Department of Aquaculture
College of Fisheries, MPUAT, Udaipur
Lecture Schedule

Class: B.F.Sc. Semester: II
Course No. : FAQC-121 (Freshwater Aquaculture) Credit Hours: 3(2+1)
Theory:

S. No.	Topic	No. of Lectures
1.	Major species cultured, production trends and prospect in different parts of the world.	3
2.	Freshwater aquaculture resources – ponds, tanks, lakes, reservoir, etc.	2
3.	Carrying capacity of pond.	1
4.	Nursery, rearing and grow-out ponds preparation and management - control of aquatic weeds and algal blooms, predatory and weed fishes, liming fertilization/ manuring, use of biofertilizers, supplementary feeding.	5
5.	Water quality management.	2
6.	Selection, transportation and acclimatization of seed.	2
7.	Traits of important cultivable fish and their culture methods – Indian major carps, exotic carps, air breathing fishes, cold water fishes, freshwater prawns.	5
8.	Wintering ponds, quarantine ponds and isolation ponds.	1
9.	Sewage-fed fish culture.	1
10.	Principles of organic recycling and detritus food chain.	1
11.	Use of agro-industrial waste and bio-fertilizers in aquaculture.	1
12.	Composite fish culture system of Indian and exotic carps -competition and compatibility.	2
13.	Exotic fish species introduced to India and their impact on indigenous species.	1
14.	Culture of other fresh water species	1
15.	Economics of different culture practices.	1

Practical:

S. No.	Topic	No. of lecture
1.	Study of cultivable species of finfish.	2
2.	Collection, identification and control of aquatic weeds, insects, predatory fishes, weed fishes and eggs and larval forms of fishes.	1
3.	Algal blooms and their control.	1
4.	Preparation and management of nursery, rearing and grow-out ponds.	1
5.	Study of effect of liming, manuring and fertilization on hydrobiology of ponds and growth of fish.	1
6.	Estimation of plankton and benthic biomass.	2
7.	Effect of natural and supplementary feed on growth.	2
8.	Visit to freshwater fish farm.	1

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Class: B.F.Sc. Semester: IV
Course No. : FAQC-221 (Aquaculture Engineering) Credit Hours: 3(2+1)
Theory:

S. No.	Topic	No. of Lectures
1.	Land survey, area calculation of plane surface of regular and irregular shape as applied to measurement of land, trapezoidal rule, Simpson's rule, volume of regular and irregular shape as applied to the volume of stacks, sheds, heaps.	3
2.	Farm-types and objectives; Fresh water and coastal aquafarms.	2
3.	Preliminary survey, site selection, topography.	2
4.	Land survey – chain surveying, compass surveying, leveling, plane table surveying and contour surveying	2
5.	Soil –types, properties, classification, sampling methods and texture analysis.	2
6.	Location, design and construction of hatcheries, race ways and farm complex.	2
7.	Tide-fed / pump fed farms, creeks, estuarine and marine water source utilization.	2
8.	Open canals and their types. Sluices and gates.	1
9.	Earth work calculation – ponds, dykes, canals and roads.	2
10.	Design and construction of ponds and dykes.	2
11.	Tidal influences and maintenance	1
12.	Effect of seepage and evaporation and their control.	1
13.	Water distribution system – main feeder channel, drainage channel.	2
14.	Water budgeting.	1
15.	Water control structure – types of inlets and outlet and their construction.	1
16.	Computation of water intake and discharge.	1
17.	Aerators – principles, classification and placement.	1
18.	Pumps - types, total head and horse power.	1
19.	Filters – types and construction.	1

Practical:

S. No.	Topic	No. of lecture
1.	Evaluation of potential site for aquaculture.	1
2.	Land survey – chain, compass, level, plane table, and contouring;	2
3.	Soilanalysis for farm construction.	2
4.	Site survey: preparation of site and contour maps.	2
5.	Design and layout of fresh water and brackish water farms and hatcheries.	2

6.	Design of farm structure: ponds, dykes, sluices and channels.	2
7.	Earth work calculation.	1
8.	Calculation on water requirement.	1
9.	Pumps: design and operation.	2
10.	Design and operation of filters.	1
11.	Design and operation of aerators.	1
12.	Visit to different types of farms.	1

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Lecture Schedule

Class: B.F.Sc. Semester: IV
Course No. : FAQC-222 (Ornamental Fish Production and Management)
Credit Hours: 2(1+1)
Theory:

S. No.	Topic	No. of Lectures
1.	World trade of ornamental fish and export potential.	2
2.	Different varieties of exotic and indigenous fishes.	4
3.	Principles of a balanced aquarium.	1
4.	Fabrication, setting up and maintenance of freshwater and marine aquarium.	2
5.	Water quality management.	1
6.	Water filtration system –biological, mechanical and chemical. Types of filters.	2
7.	Aquarium plants and their propagation methods.	2
8.	Lighting and aeration.	1
9.	Aquarium accessories and decorative.	2
10.	Aquarium fish feeds.	1
11.	Dry, wet and live feeds.	1
12.	Breeding and rearing of ornamental fishes. Broodstock management.	2
13.	Application of genetics and biotechnology for producing quality strains.	2
14.	Management practices of ornamental fish farms. Common diseases and their control.	2
15.	Conditioning,packing, transport and quarantine methods.	2
16.	Trade regulations and wild life act in relation to ornamental fishes.	2

