

Lecture plan for M.F.Sc. 2nd semester

Department of Fish Physiology and Biochemistry

Course – Diagnostic Biochemistry

Course code- FPB-507

Credit hrs. 3(2+1)

Theory

<i>Sl no.</i>	<i>Topic</i>	<i>No of lecture</i>
1.	Introduction to Diagnostic Biochemistry in fishes; Overview of key blood & tissue analytes	2
2.	Invasive techniques of blood drawing in fish (caudal vein puncture, cardiac puncture).	1
3.	Non-invasive techniques of blood drawing; Comparative evaluation, limitations & interpretation.	1
4.	Estimation and clinical significance of Hemoglobin (Hb) and Hematocrit	1
5.	Plasma proteins: Albumin, Globulin, Fibrinogen; Diagnostic evaluation of dysproteinemia.	2
6.	Glucose Tolerance Test (GTT) in fishes: Protocols, glycemic control & metabolic interpretations.	1
7.	Subcellular distribution of enzymes in fish tissues (Mitochondria, Cytosol, Lysosomes).	1
8.	Isolation and purification techniques of tissue enzymes (Centrifugation, Chromatography).	2
9.	General properties of enzymes and kinetics; Factors affecting enzyme activity in fishes.	2
10.	Concept of marker enzymes and their diagnostic role.	1
11.	Metabolic disorders related to Carbohydrate and Lipid metabolism in cultured fishes	2
12.	Metabolic disorders related to Protein and Nucleic Acid metabolism in fishes.	2
13.	Enzymes and Iso-enzymes of clinical significance in aquatic diagnostic pathology.	1

14.	Acid Phosphatase (ACP) and Alkaline Phosphatase (ALP): Physiological roles & clinical diagnostics.	1
15.	Amylase and Angiotensin-Converting Enzyme (ACE): Activity assays & diagnostic relevance.	2
16.	Cholinesterase (ChE) and Creatine Phosphokinase (CPK): Markers of neurotoxicity & muscle damage.	2
17.	Gamma-Glutamyl Transferase (GGT) & Lactate Dehydrogenase (LDH)	1
18.	Vitamins in fish nutrition: deficiency syndromes	1
19.	Mineral deficiencies in aquatic organisms: Pathological signs and structural impairments	1
20.	Osmoregulation and regulation of electrolyte content under environmental stress.	2
21.	Biochemical indicators and molecular biomarkers for vitamin and mineral stress.	2
22.	Lipid transport mechanisms: Structure and physiological roles of Chylomicrons, VLDL, and IDL.	1
23.	High-Density Lipoproteins (HDL) & Low-Density Lipoproteins (LDL): Clinical implications in disease.	1
24.	Pathophysiology of Fatty Liver Syndrome, renal disorders, and skeletal/bone abnormalities.	2
25.	Liver Function Tests (LFTs) in fishes: Serum bilirubin, transaminases, and protein ratios.	1
26.	Detoxification mechanisms in gill, liver, and kidney; Impact of pesticide toxicity.	1
27.	Teleost Immunoglobulins: General structure, heavy and light chain organization.	1
28.	Classes (IgM, IgD, IgT/IgZ) and biochemical properties of fish immunoglobulins.	1
29.	Functional significance of mucosal and systemic immunoglobulins in pathogen defense.	1
30.	Monoclonal antibodies: Production methods, hybridoma technology, and diagnostic applications	2
	Total	42

Practical

1.	Estimation of blood glucose	1
2.	Estimation of albumin and globulin	1
3.	Gel electrophoresis of serum proteins	1
4.	Quantification of serum proteins	1
5.	Determination of A/G ratio in serum	1
6.	Analysis of stress proteins	1
7.	Liver and plasma enzyme assay (GOT, GPT, ALP, AchE, CPK, LDH, Urease)	4
8.	Estimation of blood hemoglobin	1
9.	Estimation of serum bilirubin	1
10.	Estimation of blood calcium	1
11.	Histology of vital organs	2
12.	Estimation of vitamin A and D	2
13.	Tests for immunoglobulins	1
	Total	18

**Course teacher-** Ms. Susmita Rani