



LANDMARK UNIVERSITY, OMU-ARAN

COURSE COMPACT

COLLEGE: SCIENCE AND ENGINEERING

DEPARTMENT: AGRICULTURAL AND BIOSYSTEMS ENGINEERING

PROGRAMME:

COURSE COMPACT for: ABE 211

Course

Course code: ABE 211

Course title: Introduction to Agricultural and Biosystems Engineering

Credit unit: 2 Credits

Course status: Compulsory (C)

Lecturer's Data

1. Name of the lecturers: Engr. Prof. Adeniyi OLAYANJU

Qualifications obtained: *MNSE, MNLAE, MNIFST, R. Engr. (COREN)*

B.Sc., M.Sc., Ph.D (Ibadan). (Professor of Agricultural Mechanization)

Department: Agricultural and Biosystems Engineering

College: College of Science and Engineering

E-mail: olayanju.adeniyi@lmu.edu.ng

Office Location: B021 Engineering Workshop

2. Name of the lecturers: Engr. Alhassan, Elijah Aina

Qualifications obtained: B. Eng; M. Eng; MNIAE, MASABE, COREN Regd.

Department: Agricultural and Biosystems Engineering

College: College of Science and Engineering

E-mail: alhassan.elijah@lmu.edu.ng

Office Location: B021 Engineering Workshop

Consultation Hours: Wednesday (8-10)

INTRODUCTION TO THE COURSE

Course Description:

To give formal introduction of the course, Agricultural and Biosystems Engineering to the students of this programme. This will expose the students to what Agricultural and Biosystems Engineering (ABE) entails and its relevance to the world at large, prospects and opportunities in the field of Agricultural and Biosystems Engineering.

Course Justification:

Alignment with Goals and Vision of Landmark University: to impact the relevant knowledge required to produce highly skilled individuals which will cause the changes and developments required nationwide and globally.

The course is relevant as it will help expose the students to the profession agricultural engineering, various specialty in the profession and professional expectations from them which can help for the advancement of the nation's technology.

Course Objectives:

At the end of this course, the students would be able to appreciate the relevance of agricultural engineering through an overview analysis of the above stated course contents.

It will also help them to identify and comprehend the various specialization in the field of agricultural engineering.

Course Content:

Definitions of Agricultural and Biosystems Engineering (ABE). Branches (options) in ABE. Contributions of Agricultural Engineering to National development. Farm power (sources of power) – human, animal, mechanical, electrical, wind and hydro power.

Introduction to farm machinery – machine elements, machines for tillage, crop cultivation, seeding, weeding, plant protection, fertilization, harvesting. Farm buildings such as farmstead and farm residence, animal shelters, storage structures, building materials; Post-harvest technology – principles of crop drying, milling, processing, preservation, packaging; Principles of soil conservation, introduction to irrigation, drainage and farm electrification; scope of agricultural mechanization, Job prospects for agricultural engineers.

Course Expectations:

S/N	GRADING	SCORE(%)
1.	Continuous Assessments	
	• C.AI	7%
	• C.AII (Mid-Semester Test)	15%
	• C.AIII	8%
2.	Assignment	
3.	Practical (Laboratory work)/ Case Studies	
4.	Final Examination	70%
5.	Total	100

Course Delivery Strategies:

The general method of lecturing; use of writing board, marker, duster and use of teaching aids will be adopted. It will be through face to face contact, assignments and feedback mechanism.

