St. Aloysius College (Autonomous), Jabalpur
Department of Higher Education, Govt. of M.P.

Under Graduate Syllabus for B.Sc. (Bio)

As recommended by Central board of Studies in Zoology

Class - B.Sc. III Year

(Session 2023-24)

Theory Paper

Part A Introduction			
Program: Degree	Class : B.Sc	Year :III	Session :2023-24
Subject : Zoology			
1	Course Code	S3-ZOOLID	
2	Course Title	Aquaculture (Paper -I) Group-A	
3	Course Type (Core Course /Elective/Generic Elective/ Vocational/...)	Discipline Specific Elective (DSE)	
4	Pre-requisite (if any)	To study this course ,a student must have had the subject Zoology in Diploma.	
5	Course Learning Outcome (CLO)	On Completion of this course, learners with be able to: 1. Identify Aquaculture and its scope in India. 2. Recognize the different economically important fishes and other culturable fauna. 3. Identify the details of different steps involved in Aquaculture. 4. Identify the profitability of the culture and identify the fields of Aquaculture which generate self-employment.	
6	Credit Value	4	
7	Total Marks	Max. Marks : 30+70	Min. Passing Marks – 35

Part B- Content of the Course

Total No. of Lectures – Tutorials – Practical (2 hour per week): L-T-P: 60

Unit	Topic	No. of Lectures
I	1. Aquaculture 1.1. Definition, History and Indian Traditional knowledge of Aquaculture. 1.2. Planning for higher Aquaculture productivity. 1.3. Present strategies and future policies. 1.4. Problems of Aquaculture. 1.5. Significance of Aquaculture- as food and as non-food products. 1.6. Aquaculture resources in India. 2. Common Aquatic Weeds and its control. Keywords: Aquaculture, Aquatic Weeds.	10

II	1. Prawn Culture 1.1. History of Prawn Culture. 1.2. Prawns of commercial value. 1.3. Biology of fastest growing species of freshwater Prawn. 1.4. Different stages of lifecycle. 1.5. Culture technology. 1.6. Methods of Prawn Fishing. 1.7. Preservation and processing of Prawns. 1.8. Parasite and diseases of Prawns and its control. 2. Aquatic Insects. 2.1. Introduction of Aquatic Insects. 2.2. Control of Predatory Insects. Keywords: Prawn Culture, Aquatic Insects.	12
III	1. Edible Oyster Culture 1.1. Culturable species of Oysters and their distribution. 1.2. Biology of Oyster. 1.3. Oyster culture technique. 1.4. Rearing and harvesting of Oyster. 1.5. Preservation of Oyster. 1.6. Use of Oysters and its shell. 2. Pearl Culture 2.1. History of Pearl culture and pearl producing sites. 2.2. Pearl producing animals. 2.3. Biology of pearl oyster. 2.4. Process of Pearl formation. 2.5. Pearl culture techniques. 2.6. Composition, types of pearls and its enemies. 2.7. Economic value and Pearl industry in India. Keywords: Oyster culture and pearl culture.	12
IV	1. Fresh water edible fishes of India. 1.1. Biology of major carp fishes, minor carp fishes, cat fishes, live fishes and miscellaneous fishes. 2. Marine water edible fishes of India. 2.1. Hilsa, Eel, Sardines, Pomfrets, Mackerel, Bombay duck, 3. Carp culture 3.1. Introduction and History of carp culture. 3.2. Qualities of cultures fishes. 3.3. Reason and achievements of carps culture in India. 3.4. Resources of crap culture in India. 3.5. Carp culture techniques-Indian, Chinese and European system. 3.6. Types of ponds and its management. 3.7. Procedure of carp culture. 3.8. Methods of catching of carps. 3.9. Transport of fishes open type and close type. 3.10. Diseases, control and carp fishes' health management. 3.11. Fish preservation processing and marketing. Keywords: Carp culture, Marine Fishes, Freshwater Fishes.	14

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V	1. Aquarium 1.1. Introduction and History of Aquarium. 1.2. Types of Aquarium tree and fixed. 1.3. Requisites for fabrication of aquarium. 1.4. Types of significance of aquatic plants. 1.5. Types of aquarium fishes. 1.6. Maintenance of aquarium. 2. Plankton 2.1. Definition and History of Plankton. 2.2. Classification of plankton – based on their origin, size, lifecycle and their habitat. 2.3. Groups of phytoplankton and zooplankton. 2.4. Role of plankton and fisheries. 3. Polyculture 3.1 Identification and history in fisheries. 3.2 General idea and history of Polyculture. Keywords: aquarium, Plankton, Polyculture	12

Part C – Leaning Resources

Text Book , Reference Books , Other resources

Suggested Readings:

1. Pillay, T.V.R.," Aquaculture- Principle & Practice", Wiley Int.
2. Santhanam, E., Sukumaran, N, Natarajan, P, "A Md1danual of Fresh Water Aquaculture", Oxford IBH
3. Rath, RK 'Freshwater Aquaculture", Scientific publishers, Jodhpur, 1993
4. Shukla, G S, Upadhyay, V B, "economic Zoology", Rastogi Publication, Meerut, 2014
5. Sarkar, S, Kundus, G, Chaki, K, "Introduction to Economic Zoology", NCBS
6. Vishwapremi, K K C," Economic Zoology" , Anmol publication pvt. Ltd. New Delhi, 1995
7. Pillai, NGK, "Marine fishery and mariculture in India", Narendra publishing house, Delhi
8. Books Published by MP Hindi Granth Academy, Bhopal

