

## AEN 3207 AGRICULTURAL STRUCTURES

Lecturers Ms. Stella Sendagi (B.Sc. Agric. Eng, M.Sc. Agric. Eng)  
Mr. Peter Tumutegyereize (B.Sc. Agric. Eng)

Course Type: CORE (B.Sc. Agric. Eng)

Course Credits (CU): 3 CU i.e. 45 Contact Hours per semester

Course Duration: 15 weeks (45 hours) i.e. 30 LH, 30 PH

### Course Description:

The course includes engineering principles and concepts of designing, building and management of Agricultural/ Farm buildings and structures used for animal housing, effective storage of crops and equipments and family living. It also includes a range of building materials and types of construction, from traditional indigenous to industrially produced, as applied to farm structures. The course focuses mostly on Farm Structures for Tropical Climates with emphasis on structures for small to medium scale farms and to some extent, village scale Agriculture infrastructure. The acquired knowledge and skill should enable the student to produce, in cooperation with the farmer, specifications for functional building designs that provide good environment and durable construction, contributing to efficient and economically sound farm operations.

### Course objectives

- Select and quantify appropriate building materials for construction of farm structures
- Apply appropriate principles to design specific farm structures
- Site, construct and manage different farm structures

### REFERENCES:

- James Whitaker. 1979. Agricultural buildings and structures. Reston, Virginia
- Farm structures in tropical climates: Fao/Sida cooperative programme. Rural structures in east and south-east Africa food and agriculture organization of the United Nations. Rome, 1988

| Topic                               | content   | Method of instruction  | Tools/equipment needed  |
|-------------------------------------|---|--|---|
| Lecture 1<br>Introduction.          | Developments in farm structures, design characteristics of buildings and economic feasibility | <ul style="list-style-type: none"> <li>• 2 hours of interactive Lecture</li> </ul>   | <ul style="list-style-type: none"> <li>• Laptop, LCD, white boards and</li> <li>• markers or BB and chalk, papers,</li> <li>• printer, handouts</li> </ul>  |
| Lecture 2<br>Farm stead<br>Planning | Site selection, building arrangement in relation to other structures and farm                 | <ul style="list-style-type: none"> <li>• 2 hours of interactive Lecture</li> <li>• 3 hours of group assignment on map drawing and analysis of an existing farmstead</li> </ul>                           | <ul style="list-style-type: none"> <li>• Laptop, LCD, white boards and</li> <li>• markers or BB and chalk, papers,</li> <li>• printer, handouts</li> <li>• 30 seater vehicle, drawing paper,</li> <li>• tracing paper, drawing pencils,</li> <li>• rubbers, rulers</li> </ul> |
| Lecture 3<br>Building<br>materials  | Types and properties of building materials, to include wood, Concrete,                        | <ul style="list-style-type: none"> <li>• 3 hours of interactive Lecture</li> <li>• 3 hours of Study visit and/or class illustration (see types of timber, their defects and its preservation)</li> </ul> | <ul style="list-style-type: none"> <li>• Laptop, LCD, white boards and</li> <li>• markers or BB and chalk, papers,</li> <li>• printer, handouts</li> <li>• 30 seater vehicle,</li> <li>• communication services-email and</li> <li>• airtime,</li> </ul>                      |

