**AEN 3211 FARM ENGINEERING II**

**Lecturer** Mr. Ahmed Zziwa B.Sc. Agric. Eng., M.Sc. Forestry (Timber Engineering)

**Course Type**: **CORE (BARI III)**

**1.0 COURSE DESCRIPTION**

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

**Course Duration**: **15 weeks (45 Hours)**

**Course Description:**

The course introduces students to the principles and methods of constructing simple farm structures such as basic farm dwellings, aqua-culture structures, livestock housing, feeding sheds, watering structures and associated provision for health-related structures, building materials, fencing materials and fence construction. It also covers characteristics, types, fabrication techniques and costs of construction materials used in farm buildings. The course also equips students with skills for water harvesting technologies and rural water sanitation.

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**2.0 COURSE OBJECTIVES**

The course aims at equipping students with knowledge and skills necessary in planning and designing various types of farm buildings necessary to agricultural enterprises.

**The specific objectives:**

By the end of the course, students should be able to:-

* Advise on the construction of farm structures.
* Understand the importance, benefits and design characteristics of farm structures.
* Appreciate the diversity of construction materials and their suitability for farm structure construction.
* Apply basic skills in water harvesting and rural water sanitation.
* Identify common fasteners and fastening techniques used in building.
* Evaluate costs of materials and building structures.
* Research new building methods, tools and construction techniques used in farm construction.
* Know the simple earth roads on farmsteads.
* Understand all types of fences and their construction on a farm.
* Know the types of roof rain water catchment and rural sanitation structures.

**3.0 RECOMMENDED REFERENCES FOR READING**

1. **Barnes, M. and Mander, C (2000).** Farm building Construction. Farming Press Limited, England.
2. Farm Structures in Tropical Climates: An e-textbook for Structural Engineering and Design, Food and Agriculture Organization of the United Nations, Rome, Italy
3. **Ekblaw, K. J. T. (2003)** Farm Structures.
4. **Brunskill, R. W. (1982).** Traditional Farm Buildings of Britain.

**4.0 SUMMARY OF TIME NEEDED**

Interactive lectures covering theory 30 Hrs

Tutorial/Practical Hours 30 Hrs

**5.0 OVERALL COURSE EVALUATION**

Continuous assessment 40%

Semester examination 60%

**6.0 COURSE CONTENT, METHODS OF INSTRUCTION, TOOLS AND EQUIPMENT REQUIRED**

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| **TOPIC** | **CONTENT** | **METHOD OF INSTRUCTION / TIME ALLOCATED** | **TOOLS / EQUIPMENT NEEDED** |
| 1. Introduction to farm structures
 | * Benefits of farm structures
* Planning, design and erection of farm buildings
* Design considerations of farm structures
* Building Plans and Specifications
 | * 2 Lecture Hours
 | * Course notes
* Demonstration materials
* Course reader materials
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| 1. Building materials
 | * Factors considered in material selection
* Wood as a construction material
* Manufactured boards
* Natural building materials
* Earth as building material
* Soil Stabilization – binders
* Cement, sand and stones
* Concrete and reinforced concrete
* Metals, glass, plastics and paints
* Fasteners and fastening techniques
 | * 6 Lecture Hours
* 6 Tutorial Hours
 | * Course notes
* Demonstration materials
* Course reader materials
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| 1. Structural designs, elements of construction and building production
 | * Structural design
* Structural elements and loading
* Elements of construction
* Building production
* Methods of construction
* Building life
* Building repairs and maintenance
* Insurance and taxes
 | * 6 Lecture Hours
* 3 Tutorial Hours
 | * Course notes
* Course reader materials
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| 1. Climate and environmental control
 | * Insulating materials
* Plumbing, heating and ventilation
* Air distribution
* Cooling
* Sound insulation - noise control
* Lightning conductors
* Sand and dust
* Earthquakes
 | * 3 Lecture Hours
* 6 Practical Hours
 | * Course notes
* Demonstration materials
* Course reader materials
 |
| 1. Functional planning
 | * Rural planning
* Farmstead planning
* Zone Planning
* Fire protection
 | * 3 Lecture Hours
* 3 Tutorial Hours
 | * Course notes
* Demonstration materials
* Course reader materials
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| 1. Animal housing, sundry farm buildings and farm dwellings
 | * Animal behaviour and building design
* Farm buildings for various animals
* Machinery shops and storage
* Greenhouses
* Farm dwellings
 | * 4 Lecture Hours
* 4 Practical Hours
 | * Course notes
* Demonstration materials
* Course reader materials
 |
| 1. External Facilities
 | * Road location
* Fencing
 | * 3 Lecture Hours
* 4 Practical Hours
 | * Course notes
* Course reader materials
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| 1. Rural water supply and sanitation
 | * Types of storage for roof catchments
* Rural sanitation
* Pit latrines
* Septic tanks and soak away trenches
 | * 3 Lecture Hours
* 4 Practical Hours
 | * Course notes
* Demonstration materials
* Course reader materials
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