



Course plan

NAME OF THE DEPARTMENT	: Zoology
NAME OF THE FACULTY	: Dr. Anjana Verma, Dr. Kumari Pragati Nanda, Mr. Ankit
ACADEMIC SESSION	: September 2023
YEAR	: 2023-2027
PROGRAM	: FYUGP
SEMESTER	: II
COURSE TYPE	: Major
COURSE	: Ecology and Biochemistry
COURSE CODE	: MJ 2
TOTAL CREDIT	: 04 = (04 Theory)

Program Outcomes (POs):

Student should be able to,

PO1- Apply the knowledge and concepts of biology and its fundamental principles and to identify, analyze and find solutions to various biological problems.

PO2- Identify, hypothesize, and review available research literature, and analyze complex biological issues reaching substantiated conclusions using knowledge of biodiversity, environment, and biological functioning.

PO3- Develop scientific temperament, an ability to merge, interconnects and extrapolates information and knowledge across various streams.

PO4- Ability to decide appropriate technology and tools to solve problems. Understand the availability, of resources, their judicious use, and the execution of the project in sustainable way.

PO5- Design solutions for complex scientific problems and design processes that meet the specified needs with appropriate consideration for public health & safety, cultural, societal, legal, constitutional and environmental considerations.

PO6- Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.



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PO7- Communicate effectively on complex scientific activities with the science community and with society at large, such as, being able to comprehend and write effective reports and design documents, make effective presentations, and give and receive clear instructions.

PO8- Demonstrate knowledge and understanding of the scientific principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO9- Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of scientific developments, technological advancements and global changes.

PO10- Value and foster Physical, Physiological and Psychological well-being through personal practice and conduct. Ability to apply the learnings for a lifelong commitment to ethics in fulfilment of professional and social obligations.

PO11- Apply academic learning to promote higher studies, sustainable living through employment, and initiation of entrepreneurial advent to create opportunities and wealth for self and society.

PO12- Value and support social causes and rural development through service and philanthropic activities.

PROGRAM-SPECIFIC OUTCOMES (PSOs):

Student should be able to,

PSO1: An ability to demonstrate in-depth knowledge and understanding of the fundamental concepts, principles, and processes underlying the academic field of Zoology and its different subfields like animal diversity, principles of ecology, comparative anatomy and developmental biology of vertebrates, physiology, endocrinology, biochemistry, genetics, and evolutionary biology, animal biotechnology, applied Zoology, aquatic biology, immunology, reproductive biology, parasitology, entomology, apiculture, aquarium fish keeping, medical diagnostics, and sericulture.

PSO2: Development of procedural knowledge and merging it with the advanced techniques available to create different types of professionals in the field of Zoology and related fields such as Apiculture, Fisheries, Medical Diagnostics, Sericulture, Paleozoology, Ornithology, Herpetology, Forensics, Bioinformatics, and Arachnology.

PSO3: Understand and appreciate the complexity of life processes, their molecular, cellular, and physiological processes, their genetics, evolution, and behavior, and their interrelationships with the environment.

COURSE OUTCOMES (COs):

1. CO1: Identify and categorize various ecological principles and concepts, including ecosystem structures, population attributes, and community interactions. Students will be able



to recognize different biomes, population growth patterns, and factors influencing community dynamics.

2. CO2: Describe the biochemical processes involved in carbohydrate, lipid, and protein metabolism. Students will be able to explain the structures of biomolecules, metabolic pathways such as glycolysis and Krebs cycle, and the roles of enzymes and coenzymes in biochemical reactions.

3. CO3: Explain the relationships between environmental factors and ecological phenomena, such as the impact of limiting factors on ecosystem productivity and the dynamics of ecological succession. Students will articulate the principles underlying environmental management and conservation strategies.

4. CO4: Analyze experimental data and scientific literature to evaluate ecological patterns and processes. Students will be able to interpret population growth curves, calculate biodiversity indices, and analyze the effects of environmental degradation on ecosystem health.

5. CO5: Evaluate the effectiveness of conservation efforts and environmental policies, considering their socio-economic and cultural implications. Students will critically assess the outcomes of environmental movements and propose evidence-based solutions to address ecological challenges.