|  |   |   |   |
|--|---|---|---|
| Lecture 4<br>Building materials            | Metals, Plastic, bricks, manufactured boards, and other materials | <ul style="list-style-type: none"> <li>• 3 hours of interactive Lecture</li> <li>• 3 hours of Study tour with demonstration-brick making and selection</li> </ul> | <ul style="list-style-type: none"> <li>• Laptop, LCD, white boards and</li> <li>• markers or BB and chalk, papers,</li> <li>• printer, handouts</li> <li>• 30 seater vehicle,</li> <li>• communication services-email and</li> <li>• airtime</li> </ul>   |
| Lecture 5<br>Loads on buildings            | Types of loads on buildings                                       | <ul style="list-style-type: none"> <li>• 2 hours of interactive Lecture</li> <li>• 2 hours of Tutorial on load calculations</li> </ul>                            | <ul style="list-style-type: none"> <li>• Laptop, LCD, white boards and</li> <li>• markers or BB and chalk, papers,</li> <li>• printer, handouts</li> </ul>  |
| Lecture 6<br>Components of farm structures | Building foundations and floor, beam and column design            | <ul style="list-style-type: none"> <li>• 2 hours of interactive Lecture</li> <li>• 2 hours of Tutorial on design</li> </ul>                                       | <ul style="list-style-type: none"> <li>• Laptop, LCD, white boards and</li> <li>• markers or BB and chalk, papers,</li> <li>• printer, handouts</li> </ul>  |
| Lecture 7<br>Components of farm structures | Structural frames   | <ul style="list-style-type: none"> <li>• 3 hours of interactive Lecture</li> <li>• 3 hours of study visit to a construction site</li> </ul>                       | <ul style="list-style-type: none"> <li>• Laptop, LCD, white boards and</li> <li>• markers or BB and chalk, papers,</li> <li>• printer, handouts</li> <li>• 30 seater vehicle, communication services-email and</li> </ul>   |
| Lecture 8<br>Bills of quantities           | Estimating materials and cost of various structures               | <ul style="list-style-type: none"> <li>• 2 hours of interactive Lecture</li> <li>• 3 hours of Tutorials (developing B.O.Qs)</li> </ul>                            | <ul style="list-style-type: none"> <li>• Laptop, LCD, white boards and</li> <li>• markers or BB and chalk, papers,</li> <li>• printer, handouts</li> </ul>  |
| Lecture 9<br>Specialized farm structure    | Livestock housing units   | <ul style="list-style-type: none"> <li>• 3 hours of interactive Lecture</li> </ul>  | <ul style="list-style-type: none"> <li>• Laptop, LCD, white boards and</li> <li>• markers or BB and chalk, papers,</li> <li>• printer, handouts</li> <li>• Drawing paper, pencils, rulers,</li> <li>• computer lab manned with</li> <li>• AUTOCAD software</li> </ul>   |
| Lecture 10<br>Specialized farm structure   | Poultry units and greenhouses                                     | <ul style="list-style-type: none"> <li>• 3 hours of interactive Lecture</li> </ul>  | <ul style="list-style-type: none"> <li>• Laptop, LCD, white boards and</li> <li>• markers or BB and chalk, papers,</li> <li>• printer, handouts</li> <li>• Drawing paper, pencils, rulers,</li> <li>• computer lab manned with <ul style="list-style-type: none"> <li>• AUTOCAD software</li> </ul> </li> </ul> |
| Lecture 11<br>Specialized farm structure   | Drying and storage structures for different agricultural products | <ul style="list-style-type: none"> <li>• 3 hours of interactive Lecture</li> </ul>  | <ul style="list-style-type: none"> <li>• Laptop, LCD, white boards and</li> <li>• markers or BB and chalk, papers,</li> <li>• printer, handouts</li> <li>• Drawing paper, pencils, rulers,</li> <li>• computer lab manned with <ul style="list-style-type: none"> <li>• AUTOCAD software</li> </ul> </li> </ul> |
| Lecture 12<br>Management of different farm | Care and maintenance  | <ul style="list-style-type: none"> <li>• 2 hours of interactive Lecture</li> <li>• 2 hours of Test</li> </ul>   | <ul style="list-style-type: none"> <li>• Laptop, LCD, white boards and</li> <li>• markers or BB and chalk, papers,</li> <li>• printer, handouts</li> </ul>  |

|   |                                    |                            |                                    |
|---|------------------------------------|----------------------------|------------------------------------|
| structures                                |                                    |                            |                                    |
| Lecture 13, 14, 15<br>Individual projects | Specialized farm structure designs | • 9 hours of presentations | • Laptop, Projector , white boards |

**Course Assessment:**

- One test: 15%
- Group assignments 10%
- Individual assignments 15%
- Final Examination: 60%

**SUMMARY OF TIME NEEDED**

|                                      |         |
|--------------------------------------|---------|
| Interactive lectures covering theory | 30 hrs  |
| Tutorial hours                       | 07 hrs  |
| Test                                 | 02hrs   |
| Group assignments                    | 03hrs   |
| Study trips                          | 09hours |
| Presentations                        | 09hours |