Course Duration:

Two hours per week for 15 weeks (30 hours)

LECTURE CONTENT

Module 1

General overview of the course

Definitions of Agricultural and Biosystems Engineering (ABE). Branches (options) in ABE. Contributions of Agricultural Engineering to National development. **3**

WKS

Week 1: Course introduction

➤ Objectives

The students at the end of the lecture for the week should be able to:

- i. Explain what the course is about.
- ii. To know the course description, content, expectation, delivery strategies, objectives and justification

➤ Description

First hour:

General Introduction to the course

Second hour

General overview continues

Feedback from the lecture

➤ Study Question:

How do you think ABE is relevant to the actualization of the agrarian mandate of Landmark University

➤ Reading List –

- i. **Fundamentals of Engineering for Agriculture.** A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
- ii. **Introduction to Agricultural Engineering.** Y Mijinyawa, K. Ogedengbe, E. A. Ajav and A.K. Aremu
- iii. **An introduction to Agricultural Engineering Technology.** A problem solving approach. Field, Harry L.; Solie, John B, Roth Lawrence O
- iv. **An Introduction to Engineering Disciplines (ABE 206).** Faculty of Engineering and technology, University of Ilorin, Nigeria
- v. **Man, material and machine: The tricycle for Agricultural Mechanization.** T.M.A. OLÁYANJÚ. FUNAAB Inaugural Lecture Series No. 51

Week II: Definitions of Agricultural and Biosystems Engineering (ABE) and terms related to it.

➤ **Objectives**

The students at the end of the lecture for the week should be able to:

- i. Define agriculture, engineering, technology and agricultural and biosystems engineering
- ii. State the historical background of ABE. How the course evolved and the various contributions to its advancement.

➤ **Description**

First hour:

Definition of terms

Second hour

Historical background of ABE.

➤ **Study Question:**

Outline few challenges an agricultural engineer in training may face in the course of their study. Hence, proffer solutions

➤ **Reading List –**

- i. **Fundamentals of Engineering for Agriculture.** A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
- ii. **Introduction to Agricultural Engineering.** Y Mijinyawa, K. Ogedengbe, E. A. Ajav and A.K. Aremu
- iii. **An introduction to Agricultural Engineering Technology.** A problem solving approach. Field, Harry L.; Solie, John B, Roth Lawrence O
- iv. **Man, material and machine: The tricycle for Agricultural Mechanization.** T.M.A. OLÁYANJÚ. FUNAAB Inaugural Lecture Series No. 51

Week III: Branches (options) in ABE and Contributions of Agricultural Engineering to national development.

➤ **Objectives**

The students at the end of the lecture for the week should be able to:

- i. State the branches in ABE
- ii. Explain in detail what each option entails.
- iii. State the contribution of ABE to national development

➤ **Description**

First hour:

State the options in ABE

Explanation of the various options

Second hour

Lecture on the contributions of ABE to national development

Feedback from the lecture

➤ **Study Question:**

Make extensive study on opportunities available to each option in ABE.

➤ **Reading List -**

- i. **Introduction to Agricultural Engineering.** Y Mijinyawa, K. Ogedengbe, E. A. Ajav and A.K. Aremu
- ii. **An introduction to Agricultural Engineering Technology.** A problem solving approach. Field, Harry L.; Solie, John B, Roth Lawrence O
- iii. **Man, material and machine: The tricycle for Agricultural Mechanization.** T.M.A. OLÁYANJÚ. FUNAAB Inaugural Lecture Series No. 51

Module 2

Farm power (sources of power) – human, animal, mechanical, electrical, wind and hydro power. 1 WK

- **Week IV:** Farm power (sources of power) – human, animal, mechanical, electrical, wind and hydro power.

➤ **Objectives**

The students at the end of the lecture for the week should be able to:

- i. State the form of power available for farming operations
- ii. State what each power source entails- advantages and disadvantages

➤ **Description**

First hour:

Overview of farm power development from human muscle to animal draught to mechanical power.

