



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	: 2023-27
PROGRAM	: FYUGP
SEMESTER	: II
COURSE TYPE	: Major Practical
COURSE	: Ecology and Biochemistry
COURSE CODE	: MJ 3 (PRACTICALS I)
TOTAL CREDIT	: 04 = (04 Practicals)

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.



Yogoda Satsanga Mahavidyalaya

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(NAAC Accredited, Grade: B++, CGPA: 2.89)

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 various types of phytoplankton and zooplankton in an aquatic ecosystem and recognize different functional groups in carbohydrates, proteins, and lipids through quantitative tests.

2. CO2: Describe the processes for determining population density in a community using the quadrat method, and outline the steps for measuring parameters such as pH, Dissolved Oxygen content, Biological Oxygen Demand, Chemical Oxygen Demand, and free CO₂ in water samples.

3..CO3: Explain the principles behind the construction of life tables and the plotting of survivorship curves, and elucidate the action of salivary amylase, including the effects of pH, temperature, and inhibitors on its activity.

4. CO4**: Analyze the diversity of a community by calculating the Shannon-Weiner diversity index and perform paper chromatography to separate amino acids, interpreting the resulting chromatograms.

5. CO5: Evaluate the health of an aquatic ecosystem by integrating data from various measurements (temperature, turbidity, pH, Dissolved Oxygen, BOD, COD, and free CO₂) and assess the efficiency of protein separation techniques such as SDS-PAGE based on experimental results.

CORRELATION BETWEEN POs AND COs

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

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 (Practical)}	NO. OF Practicals	TEST	QUIZ	ASSIGNMENT/ PROJECT
1	11	1	1	1
2	13			
3	12			
4	10			
5	14			

A. SUGGESTED READINGS

a. TEXT BOOKS

1. Plummer, D. T. (1987). An Introduction to Practical Biochemistry** (3rd ed.). Tata McGraw-Hill.
2. Krebs, C. J. (2016). Ecology: The Experimental Analysis of Distribution and Abundance (6th ed.). Pearson.
3. Welch, P. S. (1948). Limnological Methods. McGraw-Hill.
4. Dawson, C. R. (2012). Practical Research: Planning and Design (10th ed.). Pearson.
5. Smith, R. L., & Smith, T. M. (2012). Elements of Ecology (8th ed.). Benjamin Cummings.

a. REFERENCE BOOKS

1. Mann, F.G. & Saunders, B.C. *Practical Organic Zoology*, Pearson Education (2009)
2. Furniss, B.S., Hannaford, A.J., Smith, P.W.G., Tatchell, A.R. *Practical Organic Zoology, 5th Ed.*, Pearson (2012)
3. Principles and Techniques of Biochemistry and Molecular Biology: Wilson and Walker, edited by Hofman
4. Experimental procedures in life sciences: S. Rajan



b. VIDEO RESOURCE

1. Life Tables and Survivorship Curves:URL:

<https://www.youtube.com/watch?v=XdtWi80aqFs>

2. Quadrate Method and Diversity Index Calculation:URL:

<https://www.youtube.com/watch?v=IQOn0oXgvXQ>

3. Aquatic Ecosystem Measurements: - URL:

<https://www.youtube.com/watch?v=mUfcINwh1wY>

4. Paper Chromatography of Amino Acids:-URL:

<https://www.youtube.com/watch?v=04C4InWfzRo>

5. SDS-PAGE for Protein Separation: - URL:

<https://www.youtube.com/watch?v=GrN1vpRbnd4>

c. WEB RESOURCES:-

1. <https://www.khanacademy.org/science/biology/ecology/population-ecology/a/survivorship-curve>

2. https://www.tutorialspoint.com/environmental_studies/environmental_studies_quadrant_sampling.htm

3. https://www.caryinstitute.org/sites/default/files/public/downloads/lesson-plans/limnology_manual.pdf

4. https://www.biorad.com/webroot/web/pdf/lsr/literature/Bulletin_9092.pdf](https://www.biorad.com/webroot/web/pdf/lsr/literature/Bulletin_9092.pdf)

5. <https://www.protocols.io/view/sds-page-sodium-dodecyl-sulfate-polyacrylamide-gel-bj9kkh4w>

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

1. Ecology Practical Guide:

- URL:

<https://www.ecologypracticalguide.com/>

2. Biochemistry Online Laboratory Manual:



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- URL: <https://biochem.oregonstate.edu/content/biochemistry-online-laboratory-manual>
- 3. Ecology Lab Resources:
 - URL: <https://serc.carleton.edu/eslabs/>
- 4. Biochemistry Virtual Lab:
 - URL: <https://virtualbiochemistrylab.com/>
- 5. Ecology Practical Videos:
 - URL: [https://www.youtube.com/playlist?list=PLijhMwPe9i18lcqL_dFKfey7KxwzGx-P]