I. Course Title : **Design of Aquacultural Structures**
II. Course Code : **PFE 517**
III. Credit Hours : **2+1**

IV. Aim of the course

To acquaint and equip the students with aquaculture structures and their design features.

V. Theory

Unit I

Inland fish farming and associated considerations.

Unit II

Fish physiology and micro-climatic considerations.Site selection for aquaculture structures.

Unit III

Design of dykes, sluice, channels etc. Aeration and feeding systems: Design of fish rearing structures, hatcheries, containers for live fish, fingerlings, fish seeds.

Unit IV

Aquaculture in recirculatory systems, oxygen and aeration, sterilization and disinfection. Recirculation of water:Reuse systems, water exchange, design of re-use systems, Inlet and outlet structures and water treatment plants.

VI. Practical

Aeration and feeding systems of fish ponds, fish farming structures, water treatment plants, containers for live fish.Design of re-use systems.Inlet and outlet structures.

VII. Learning outcome

Student's capability to design suitable aquaculture structures.

VIII. Lecture Schedule

S.No.	Topic	No. of Lectures
1.	Inland fish farming.	1
2.	Considerations in site selection for designing inland fish farms.	2
3.	Preparatory work for designing inland fish farms: technological requirements, general technical, hydrological and meteorological data.	3
4.	Fish physiology.	2
5.	Micro-climatic considerations for fish farms.	1
6.	Design of dykes, sluice, channels etc.	3
7.	Aeration and feeding systems.	1
8.	Design of fish rearing structures.	1
9.	Hatcheries.	2
10.	Containers for live fish, fingerlings, fish seeds.	1
11.	Fish pond arrangements: Barrage Ponds, Contour Ponds, Paddy Ponds.	2
12.	Earth structures in fish farms: Dams and Dikes, Feeder Canals, Drainage canals, Drain Ditch, Internal Pond Drains, Borrow Pits and Internal Harvesting Pits.	3
13.	Aquaculture in recirculatory systems.	2
14.	Oxygen and aeration in fish farms. Sterilization and disinfection in fish farms.	2

S.No.	Topic	No. of Lectures
15.	Recirculation of water; Reuse systems, water exchange, design of re-use systems, Inlet and outlet structures.	3
16.	Water treatment plants in fish farms.	1
	Total	**30**

IX. List of Practicals

S.No.	Topic	No. of Practicals
1.	Study of aeration systems of fish ponds.	1
2.	Study of feeding systems of fish ponds.	1
3.	Design of dykes in fish farming structures.	1
4.	Design of feeder canals in fish farming structures.	2
5.	Design of drainage canals in fish farming structures.	1
6.	Design of drain ditch in fish farming structures.	1
7.	Design of internal pond drains in fish farming structures.	1
8.	Design of borrow pits in fish farming structures.	1
9.	Design of internal harvesting pits in fish farming structures.	1
10.	Study of waste water management through aquaculture.	1
11.	Design of recirculatory ponds for waste water treatment in fish farms.	1
12.	Different types of containers for live fish.	1
13.	Design of re-use systems in fish farms.	1
14.	Different types of inlet and outlet structures in fish farms.	1
	Total	**15**

X. Suggested Reading

- FAO. 1983. *Inland Aquaculture Engineering.* ISBN 92-5-102168-6.

I. Course Title	**:**	**Thermal Environmental Engineering for Agricultural Processing**
II. Course Code	**:**	**PFE 518**
III. Credit Hours	**:**	**3+0**

IV. Aim of the course

To acquaint and equip the students with the concept of thermodynamic properties of air and its application in food processing.

V. Theory

Unit I

Requirements of temperature and moisture in food preservation, processing, storage, animal and plant production systems, human comfort etc.

Unit II

Thermodynamic properties of moist air, psychrometric chart, psychrometric processes and applications. Mass transfer and evaporation of water from free surfaces, theory of psychrometer, direct contact transfer processes between moist air and water-air washer, cooling tower, heating and cooling of moist air by extended surface coils, dehumidification using moisture absorbing materials. Solar irradiations on structures, calculation of heating and cooling loads in buildings/ storage structures.

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