



ST. ALOYSIUS COLLEGE(AUTONOMOUS), JABALPUR

Reaccredited 'A+' Grade by NAAC(CGPA:3.68/4.00)

College with Potential for Excellence by UGC

DST-FIST Supported & STAR College Scheme by DBT

Faculty of Science

Bachelor of Science (B.Sc.)

SUBJECT: ZOOLOGY

B.Sc. V Semester

Paper-I

AQUACULTURE

Course Outcomes

S. No.	Course Outcomes	
	On completion of this course, learners will be able to:-	
01	Identify Aquaculture and its scope in India.	C
02	Recognize the different economically important fishes and other culturable fauna.	E
03	Identify the details of different steps involved in Aquaculture.	U,R
04	Identify the profitability of the culture and identify the fields of Aquaculture which generate self-employment.	UR

Credit and Marking Scheme

	Credits	Marks		Total Marks
		Internal	External	
Theory	4	40	60	100
Practical	2	40	60	100
Total	6		200	

Evaluation Scheme

	Marks	
	Internal	External
Theory	3 Internal Exams each of 20 Marks (During the Semester) (Best 2 will be taken)	1 External Exams (At the End of Semester)
Practical	3 Internal Exams (During the Semester) (Best 2 will be taken)	1 External Exams (At the End of Semester)

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Theory

No. of Lectures (in hours per week): 2 Hrs. per week

Hours -60

M.M-60

Units	Topics	No. of Lectures
I	<p>1. Aquaculture</p> <p>1.1. Definition, History and Indian Traditional knowledge of Aquaculture.</p> <p>1.2. Planning for higher Aquaculture productivity.</p> <p>1.3. Present strategies and future policies.</p> <p>1.4. Problems of Aquaculture.</p> <p>1.5. Significance of Aquaculture- as food and as non-food products.</p> <p>1.6. Aquaculture resources in India.</p> <p>2. Common Aquatic Weeds and its control.</p> <p>Keywords: Aquaculture, Aquatic Weeds.</p>	10
II	<p>1. Prawn Culture</p> <p>1.1. History of Prawn Culture.</p> <p>1.2. Prawns of commercial value.</p> <p>1.3. Biology of fastest growing species of freshwater Prawn.</p> <p>1.4. Different stages of lifecycle.</p> <p>1.5. Culture technology.</p> <p>1.6. Methods of Prawn Fishing.</p> <p>1.7. Preservation and processing of Prawns.</p> <p>1.8. Parasite and diseases of Prawns and its control.</p> <p>2. Aquatic Insects.</p> <p>2.1. Introduction of Aquatic Insects.</p> <p>2.2. Control of Predatory Insects.</p> <p>Keywords: Prawn Culture, Aquatic Insects.</p>	10
III	<p>1. Edible Oyster Culture</p> <p>1.1. Culturable species of Oysters and their distribution.</p> <p>1.2. Biology of Oyster.</p> <p>1.3. Oyster culture technique.</p> <p>1.4. Rearing and harvesting of Oyster.</p> <p>1.5. Preservation of Oyster.</p> <p>1.6. Use of Oysters and its shell.</p> <p>2. Pearl Culture</p> <p>2.1. History of Pearl culture and pearl producing sites.</p> <p>2.2. Pearl producing animals.</p>	10



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	<p>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.</p>	
IV	<p>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.</p>	10
V	<p>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, Planktons, Polyculture.</p>	10



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References

Text Books, Reference Books, Other Resources

1. "Pillay, T.V.R.," Aquaculture- Principle & Practice", Wiley Int.
2. Santhanam, E., Sukumaran, N, Natarajan, P, "A Manual 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=gb_s_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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List of Practicals.

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 swimmer. 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



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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/>



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A. Saxena