Ecology Course Curriculum:

1. Systematically collect ecological and environmental data
2. Design and conduct surveys and field experiments for ecology research
3. Write up and presentation of the results in a concise and informative manner

Instruction Time: 8-12 weeks

Details of the course:

1. Identification Skills: Vertebrates (fish), Invertebrates (zooplankton)

2. Field Skills: Field Safety, Population assessment (quadrats, transects), Community level assessment (measuring density and diversity, benthic analyses etc), Assessment involving two or more trophic levels, Soil analysis (e.g. moisture, organic matter content, texture, functions etc), Water analysis (physical and biological measurements, flow etc),

3. Use of Field Instrumentation: digital multi-parameter pen, portable pH/ORP/temp meter, GPS range finder

4. Research Design and Data Skills: Develop hypothesis based research questions, Comparative study data collection plans, Experimental treatment/control design, Sampling, Data collection, Data arrangement, analysis, graphing, Statistical analysis, Data interpretation, Data management etc.

5. Other Skills: Collaboration and teamwork, Problem solving, Critical thinking, Creativity and imagination, Science communication (to public), Presentation to technical/general audience

6. Course description: The systematic design of the course will help in development of broad knowledge of how to apply a range of routine professional techniques for studying different kind of biological organisms and ecosystems in the field. Additionally, detailed experience in methods of identification and classification of organisms, gene/protein expression of the different biomarkers using the lysates of biological samples will enhance the depth & variety of learning merging different aspects of biological sciences.

7. Publication: The results can be converted into paper publication/review (if enough data is there)

8. Certificate of participation: From registered Government society

Ecotoxicology Course Curriculum:

1. Systematically collect toxicological and fisheries data
2. Design and conduct surveys and field experiments for ecotoxicology research
3. Write up and presentation of the results in a concise and informative manner

Instruction Time: 8-12 weeks

Details of the course:

1. Development of research questions and hypotheses, comparative study and data collection plans, Experimental design

2. Experimental set up for LC50: Determination of LC50 and LD50 through probit analysis

3. Maintenance of toxicology experiment (for 14-21 days): Acute, Chronic and sub-chronic experiment set up

4. Fish anatomy, blood and tissue culture: Collection of blood from caudal vein and heart puncture, collection and storage of different fish tissues

5. Diamond Harbour field trip: Local one/two-days field trip for survey of fish culture, fish packaging and transport

6. Acid digestion of fish tissue: Proper digestion process of fish muscle for the determination of metal, micro plastic or any other contamination

7. Primary fish tissue culture: Oocyte and primary hepatocyte culture for toxicological experiment.

8. Stress parameter and enzyme analysis: Spectrophotometric analysis of basic stress factor (SOD, CAT, GSH, etc.) and liver function enzymes (SGOT, SGPT, etc.)

9. Graphical presentation of data and Basic statistical analysis

10. Gene/protein expression studies of the different biomarkers using the lysates of biological samples

11. Write up, analysis, presentation of the results to technical/general audience

12. The results can be converted into paper publication/review (if enough data is there)

13. Certificate of participation: From registered Government society

Fisheries and Aquaculture Course Curriculum:

1. Ornamental Fisheries and aquaria design
2. Fish farming techniques and hatchery management
3. Fish nutrition and management

Instruction Time: 8-12 weeks

Details of the course:

1. Breeding and rearing of livebearers and egg layers, water quality management in the production and culture unit, setting up, construction and installation of an aquarium.

2. Study of primary and secondary sexual characters, brooder handling and morphological features recording, gonadal development observation in carps and other cultivable finfishes

3. Histological observation of gonads and eggs, estimation of GSI, fecundity, absolute fecundity, egg parameters, ovarian features, collection and identification of cultivable finfish seed, seed quality character identification, observation and analysis of inducing agents

4. Induced breeding of fishes through various inducing agents, evaluation of carp milt and egg, preparation of brood and larval feed for different cultivable finfish, packing and transportation of cultivable finfish seed, visit to different finfish hatcheries

5. Principles of fish nutrition, nutritional requirements determination for different species, chemistry and nutritive value of various classes of fish food, feed evaluation, proximate analysis.

6. Nutrient requirements of fish, nutrient sources and practical consideration in fish feeding, feed formulation and manufacturing, visit to feed mills and feed making process.

