**Name of the Programme**: **M.Sc. Zoology**

**Course Code:** ZOO-613 **Title of the Course:** Techniques in Aquaculture (Practical)

**Number of Credits:** 01

**Effective from AY:** 2023-24

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| **Pre-requisites for the Course:** | Basic knowledge of fish biology, fish handling and fish culture methods.<br>Parallel enrollment for ZOO-613 Developments in Aquaculture (Theory) | |
| **Course Objectives:** | 1. To provide practical knowledge of advanced methods and techniques used in aquaculture and fisheries.<br>2. To create skills in induce breeding, fish feed formulations and different organic farming techniques.<br>3. Develop in-depth knowledge of live fish feed culture.<br>4. To encourage to adapt skills for employment in the field of aquaculture and fisheries. | |
| **Content:** | Measurement of DO, total hardness, and Salinity of the water bodies<br>Preparation of fish feed in the laboratory.<br>Study of common fish diseases.<br>Demonstration of Induced breeding of Indian major carps<br>Demonstration of raft technique for mussel culture.<br>Culture and maintenance of live fish feed (Artemia, algae)<br>Demonstration of a small-scale aquaponics system.<br>Observations of gonadal maturation in fish.<br>Detection of organoleptic changes in fish.<br>Visit fish farms/ Fish breeding units/ Fish Processing industry. | 15 x 2 hours |
| **Pedagogy:** | Mini projects/ tutorials/Group discussions/Field visits/ lab-based activities/Workshops | |
| **References/ Readings:** | 1. J.B.Paul, Handbook of Fish Biology and Fisheries (Vol.1). Blackwell Publishing,2002<br>2. B.R. Selvamani and R.K. Mahadevan, Freshwater fish farming Campus Books International, 2008<br>3. D. Pauly, P. Tyedmers, R. Froese, and L. Y. Liu, ”Fishing down and farming up the food web”, Conservation Biology in Practice, Vol, 2 no.4, 2001.<br>4. Helfman, B. Bruce, E. Douglas, and B.W. Bowen, The Diversity of Fishes: Biology, Evolution, and Ecology, Wiley-Blackwell,2009.<br>5. G. Cailliet, and Ebeling, Fishes, a field and laboratory manual on their structure, identification and natural history, Waveland Press, Ill,1986.<br>6. Pillay, Aquaculture Principles and Practices, John Willey, 2005. | |

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| | 7. N. Jain and P. Mishra, Practical Manual on Fish Nutrition and Feed Technology, Daya Publishing House, 2021. |
| **Course Outcomes:** | The learner will<br>1. Design ideas to construct and manage a fish farm/hatchery/fish pond.<br>2. Be skilled to formulate fish feed with in-depth knowledge of its components.<br>3. Construct small-scale aquaponics and bio floc unit set-up.<br>4. Create logical knowledge in fish breeding, rearing, culturing and feeding technologies.<br>5. Develop the ability to guide layman individual who wishes to carry out various activities related to aquaculture.<br>6. Compose strategies for aquaculture business management and will be able to research in the field of fish biology for more outcomes in aquaculture. |

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