa Munda Tribal University

राजपिपला, जि० नर्मदा Rajpipla, Dist. Narmda

Established by Tribal Development Department, Govt. of Gujarat

School of Science

B.Sc. (Zoology) Programme

Subject Code & Name: - BS04MIZOO1 Ecology and Evolution

Teaching and Evaluation Scheme:

Teaching Scheme				Examination Scheme			
Credits				Component Weightage (%)			
				CCE		SEE	
L	T	P	Total	TH	PWE	TH	PWE
3	0	1	4	35	15	35	15

Programme Name	B.Sc. (Zoology)
Semester	IV
Course Code	BS04MIZOO1
Course Title	Ecology and Evolution
Course Content Type (Th./Pr.)	Theory & Practical
Course Credit	4
Sessions+ Lab. Per Week	3 + 2
Total Teaching/Lab. Hours	45 Theory Hours+ 30 Practical Hours
* 2 Laboratory = 1 Session	

Learning Objectives

1. Understand the interactions between biotic (living) and abiotic (non-living) components of ecosystems.
2. Study the different types of ecosystems (e.g., terrestrial, aquatic) and their structure
3. Learn about species interactions, including competition, predation, mutualism, and parasitism.
4. Learn basic concepts of evolution with evidences and theories.

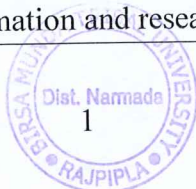
Prerequisites (if any)

- Students have to be aware of the life and how it interacts with the surroundings; a life developed progressively by microlevel modifications.

Learning Outcomes

On the Completion of this course, students will able to:

1. Explain the basic concepts of ecology and evolution.
2. Apply ecological and evolutionary principles to real-world problems.
3. Understand the impact of human activities on ecosystems and biodiversity.
4. Critically evaluate scientific information and research findings.





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Detailed Contents		
UNIT	TOPIC/SUB-TOPIC	TEACHING HOURS
I	<p>Introduction of Ecology</p> <p>Definition of Environment and Atmosphere: Various Zones of Atmosphere and Air.</p> <p>Hydrosphere (Water): Physical and Chemical properties of water, Effect of Factor of Aquatic Environment on Aquatic Organisms, Water and Ecological Adaptations.</p> <p>Lithosphere (Soil): Physical and Chemical Properties of Soil, Soil as Habitats for Animals, Soil Fauna and Soil Flora. Adaptations of soil animals.</p>	15
II	<p>Components of Ecology</p> <p>Abiotic Environmental Factors:</p> <p>Light and Radiations: Light Variations in Different Environments, Effect of Light on the Plants and Animals.</p> <p>Temperature: Temperature Fluctuations in Different Environments, Range of Temperature Tolerance, Poikilotherms and Homeotherms, Effect of Temperature on Plants and Animals.</p> <p>Other Abiotic Factors: Precipitation (Rain Fall), Humidity of Air, Fire, Wind Factor and Physiographic Factors.</p> <p>Biotic Environmental Factors: Interactions between species.</p> <p>Positive interactions: Mutualism, Commensalism, Protocooperation.</p> <p>Negative interactions: Exploitation; Social parasitism, Parasitism, Predation. Amensalism and antibiosis; Competition.</p>	15
III	<p>Introduction to Evolution: Evolution vs Creation, Theory of Preformation, Baer's Law, The Biogenetic Law (Recapitulation Theory).</p> <p>Origin of Life: Abiogenesis, Biogenesis, Origin of Life and Organic Evolution, Biochemical Origin of Life, Time of Origin Miller's Experiment.</p> <p>Evidences for Evolution: Evidences from Morphology and Comparative Anatomy, Embryological evidence, Physiological and Biological evidence, Taxonomic evidences, Paleontological evidences, Geographical evidence, Genetical evidence.</p> <p>Lamarckism: Criticism of Lamarckism, Neo - Lamarckism.</p> <p>Darwinism: Natural Selection Theory, Supplementary Theories of Darwin, Neo - Darwinism.</p>	15





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Unit - IV Practical (s)

30 Hours

1. To study various Zones of Atmosphere and Air through chart/ multimedia.
2. To determine Alkalinity of given water sample.
3. To determine Acidity of given water sample.
4. Estimation of free CO₂ of water in given sample.
5. Estimation of Chloride of water in given sample.
6. To study the interactions between species with examples.
7. To study origin of life through Miller experiment.
8. To study embryological and biological evidence for Evolution.
9. To study vestigial organs in human and other animals.
10. To study Connecting links in Evolution.
11. To study of Lamarckism with examples.
12. To study of Darwinism with examples.

Text Book(s)

1. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology by S. P. Verma & V.K. Agarwal
2. Environmental Biology: Principles of Ecology P. S. Verma, V. K. Agarwal, 2000
3. Ecology & Environment, P. D. Sharma Rastogi Publications, Merrut, New Delhi
4. Ecology (Fundamentals of Ecology) P. S. Odum, Saunders
5. Essentials of Ecology and Environmental Science by S. V. S. Rana
6. Ecology: Principles and Applications by J. L. Chapman, Michael Reiss
7. A Textbook of Ecology and Environment by Prakash Chandra Joshi · 2009
8. Organic Evolution Evolutionary Biology 15Ed (Pb 2024) Veer Bala Rastogi
9. Organic Evolution by N Arumugam, 2019
10. Text Book of Organic Evolution Pb by Mohan Arora and Himanshu Arora Himalaya Pub. House – New Delhi 2013

Reference Books

1. The Ecology Book Tom Hennigan, Jean Lightner, 2013
2. Evolution by Mark Ridley, 2004
3. Principles of Terrestrial Ecosystem Ecology by F. Stuart Chapin III, Pamela A. Matson, Peter Vitousek · 2011
4. Elements of Ecology, Thomas Michael Smith, Robert Leo Smith, Isobel Waters · 2012





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5. Zoology, For B.Sc. Students Paper-1 & 2: Biodiversity & Ecology-I by E.L. Jordan and P.S. Verma
6. Zoology for Degree Students by V. K. Agarwal
7. Evolution Book - Reference Book for B.Sc., M.Sc. & Competitive Exams - IIT JAM, CUET PG, CSIR NET, GATE & SET by Kailash Choudhary

Web Resources

1. <https://www.toppr.com/guides/biology/organism-and-populations/ecology-and-ecological-adaptations/>

L:: Lecture, **T::** Tutorial, **P::** Practical

CCE:: Continuous and Comprehensive Evaluation

(CCE Theory includes Mid Semester Examination, Assignment, MCQ quizzes, Seminar, Reflective notes, class participation, case analysis and presentation, slip tests (announced/surprised), attendance etc. or any combination of these)

PWE:: Practical Work Examination

(PWE includes Laboratory practical work, project work, viva simulation exercise work etc.)

SEE:: Semester End Evaluation

