

## Faculty of Fisheries

Subject Code:A1801

### Aquaculture, Fish Nutrition and Feed Technology and Aquatic Animal Health Management

<b>Module. 1</b>	<p>Sustainable aquaculture, Systems approach and its application in aquaculture, Aquatic resource and livelihood systems, Environmental issues , Socio-economic issues, Strategies for sustainability , Application of renewable energy in aquaculture , Seed certification, Sustainable use of antibiotics</p> <p>Soil and water quality management, Aquatic weed management, Waste water treatment practices, Impact of environment on aquaculture</p>
<b>Module. 2</b>	<p>Environmental and endocrine control of reproduction -Induced spawning: Methods of natural and artificial fertilization</p> <p>Hatchery technology and management - water quality and feed management - better management practices (BMPs) - packaging and transport of seed.</p> <p>Broodstock management - Selective breeding - Transportation of brood stock.</p>
<b>Module .3</b>	<p>Aquarium keeping: Design and construction of tanks; species-wise tank size requirement; heating, lighting, aeration and filtration arrangements; decorations used; common aquarium plants and their propagation; Feed, health and water quality management; prophylaxis; quarantine.</p> <p>Important cultivable finfishes: Distribution, biology, seed collection, nursery rearing, culture techniques, problems and prospects.</p> <p>Culture of crustaceans: Shrimp farming: systems of farming – extensive, semi-intensive and intensive; shrimp farming in undrainable ponds, low and zero water exchange systems; Mud crab fattening, production of soft-shell crabs; Lobster culture</p> <p>Integrated farming systems</p>
<b>Module. 4</b>	<p>Nutritional bioenergetics, Energy budgets, Energetic efficiency of fish production.</p> <p>Nutritional physiology, Feed Manufacture, Feed formulation and processing, On-farm feed manufacture, Feed storage</p> <p>Feeding Practices, : Feeding methods and scheduling, ration size, feed performance and economics</p> <p>Live feeds and their Mass culture techniques, culture of important microalgae, rotifers, artemia, cladocerans, copepods, oligochaetes, nematodes and insect larvae.</p> <p>Carbohydrates: Definition, classification and biological significance; Chemical reactions;</p> <p>Proteins: Definition, classification, biological significance and chemical reactions.</p> <p>Types of feed: Dry (pellets, flakes, powdered, micro-encapsulated, micro-bound and micro-coated diets) and non-dry.</p> <p>Feed storage: Hydro-stability of feed and their storage; Prevention of spoilage from rancidity, fungus and associated toxins; Fish disease vectors in feed , quality control; Feed value in relation to processing; Use of natural and synthetic carotenoids, Feed additives.</p> <p>Feed economics and evaluation criteria, Nutritional energetics, Energy budget equation, Micro-particulate diets ; Grow-out and finisher feeds. Feed intake: different techniques of assessing feed intake</p>
<b>Module. 5</b>	<p>Host-pathogen-environment relationship, Environmental stress. Response of fish to stress-Defence system in fish and shellfish: Organs and cells of immune system, innate immunity-cellular and humoral factors, inflammation response to diseases. Specific defence mechanisms-Antibody and cell mediated immunity in fish and shellfish.</p>
<b>Module .6</b>	<p>Parasitic and mycotic diseases of finfish and shellfish: General characteristics, Diagnosis, Life cycle, Prevention and treatment.</p> <p>OIE Listed bacterial and viral diseases of finfish and shellfish: General characteristics, Epizootiology, Clinical Signs, Diagnosis, Prevention and treatment.</p> <p>Non-infectious Diseases: Nutritional diseases, water, soil, environmental parameters and their effects on fish health. Disease in shrimp hatcheries and grow-out systems.</p>
<b>Module. 7</b>	<p>Diagnostic techniques in health management: Microbiological, haematological, histopathological, nucleic acid based and protein based techniques. Disease surveillance and reporting.</p> <p>Disease control and management: Environment management, antimicrobial and chemotherapeutic agents, prophylaxis- vaccines, adjuvants, immunostimulants and probiotics.</p> <p>Use and abuse of antibiotics in aquaculture, quarantine systems and fish health.</p> <p>Seed certification, SPF and SPR stocks - development and applications.</p>