

<b>AGT-853</b>	<b>Farm Structures and Management</b>	<b><u>3(3-0)</u></b>
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## **Outcomes**

- Farms structures and heat flow through walls and designing the ventilation systems.
- The course will cover the structures used for the storage of fruits, vegetables and food grains and their designs.
- The course will provide the knowledge of materials used for the construction of farm structures and their application along with practical exposure of farms structures with case studies and design assignments.

## **Contents**

### **1. Construction of Buildings and Heat Flow**

- a. Heat flow through Walls Insulation: Rate of heat transmission through building materials, conductance, combined conductance coefficient,
- b. Equation for heat flow through non-homogenous walls, combined ceiling and roof coefficient.

### **2. Ventilation in Farm Structures**

- a. Ventilation: Air flow and quantity of moisture, Air flow required in heat transfer,
- b. Estimating Air flow required to prevent condensation,
- c. Air flow required to maintain prescribed chemical composition,
- d. Heat balance equation, Exposure ratio,
- e. Ventilating systems, Ventilation by Wind forces, Stack ventilation Systems, Construction practices, Forced draft systems.

### **3. Dairy and Poultry Structures**

- a. Dairy Building: Functional planning, Environment, Sanitation, Space requirements for animals and traffic, arrangement of space, Other considerations,
- b. Milking Parlors, Pen vs Stall Barns, Storage of feed, Milk and manure etc, Insulation and ventilation,

- c. Design of Dairy Building. Poultry Housing: Functional planning, Production practices, Environment, Space requirements, Arrangement or space, Insulation and ventilation, other considerations, Design of Poultry House.

#### **4. Storage Structures for Agricultural Crops**

- a. Storage of Fruits and Vegetable Crops: Condition for storage, Refrigerated vs Common Storage,
- b. Economic aspects of storage, Characteristics of Common storage, Refrigerated storage,
- c. Refrigerating Load, Modified Atmosphere Storage, Types of Evaporators, Coil Temperature vs Relative Humidity and Equipment capacity, Air movement, Storage management,
- d. Performance evaluation of existing storages for fruit and vegetables, Design of storages for horticultural produce.
- e. Storage of Grains: Destructive agents, Respiration of grains, Indices of quality, Moisture and Temperature changes in stored grains, Moisture properties of grains, Functional requirements, Conditioning moist grains, Storage structure, Equipment for grain handling and processing.

#### **5. Building Stones and Bricks**

- a. Stones: Classification and characteristics of good building stones. Tests of stones. Quarrying and dressing of stones. Artificial stones and its varieties, preservation of stone work.
- b. Tiles and Bricks: Different kinds of tiles. Manufacturing and uses of tiles. Coloring and glazing of tiles. Fire tiles and bricks. Qualities of good bricks. Refractory bricks and ceramics.
- c. Lime and Cement: Classification of lime. Properties and applications of lime. Types of cement. Manufacturing process of cement.
- d. Determination of initial and final setting time. Normal consistency. Concrete and Mortars: Aggregates for concrete and mortars. Types of concrete. Water-cement ratio. Workability of concrete. Compaction and curing of concrete. Types and uses of mortars. Tests for mortars.
- e. Timber: Classification of trees, growth of timber trees. Methods of seasoning and sawing. Decay and preservation of timber, laminated materials.

## **6. Metals as Farm Materials**

- a. Metals: Composition and properties of ferrous and non-ferrous metals.
- b. Methods of corrosion control, comparison of construction materials strength.
- c. Paints, Plasters and Varnishes: Composition, preparation, properties, tests and uses of paints, plasters, varnishes and distemper.
- d. Miscellaneous Materials: Composition, varieties, properties and uses of glass, plastics, Laminates and adhesive. Properties and uses of asphalt, rubber and asbestos.

## **7. Drawing and Layout**

- a. To draw the layout plan of old and new agricultural engineering workshop.
- b. To draw the layout plan of dairy farm and its requirements.
- c. To draw the layout plan of horse farm and its requirement.
- d. To draw the layout plan of poultry farm and its requirement.

## **8. Design and Construction of Farm Structures**

- a. Different materials used in farm structure their properties and their requirement.
- b. Design problems of farm structures and godowns.
- c. Numerical problems related to capacity of farms, size of farm.
- d. Numerical problems related to agricultural processing.
- e. Design problems of grain storage structures.
- f. Storage of milk and its processing at dairy farm and numerical problems related to it.

## **9. Animal Shelters and Farms**

- a. Animal shelters in farm their types and size according to the size of animal.
- b. Cost estimation of farms.

### **Suggested Readings:**

1. Branes, A. M. and C. Mander. 2000. Farm Building Construction. Farming Press, London, England.
2. French T.E. 2010. Agricultural Drawing and design of farm structures. Nabu Publisher, New York, USA.
3. Kruegher W.C. 2011. Farm Structures and Equipments-with information on farm house, wells, water piping, , heating System and livestock Houses. Kent Press, Toronto, Canada