Practical:

S. No.	Topic	No. of lecture
1.	Identification of common ornamental fishes and plants.	4
2.	Fabrication of all-glass aquarium.	1
3.	Setting-up and maintenance.	1
4.	Aquarium accessories and equipments.	2
5.	Conditioning and packing of ornamental fishes.	1
6.	Preparation of feed.	1
7.	Setting-up of breeding tank for live bearers, barbs, goldfish, tetras, chichlids, gauramis, fighters and catfishes.	2
8.	Identification of ornamental fish diseases and prophylactic measures.	2

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Class: B.F.Sc. Semester: IV
Course No. : FAQC-223 (Coastal Aquaculture and Mariculture) Credit Hours: 3(2+1)
Theory:

S. No.	Topic	No. of Lectures
1.	An over view of sea farming and shore-based aquaculture in different parts of the world.	2
2.	Resources for shore-based aquaculture and sea farming in India.	2
3.	Traits of important cultivable fish and shellfish (seabass, mullet, milkfish, grouper, snappers, ayu, pearlspot, tiger shrimp, white shrimp, mud crab, mussel, clam, oysters (edible and pearl oyster), seaweeds, etc.	4
4.	Shore based aquaculture system: traditional (pokkali, bheries, gazanis, khazans), semi-intensive, intensive aquaculture practice of commercially important species of fish and shellfish.	4
5.	Methods of aquaculture - rafts, racks, cages, poles and ropes.	4
6.	Seed resources.	1
7.	Water and soil quality management.	2
8.	Estimation of growth, survival and pond productivity.	2
9.	Seaweed culture.	2
10.	Pearl culture.	2
11.	Sea ranching.	1

Practical:

S. No.	Topic	No. of lecture
1.	Identification of important cultivable species.	4
2.	Collection and identification of commercially important seed of finfish.	1
3.	Collection and identification of commercially important seed of shellfishes.	1
4.	Types of fertilizers - Pond preparation.	1
5.	Seed selection, quality and acclimatization.	2
6.	Water quality parameters.	1
7.	Estimation of seed survival.	1
8.	Pond biomass estimation.	1
9.	Material, apparatus and machinery for shore based aquaculture and sea farming.	2
10.	Estimation of feed intake.	1
11.	Growth and health monitoring.	1
12.	Fouling organisms in cages and pens.	2
12.	Visit to coastal Fish Farm.	1

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Lecture Schedule

Class: B.F.Sc. Semester: VI
Course No. : FAQC-321 (Biotechnology and Bioinformatics) Credit Hours: 2(1+1)
Theory:

S. No.	Topic	No. of Lectures
1.	DNA as genetic material, Chemistry of nucleic acids, Genetic code.	2
2.	Organization of genome in prokaryotes and eukaryotes.	1
3.	Concept of replication, transcription and translation.	1
4.	Recombinant DNA technology, Gene cloning and Transgenesis.	2
5.	Molecular and immunological techniques, Cell culture and cell lines.	2
6.	Development of vaccines, Hybridoma technology, Monoclonal antibody production.	2
7.	PCR techniques.	1
8.	Waste water treatment, Biofilters in aquaculture.	1
9.	Biofertilizers, Probiotics, Biosensors, Bioprocessing.	2
10.	Concept of Bioinformatics - NCBI, Genebank sequence database-primary and secondary database.	2

Practical:

S. No.	Topic	No. of lecture
1.	Isolation and quantification of DNA.	2
2.	Electrophoresis.	1
3.	ELISA, Immunodots.	1
4.	PCR, Western blot, immunofluorescence, immunoperoxidase.	2
5.	DNA hybridisation,	2
6.	Setting of biofilters, Bioprocessing of organic wastes.	2
7.	Practical on genebank sequence database.	2

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Class: B.F.Sc. Semester: VI
Course No. : FAQC-322 (Fish Genetics and Breeding) Credit Hours: 3(2+1)
Theory:

S. No.	Topic	No. of Lectures
1.	Principles of genetics and breeding.	1
2.	Gene and chromosome as basis of inheritance, Mendel's law of inheritance.	1
3.	Gene interactions – Epistasis, Pleotropism, Dominance, Lethal genes.	1
4.	Sex determination, Sex linked genes, sex influenced and sex limited traits.	2
5.	Hybridization.	1
6.	Mutation, Chromosomal structure and aberrations.	2
7.	Linkage and crossing over. Chromosome manipulation techniques.	2
8.	Cryopreservation.	1
9.	Introduction to population genetics. Hardy- Weinberg law and its significance.	1
10.	Quantitative genetics – qualitative and quantitative traits, polygenic traits, heritability.	2
11.	Inbreeding and its consequences.	1
12.	History and present status of selective breeding programs in aquaculture. Selection methods and breeding plans.	2
13.	Mating designs. Domestication methods.	2
14.	Seed certification and quarantine procedures.	1

Practical:

S. No.	Topic	No. of lecture
1.	Problems on Mendelian inheritance, linkage and crossing over, monohybrid and dihybrid ration, epistasis, pleotropism.	4
2.	Mitotic and meiotic chromosome preparation.	2
3.	Demonstration of protocol of androgenesis, gynogenesis and polyploidy.	2
4.	Problems on gene and genotypic frequency.	1
5.	Cryopreservation protocols.	1
6.	Quality evaluation of fish milt.	2