Suggestive digital platforms web Links

1. Aquaculture- https://igor.crew.c-base.org/aquaculture.pdf
2. Applied Zoology- https://books.google.co.in/books?id=BjINII*UjbEC&printsec=frontcover&source=gbs ge summary r&cad=0#v=onepage&q&f=false

Suggestive equivalent on line courses

1. https://www.fao.org>gfem>news>details
2. https://www.openlearning.com>course
3. https://www.udemy.com>topic>aquaculture
4. https://www.Swayam online courses
5. UNIMAS MOOC : Aquaculture
6. https://www.mphindigranthacademy.org/

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Part D-Assessment and Evaluation

Suggested Continuous Evaluation Methods: Maximum Marks : 100 Continuous Comprehensive Evaluation (CCE) :30 marks University Exam (UE) 70 marks		
Internal assessment: Continuous Comprehensive Evaluation (cce):	Class Test Assignment/Presentation	30
External Assessment: University Exam Section: Time : 03:00 Hours	Section(A): Very Short Questions Section(B): Short Questions Section(C): Long Questions	70
Any remarks/suggestions:		

Practical Paper

Part A Introduction			
Program: Degree	Class: B.Sc.	Year: III	Session :2023-24
Subject: Zoology			

1	Course Code	S3-ZOOLIQ
2	Course Title	Applied Aquaculture (Paper -I) Group-A
3	Course Type (Core Course /Elective/Generic Elective/ Vocational/...)	Discipline Specific Elective (DSE)
4	Pre-requisite (if any)	To study this course, a student must have had the subject Zoology in Diploma.
5	Course Learning Outcome (CLO)	On Completion of this course, learners with be able to: 1. Identity and study the fresh and marine water economically important fauna. 2. Identify the water quality parameters by different experiments. 3. Learn the required things in the set-up of an aquarium and its maintenance. 4. Identify and learn the Rearing Method of aquarium fishes. 5. Know the method of preparation of slide of Zoo Plankton and Preservation method of Phyto Plankton. 6. Identify harmful aquatic insects for Aquaculture. 7. Enhance Collaborative Learning and Communication Skills through Practical Work, Team Work, Group Discussion, Assignment and Project.
6	Credit Value	2
7	Total Marks	Max. Marks : 100 / Min. Passing Marks – 35

Part B- Content of the Course

Total No. of Lectures – Tutorials – Practical (2 hour per week):

Unit	Topic	No. of Lectures
I	Identification & Study of fresh water/marine water culturable, economically important fauna- Prawns, Pearl oyster, Edible oyster, Carp fishes, Crab, Lobsters and Squilla.	04

II	Identification & Study of fresh water edible fishes- Labeo, Catla, Mystus, Wallego, Channa, Anabas and Cirrhinus.	03
III	Identification & Study of marine water edible fishes- Hilsa, Pomfret, Mackerel, Eel and Bombay duck.	03
IV	Collection Identification, Study and Preservation/slide preparation of phytoplankton and zooplankton from a pond.	03
V	Study of Water analysis. a. Estimation of dissolved oxygen in water **b. Estimation of Biological oxygen Demand in water** **c. Estimation of Chemical oxygen demand in water** d. Detection of chloride in water. e. Determination of pH/Recording of temperature of water. f. Hardness of water. g. Transparency of water.	06
VI	Study/Establishment and maintenance of aquarium in laboratory.	03
VII	Identification and Study of Aquarium fishes- Gold fish, Tiger fish, Kissing Gourami, Guppy, Black molly, X-ray fish, Zebra fish.	02
VIII	Identification and Study of Aquatic insects - Ranatra, Balostoma, Nepa, Water boat men, Back swimmier. **Identification and Study of Aquatic weeds Azolla,Pistia,Vallisneria Hydrilla , Chara**	02
IX	Visit/Virtual tour and Study of an aquatic site/any culture site and submit a report to supervisor.	04

Text Book , Reference Books , Other resources

Text Book , Reference Books , Other resources Suggested Readings:

1. Saxena, O.P., "Modern Approach to Non-Chordate Practical Zoology", Rajhans Publication, Meerut, 1992
2. Swarup, N, Arora, S and Pathak, S.C, "Laboratory Techniques in Modern Biology", Kalyani Publishers, New Delhi, 1992
3. Shukla, GS, Upadhyay, V B, "Economic Zoology", Rastogi Publication, Meerat,2014
4. Sarkar, S, Kundus, G, Chaki, K, "Introduction to Economic Zoology", NCBS
5. Lal, S.S., "A Textbook of Practical Zoology - Invertebrates", Rastogi Publication, 2016
6. Lal, S.S., "A Textbook of Practical Zoology - Vertebrates", Rastogi Publication, 2016
7. Verma, P.S., "A Manual of Practical Zoology - Invertebrates", S. Chand & Co., 2013
8. Verma, P.S., "A Manual of Practical Zoology - Vertebrates", S. Chand & Co., 2013
9. Besty, Judith, C., Felix, S., "Principles of Aquaculture: Practical Manual", Narendra Publishing House, Delhi, 2019
10. Books Published by MP Hindi Granth Academy, Bhopal

Suggestive digital platforms web links

1. https://www.fao.org>
2. https://asean.org>storage
3. https://www.researchgate.net
4. https://www.mphindigranthacademy.org/