7. Feed and water quality management; disease prevention and treatment; use of probiotics and prebiotics: harvesting and handling; continuous stocking and harvesting

8. Write up, analysis, presentation of the results to technical/general audience

9. The results can be converted into paper publication/review (if enough data is there)

10. Certificate of participation: From registered Government society

Biotechnology Curriculum:

1. Design & formulate hypothesis driven objectives and conduct relevant experiments for biotechnology research
2. Hands-on curriculum to learn the cutting-edge techniques use in biotechnology research
3. Write up and presentation of the results in a concise and informative manner

Instruction Time: 8-12 weeks, can continue upto 24 months as per requirement

Details of the course:

1. Development of hypothesis driven research questions and experimental design
2. DNA/RNA isolation & cDNA preparation, buffer preparation
3. Manipulation of DNA sequences, preparation and screening of nucleic acid libraries, gene silencing, analysis of variations in genome sequence
4. Protein estimation by Bradford method
5. PCR & its use in biological research
6. RDT related molecular techniques
7. Bacterial culture & genetics
8. ELISA & its use in biological research
9. Experimental set up for gene cloning & analysis
10. Primer design, calculations, database access knowledge
11. Site directed mutagenesis
12. Vectors, plasmids and details of their functions and how they are used in biotechnology
13. SDS PAGE and Coomassie Brilliant blue staining of proteins on SDS gel
14. Gene/protein expression studies (western blot) to check different biomarkers using the lysates of biological samples
15. Microscopy & preparation and staining of specimens (Immunohistochemistry, H&E)
16. Write up, analysis, presentation of the results to technical/general audience
17. The results can be converted into paper publication/review (if enough data is there)
18. Certificate of participation: From registered Government society

Molecular Biology Curriculum:

1. Design hypothesis driven objectives and conduct relevant experiments
2. Hands-on curriculum to learn the cutting-edge techniques of molecular biology
3. Write up and presentation of the results in a concise and informative manner

Instruction Time: 8-12 weeks, can continue upto 24 months as per requirement

Details of the course:

1. Development of hypothesis driven research questions and experimental design
2. DNA/RNA isolation & cDNA preparation, buffer preparation, DNA laddering
3. Manipulation of DNA sequences, preparation and screening of nucleic acid libraries, gene silencing, analysis of variations in genome sequence
4. PCR & its use in biological research
5. RDT related molecular techniques & bacterial genetics
6. ELISA & its use in biological research
7. Experimental set up for gene cloning & analysis
8. Primer design, calculations, database access knowledge
9. Site directed mutagenesis
10. Vectors, plasmids and details of their functions and how they are used in research
11. SDS PAGE and Coomassie Brilliant blue staining of proteins on SDS gel
12. Gene/protein expression studies (western blot) to check different biomarkers using the lysates of biological samples
13. Microscopy & preparation and staining of specimens (Immunohistochemistry, H&E)
14. CRIPSR basics, design of primers, T7E1 analysis, DNA sequence analysis
15. Write up, analysis, presentation of the results to technical/general audience
16. The results can be converted into paper publication/review (if enough data is there)
17. Certificate of participation: From registered Government society

Cell Biology & Genetics Curriculum:

1. Design and perform relevant experiments
2. Hands-on curriculum to learn the cutting-edge techniques

Instruction Time: 8-12 weeks, can continue upto 24 months as per requirement

Details of the course:

1. Development of hypothesis driven research questions and experimental design
2. DNA/RNA isolation & cDNA preparation, buffer preparation
3. Manipulation of DNA sequences, preparation and screening of nucleic acid libraries, gene silencing, analysis of variations in genome sequence
4. PCR & its use in biological research
5. RDT related molecular techniques & bacterial genetics
6. ELISA & its use in biological research
7. Experimental set up for gene cloning & analysis
8. Primer design, calculations, database access knowledge
9. Site directed mutagenesis
10. Vectors, plasmids and details of their functions and how they are used in biotechnology
11. SDS PAGE and Coomassie Brilliant blue staining of proteins on SDS gel
12. Gene/protein expression studies (western blot) to check different biomarkers using the lysates of biological samples
13. Microscopy & preparation and staining of specimens (Immunohistochemistry, IF, H&E)
14. CRIPSR basics, design of primers, T7E1 analysis, DNA sequence analysis
15. Write up, analysis, presentation of the results to technical/general audience
16. The results can be converted into paper publication/review (if enough data is there)
17. Certificate of participation: From registered Government society