CORRELATION BETWEEN POs AND COs

POs → COs ↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	2	1	-	-	-	-	-	-	-	3	2
CO2	3	2	-	-	-	-	-	-	-	-	-	-	3	1
CO3	3	3	2	2	1	-	2	-	-	1	1	-	3	3
CO4	2	3	-	3	1	3	2	-	-	-	-	-	3	3
CO5	1	2	-	1	2	2	2	-	3	3	3	2	2	2

1. Weak

2. Moderate

3. Strong

Course teaching and learning activities

A. PEDAGOGY

- i. Whiteboard
- ii. Flipped Class
- iii. Debate
- iv. Group Discussions
- v. PPT



- vi. Technology based learning
- vii. Lab work

B. COURSE COMPLETION PLAN

UNIT {(Ecology and Biochemistry (each 1 unit)}	NO. OF LECTURES		TEST	QUIZ	ASSIGNMENT
	THEORY	TUTORIAL			
1	11		1	1	1
2	13		1	1	-
3	12		1	1	1
4	10		1	1	-
5	14		1	1	1

A. SUGGESTED READINGS

1. TEXT B

1. Molles, M. C. (2016). ****Ecology: Concepts and Applications**** (7th ed.). McGraw-Hill Education.
2. Smith, T. M., & Smith, R. L. (2015). ****Elements of Ecology**** (9th ed.). Pearson Education.
3. Begon, M., Townsend, C. R., & Harper, J. L. (2006). ****Ecology: From Individuals to Ecosystems**** (4th ed.). Blackwell Publishing.
4. Berg, J. M., Tymoczko, J. L., Gatto, G. J., & Stryer, L. (2015). ****Biochemistry**** (8th ed.). W.H. Freeman and Company.
5. Nelson, D. L., & Cox, M. M. (2017). ****Lehninger Principles of Biochemistry**** (7th ed.). W.H. Freeman and Company.

a. REFERENCE BOOKS

1. Raziuddin, M., Mishra P.K. 2014, A Handbook of Environmental Studies, Akanaksha Publications, Ranchi.
2. Mukherjee, B. 2011: Fundamentals of Environmental Biology. Silverline Publications, Allahabad.
3. Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.



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4. Cox, M.M and Nelson, D.L. (2008). Lehninger Principles of Biochemistry, V Edition, W.H. Freeman and Co., New York.

5. Berg, J.M., Tymoczko, J.L. and Stryer, L. (2007). Biochemistry, VI Ed, W.H. Freeman and Co., New York.

6. Murray, R.K., Bender, D.A., Botham, K.M., Kennelly, P.J., Rodwell, V.W. and Well, P.A. (2009). Harper's Illustrated Biochemistry, XXVIII Edition, International Edition, The McGraw-Hill Companies Inc.

b. VIDEO RESOURCE

1. Ecology: - "Introduction to Ecology" - <https://www.youtube.com/watch?v=izRvPaAWgyw>

2. Biochemistry: "Biomolecules (Updated)" -

<https://www.youtube.com/watch?v=H8WJ2KENIK0>

3. Zoology: - "Introduction to Zoology" -

<https://www.youtube.com/watch?v=CCgB8g3O6AA>

4. Environmental Management**: Environmental Management Systems Explained" -

<https://www.youtube.com/watch?v=bKDE3EjVm4U>

5. General Biology: Crash Course Biology" (playlist) -

<https://www.youtube.com/playlist?list=PL3EED4C1D684D3ADF>

c. WEB RESOURCES:-

1. Ecology: - <https://www.nature.com/subjects/ecology>

2. Biochemistry: - <https://www.ncbi.nlm.nih.gov/books/NBK21154/>

3. Zoology: - <https://www.britannica.com/science/zoology>

4. Environmental Management: - <https://www.epa.gov/learn-issues/learn-about-environmental-issues>

d. **E-RESOURCES:-** Students may refer to e-notes shared in their whatsapp group and the following e- resources.

1. Ecological Concepts and Applications - The Encyclopedia of Earth

- https://editors.eol.org/eoearth/wiki/Ecological_Concepts_and_Applications

2. The Ecological Society of America - Journal Articles and Resources

- <https://www.esa.org/>

3. Biochemistry Free & Easy- An Open Textbook

- <http://biochem.science.oregonstate.edu/content/biochemistry-free-and-easy>

4. Lehninger Principles of Biochemistry (Interactive Text) - W.H. Freeman

- <https://lehninger.whfreeman.com/>

5. Biochemical Pathways - KEGG: Kyoto Encyclopedia of Genes and Genomes

- <https://www.genome.jp/kegg/pathway.html>