

FRM-221: PHYSIOLOGY OF FINFISH AND SHELLFISH

Credit Hours: 3 (2+1)

Course Teacher: Dr. Showkat Ahmad Dar and Dr. sarvendra Kumar

THEORY

Sl. No.	Topic	No. of Lectures
1	Water as a biological medium: physical and chemical properties of water and their physiological significance	1
2	Water balance and physiological adaptations of finfish and shellfish to the aquatic environment	1
3	Gas exchange: respiratory organs and mechanisms of respiration in finfish	1
4	Gas exchange in shellfish and factors affecting respiratory efficiency	1
5	Circulation: blood, heart and circulatory system in finfish and shellfish	1
6	Circulation: cardiac output, blood flow and transport of gases and metabolites	1
7	Excretion: nitrogenous waste products and excretory organs	1
8	Ammonia excretion and mechanisms of nitrogenous waste elimination	1
9	Osmoregulation in freshwater and marine finfish	1
10	Osmoregulation in shellfish; ionic and water balance	1
11	Reproductive physiology of finfish: gonadal development, gametogenesis and maturation	1
12	Reproductive physiology: hormonal regulation, spawning and reproductive cycles	1
13	Muscle physiology: structure, contraction and energy requirements of fish muscle	1
14	Sense organs: vision, olfaction, taste, hearing and lateral line system	1
15	Energy and nutrient status of food; digestion, absorption and nutrient utilization	1
16	Nitrogen balance and protein metabolism in finfish and shellfish	1
17	Standard metabolism and active metabolism: concepts, components and measurement	1
18	Energy utilization, metabolic scope and physiological energy allocation	1
19	Effect of temperature on physiological processes and metabolism	1
20	Effect of salinity and other environmental factors on physiology of finfish and shellfish	1
21	Effects of dissolved oxygen, pH and other water-quality factors on physiological performance	1
22	Stress physiology: stressors, primary and secondary stress responses	1
23	Stress-related physiological changes: metabolic, haematological and osmoregulatory responses	1
24	Endocrine physiology: structure and functions of pituitary, thyroid and adrenal/interrenal glands	1
25	Endocrine physiology: pancreas, gonads and other important endocrine tissues/glands	1
26	Hormonal regulation of growth, metabolism, osmoregulation and reproduction	1

27	Integrated physiological responses of finfish and shellfish to environmental and aquaculture conditions	1
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Total Theory Lectures: 27

PRACTICAL

Sl. No.	Practical	No. of practical's
1	Estimation of oxygen consumption in finfish	1
2	Estimation of oxygen consumption in shellfish	1
3	Study of osmoregulation in freshwater and marine finfish	1
4	Study of osmoregulation in shellfish	1
5	Estimation of ammonia excretion	1
6	Estimation of carbon-dioxide output	1
7	Determination of metabolic rate under different physiological conditions	1
8	Influence of temperature on oxygen consumption and metabolism	1
9	Influence of salinity on oxygen consumption and metabolism	1
10	Comparative study of metabolic responses of finfish and shellfish	1
11	Haematological examination of finfish: Hb, haematocrit and RBC/WBC parameters	1
12	Haematological examination of shellfish: haemolymph parameters	1
13	Preparation and processing of tissues for histological examination	1
14	Preparation of tissue sections and staining techniques	1
15	Histological study of gill, liver and kidney/tissues of finfish	1
16	Histological study of important tissues/organs of shellfish	1
17	Interpretation of physiological and haematological responses under environmental stress	1

Total Practical Sessions: 17