Physiology Curriculum:

1. Design hypothesis driven objectives and conduct relevant experiments
2. Hands-on curriculum to learn the cutting-edge biological techniques

Instruction Time: 8-12 week, can continue upto 24 months as per requirement

Details of the course:

1. Development of hypothesis driven research questions and set up experimental design
2. DNA/RNA isolation & cDNA preparation, buffer preparation
3. Manipulation of DNA sequences, preparation and screening of nucleic acid libraries, gene silencing, analysis of variations in genome sequence
4. PCR & its use in biological research
5. RDT related molecular techniques & bacterial genetics
6. ELISA & its use in biological research
7. Experimental set up for gene cloning & analysis
8. Primer design, calculations, database access knowledge
9. Vectors, plasmids and details of their functions and how they are used in research
10. SDS PAGE and Coomassie Brilliant blue staining of proteins on SDS gel
11. Gene/protein expression studies (western blot) to check different biomarkers using the lysates of biological samples
12. Microscopy & preparation and staining of specimens (Immunohistochemistry, H&E)
13. CRIPSR basics, design of primers, T7E1 analysis, DNA sequence analysis
14. Write up, analysis, presentation of the results to technical/general audience
15. The results can be converted into paper publication/review (if enough data is there)
16. Certificate of participation: From registered Government society

Botany Curriculum:

1. Generate hypothesis driven objectives and conduct relevant experiments
2. Effects of different plant-based compounds in different biological activities
3. Hands-on curriculum to learn the cutting-edge biological techniques

Instruction Time: 8-12 weeks, can continue upto 24 months as per requirement

Details of the course:

1. DNA/RNA isolation & cDNA preparation, buffer preparation, pH, autoclaving
2. Manipulation of DNA sequences, preparation and screening of nucleic acid libraries, gene silencing, analysis of variations in genome sequence
3. PCR & its use in biological research
4. RDT related molecular techniques & bacterial genetics
5. ELISA & its use in biological research
6. Experimental set up for gene cloning & analysis
7. Primer design, calculations, database access knowledge
8. Vectors, plasmids and details of their functions and how they are used in research
9. SDS PAGE and Coomassie Brilliant blue staining of proteins on SDS gel
10. Gene/protein expression studies (western blot) to check different biomarkers using the lysates of biological samples
11. Microscopy & preparation and staining of specimens (Immunohistochemistry, H&E)
12. CRIPSR basics, design of primers, T7E1 analysis, DNA sequence analysis
13. Write up, analysis, presentation of the results to technical/general audience
14. The results can be converted into paper publication/review (if enough data is there)
15. Certificate of participation: From registered Government society

Microbiology Curriculum:

1. Generate hypothesis driven objectives and conduct relevant experiments
2. Testing of different compounds for anti-bacterial effects
3. Hands-on curriculum to learn the cutting-edge biological techniques

Instruction Time: 8-12 weeks, can continue upto 24 months as per requirement

Details of the course:

1. DNA/RNA isolation & cDNA preparation, buffer preparation, pH, autoclaving
2. Manipulation of DNA sequences, preparation and screening of nucleic acid libraries, gene silencing, analysis of variations in genome sequence
3. PCR & its use in biological research
4. Testing of potency & bioactivity of antibiotics
5. RDT related molecular techniques & bacterial genetics
6. ELISA & its use in biological research
7. Experimental set up for gene cloning & analysis
8. Primer design, calculations, database access knowledge
9. Vectors, plasmids and details of their functions and how they are used in research
10. SDS PAGE and Coomassie Brilliant blue staining of proteins on SDS gel
11. Gene/protein expression studies (western blot) to check different biomarkers using the lysates of biological samples
12. Microscopy & preparation and staining of specimens (Immunohistochemistry, H&E)
13. CRIPSR basics, design of primers, T7E1 analysis, DNA sequence analysis
14. Write up, analysis, presentation of the results to technical/general audience
15. The results can be converted into paper publication/review (if enough data is there)
16. Certificate of participation: From registered Government society