AC 26/6/2015
Item No. 25

Sindhu Swadhyay Sanstha

M. Sc. Life Sciences (Marine Biotechnology)

Semester – IV, Paper – VII: COASTAL AQUACULTURE

UNIT-I 15 HOURS (Credit – 4)

Overview, importance of aquaculture, global scenario, present status in India - prospects and scope.

Aqua-farming systems: traditional, extensive, semi-intensive and intensive; Site selection: topography, water availability and supply, soil conditions, design and layout, structure and construction.

UNIT- II 15 HOURS (Credit-4)

Cultivable Species- Seaweeds- (Gracilaria, Gelidiella, Kappaphycus): Finfishes (Asian sea bass, groupers, pearl spot, mullets, milkfish and ornamental fishes). Shellfishes (shrimps, crabs, lobsters, mussels, edible oysters, pearl oysters, clams).

UNIT- III 15 HOURS (Credit – 4)

Culture techniques - monoculture, polyculture - pond, raceway, cages, pens, raft and rope culture. Hatchery seed production techniques- breeding, hatchery and nursery phases.

UNIT-V 15 HOURS (Credit – 4)

Feed and Feed formulation: Farm conditioning, Conventional and non conventional feed stuffs, feed formulation technology, growth promoting agents in aqua feed, culture of live feed organisms diatoms- brine shrimp, rotifers, - bioenvironmental monitoring- harvesting- control of predators, parasites and diseases - Best management practices in shrimp farming.

PRACTICALS : 60 HOURS (Credit – 4)

1. Estimation of Salinity.

2. Estimation of Dissolved Oxygen.

3. Determination of Nitrite, Nitrate and Ammonia

4. Extraction and Estimation of Chlorophyll Primary productivity.

5. Diet preparation of Fishes

6. Diet preparation of prawns

7. Identification of local fishes and shelfishes

8. Identification of Phytoplankton- Diatoms, Dinoflagellates, Blue green algae and Coccoolithophores.

9. Identification of Zooplankton- Copepods, Hydromedusae, Pteropods, Chaetognatha, Thaliaceae and planktonic Larvae.

10. Identification of locally available Seaweeds, Seagrasses and Mangrove plants.

11. Methods of sample collection from marine environments: Isolation of bacteria

12. Determination of moisture content of dried fish

13. Microbiological analysis of fish

Text Books:

1. Pillay, T.V.R .1990. Aquaculture Principles & Practices. Fishing News (Books) Limited, London.

2. Santhanam R. N. Ramanathan and G. Jegatheesan 1990. Coastal Aquaculture in India, CBS publishers and Distributors.

3. Joachim W., Hertrampft and F.P Pascal, 2000 Handbook on Ingredients for Aquaculture feeds. Kluwer Academic Publishers, London

Reference Books:

1. Bardach, John.E. 1997 Sustainable Aquaculture. John Wiley and Sons.

2. Chapman, V.J., 1980. Seaweeds and theirs uses Chapman and Hall London.

3. Wheaton, F.W. 1977. Aquaculture Engineering. John Wiley and Sons, New York.

4. Stickney, 1995. Principles of Aquaculture, John Wiley & Sons.

Semester – IV

Paper – VIII: Marine Biotechnology

UNIT-I 15 HOURS (Credit – 4)

Biotechnology in marine science - history of marine biotechnology application in aquaculture, pharmaceutical, environment remediation, biofouling and biocorroison. Developmental biotechnology - induced breeding in-vitro fertilization cryo preservation biotechnological tools - ELISA, FISH, PCR Gene probes, dot immuno binding activity, monoclonal antibodies biosafety ethics.

UNIT-III 15 HOURS (Credit – 4)

Bioactive marine natural products - membrane receptors, anti tumor compounds, anti inflammatory / analgesic compounds, anti viral agents, isolation and identification of marine bioactive compounds such as labile proteins, toxins, carotenoids bioterminator Commercial development of marine natural products-chitosan, chitin.

UNIT-IV 15 HOURS (Credit -4)

Algal biotechnology - single cell protein, hydrocolloids, agarose, carrageen alginates and other by products. Marine Enzymes sources and their applications Marine Lipids sources and their applications.

UNIT-V 15 HOURS (Credit – 4)

Bioinformatics - introduction to computers, Internet and bioinformatics, Bioinformatics servers- (European Bioinformatics Institute, National Centre for Biotechnological Information, DNA Data Bank of Japan), DNA sequence & structural analyses, Basic Logical Alignment Tool, DNA sequence alignment and phylogeny, protein structural analysis, 3D Molecular Visualizer, drug designing.

PRACTICAL:

PROJECT: Dissertation/ Literature Review 60 HOURS (Credit – 4)

Text Books

1. Italy, E (Eds). 1998, New Developments in Marine Biotechnology, Plenum Pub. Corp.

2. Milton Fingerman and Rachakonda Nagabhushanam, 1996, Molecular Genetics of Marine Organisms, Science Pub Inc.

3. Y. Le Gal and H.O.Halvorson 1998, New Developments in Marine Biotechnology. Springer.

Reference Books

1. David H. Attaway, 2001. Marine Biotechnology, Volume 1, Pharmaceutical and Bioactive Natural Products.

2. Rita R. Colwell 1984. Biotechnology in the Marine Sciences (Advances in Marine Science & Biotechnology) Wiley Interscience.

3. Scheupr, P.J. (Ed.), 1984. Chemistry of Marine Natural Products, ,Chemical and Biological Perspectives. Vol. I III, Academic Press, New York.