22PAFE301 AGRICULTURAL STRUCTURES AND ENVIRONMENTAL CONTROL

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Hours Per Week :

L	T	P	C
2	0	2	3

PREREQUISITE KNOWLEDGE: Basics of grain properties and component of farmstead.

COURSE DESCRIPTION AND OBJECTIVES:

The goal of this course is to examine factors affecting grain storage and its spoilage and construct different grain storage structures i.e. bulk and bag storage structures. It also summarizes us about farmstead and its several components as well as to propose and develop small farmstead at locality.

MODULE-1

UNIT-1 **8L+0T+8P=16 Hours**

STORAGE OF GRAIN:

Storage of grains, Causes of spoilage, Water activity for low and high moisture food and its limits for storage, Moisture and temperature changes in grain bins; Storage of seeds.

UNIT-2 **8L+0T+8P=16 Hours**

GRAIN STORAGE STRUCTURES:

Traditional storage structures and their improvements, Improved storage structures (CAP, hermetic storage, Pusa bin, RCC ring bins), Design consideration for grain storage godown, Bag storage structures, Shallow and Deep bin, Calculation of pressure in bins.

PRACTICES:

- Design of a feed/fodder storage structures.
- Design of grain storage structures.
- Design and layout of commercial bag and bulk storage facilities.
- Study and performance evaluation of different domestic storage structure.

MODULE-2

UNIT-1 **8L+0T+8P=16 Hours**

FARMSTEAD:

Planning and layout of farmstead. Scope, importance and need for environmental control. Livestock production facilities, BIS Standards for dairy, piggery, poultry and other farm structures. Rural living and development, rural roads. Sources of water supply, norms of water supply for human being and animals, drinking water standards and water treatment suitable to rural community. Site and orientation of building in regard to sanitation, community sanitation system.

UNIT-2 **8L+0T+8P=16 Hours**

FACTORS AFFECTING FARMSTEAD AND DESIGN:

Physiological reaction of livestock environmental factors, environmental control systems and their design, control of temperature, humidity and other air constituents by ventilation and other methods, Design, construction and cost estimation of farm structures; animal shelters, compost pit, fodder silo, fencing and implement sheds, barn for cows, buffalo, poultry, etc. Rural roads construction cost and repair and maintenance. Sewage system and its design, cost and maintenance, design of septic tank for small family. Estimation of domestic power requirement, source of power supply and electrification of rural housing. Calculation of cooling load in storage.

SKILLS:

- ✓ *Compute moisture migration or temperature or RH change in grain storage structures during grain storage.*
- ✓ *Evaluate lateral and vertical pressure in shallow and deep bin.*
- ✓ *Examine different component of farm stead.*
- ✓ *Investigate physiological reaction of animal livestock in animal shed.*
- ✓ *Evaluate domestic power requirement for small house hold family.*

PRACTICES:

- Measurements for environmental parameters and cooling load of a farm building.
- Design and layout of a dairy farm.
- Design and layout of a poultry house.
- Design and layout of a goat house/sheep house
- Design of a farm fencing system.
- Estimation of a Farm building.

COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Illustrate effect of grain properties in the field of grain spoilage and storage.	Apply	1	1, 2, 7
2	Analyze knowledge of grain frictional properties to determine grain pressure in bin and to develop design bag bulk storage structures.	Analyze	1	1, 2, 3, 4, 6, 9
3	Examine different component farmstead at rural area.	Evaluate	2	1, 2, 6, 7, 9
4	Propose and design sewage system for rural area and evaluate performance.	Evaluate	2	1, 2, 3, 4, 7, 9, 11
5	Design small animal shelter in farm stead.	Create	2	1, 2, 3, 4, 6, 7, 9, 11

TEXT BOOKS:

1. Ojha, T.P and Michael, A.M. Principles of Agricultural Engineering, Vol. I, Jain Brothers, Karol Bag, New Delhi, 2009.
2. Pandey, P.H. Principles and practices of Agricultural Structures and Environmental Control, Kalyani Publishers, Ludhiana, 2006.

REFERENCE BOOKS:

1. Nathonson, J.A. Basic Environmental Technology, Prentice Hall of India, New Delhi, 2009. Venugopal Rao, P. Text Book of Environmental Engineering, Prentice Hall of India, New Delhi, 2012.
2. Garg, S.K. Water Supply Engineering, Khanna Publishers, New Delhi-6, 2016.
3. Dutta, B.N. Estimating and Costing in Civil Engineering, Duttta & CO, Lucknow, 2012.
4. Khanna, P.N. Indian Practical Civil Engineer's Hand Book, Engineer's Publishers, New Delhi, 2016.
5. Sahay, K.M. and Singh, K.K. Unit Operations of Agricultural Processing, Vikas publishing pvt. Ltd, Noida, 1999.
6. Banerjee, G.C. A Text Book of Animal Husbandry, Oxford IBH Publishing Co, New Delhi, 2008.