The various forms of power available for farm operations

Second hour

Explanation of what each power source entails including their merit and demerits (human, animal, mechanical, electrical, wind, solar and hydro power)

Feedback and prayer

➤ **Study Question:**

Why do you feel the use of solar energy should be encouraged in farming operation? State its merits over other sources of power

➤ **Reading List**

- i. **Fundamentals of Engineering for Agriculture.** A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
- ii. **Introduction to Agricultural power systems .** Igbeka, J.C.
- iii. **Introduction to Agricultural Engineering.** Y Mijinyawa, K. Ogedengbe, E. A. Ajav and A.K. Aremu
- iv. **An introduction to Agricultural Engineering Technology.** A problem

- solving approach. Field, Harry L.; Solie, John B, Roth Lawrence O
- v. **Man, material and machine: The tricycle for Agricultural Mechanization. T.M.A. OLÁYANJÚ.**
FUNAAB Inaugural Lecture Series No. 51

Module 3

Introduction to farm machinery – machine elements, machines for tillage, crop cultivation, seeding, weeding, plant protection, fertilization, harvesting. **2 WKS**

➤ **Week V:** Introduction to farm machinery – machine elements, machines for tillage.

➤ **Objectives**

The students at the end of the lecture for the week should be able to:

- i. Define farm machinery
- ii. State the importance of farm machinery
- iii. State the component/parts of machine elements in farm machinery.
- iv. Define tillage
- v. State farm machinery use for tillage operations

➤ **Description**

First hour:

Definition of farm machinery
Importance of farm machinery
Component parts of machine element

Second hour

Definition of tillage
Equipment used for tillage operations
Feedback from the lecture

➤ **Study Question:**

Make extensive study on the importance of farm machinery to modern day agriculture.

The introduction of farm machinery has resulted in the loss of many jobs on the farm. Argue for or against this statement.

➤ **Reading List -.**

- i. **Fundamentals of Engineering for Agriculture.** A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
- ii. **Introduction to Agricultural power systems .** Igbeka, J.C.
- iii. **Man, material and machine: The tricycle for Agricultural Mechanization. T.M.A. OLÁYANJÚ.**

Week VI: Machines for crop cultivation, seeding, weeding, plant protection, fertilization, harvesting

➤ **Objectives**

The students at the end of the lecture for the week should be able to:

- i. State machines use for these farming operations i.e seeding, weeding, plant protection, fertilization, harvesting etc.

➤ **Description**

First hour:

Brief recap of last week lecture

Machines for seeding, weeding and plant protection

Second hour

Machines for fertilization and harvesting

First Continuous Assessment (CA)

➤ **Study Question:**

Make extensive study on the importance of farm machinery.

The importance of proper management and maintenance of farm machinery cannot be over emphasized. Discuss

➤ **Reading List –**

- i. **Fundamentals of Engineering for Agriculture.** A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
- ii. **Introduction to Agricultural power systems .** Igbeka, J.C.
- iii. **Farm Machinery .** Brian Bell. Fifth Edition

Module 4

Farm buildings such as farmstead and farm residence, animal shelters, storage structures, building materials. **1 WK**

- **Week VII:** Farm buildings such as farmstead and farm residence, animal shelters, storage structures, building materials.

➤ **Objectives**

The students at the end of the lectures for the week should be able to:

- i. Define farm buildings
- ii. State the importance of farm buildings.
- iii. State the basic requirements of farm buildings

- iv. State the various forms of storage structures
- v. To explain the importance of storage structure
- vi. State the difference between residential and farm building
- vii. State the various materials for farm building constructions

➤ **Description**

First hour:

Definition of farm buildings
 Classification and features of each one
 Importance of farm buildings
 Basic requirement of farm buildings

Second hour

Various forms of storage structures
 Importance of storage structures
 Difference between residential and farm buildings
 Material for farm building constructions

➤ **Study Question:**

- i. Make extensive study on the importance of farm buildings in modern day farming systems.
- ii. What form of storage structure will you recommend for grains and vegetables storage.
- iii. Post-harvest losses of agricultural produce is enormous. How do you feel your knowledge as an agric. engineer can help to reduce this menace?

➤ **Reading List –**

- i. **Introduction to Agricultural Engineering.** Y Mijinyawa, K. Ogedengbe, E. A. Ajav and A.K. Aremu
- ii. **Farm Structures.** Yahaya Mijinyawa

Module 5

Post-harvest technology – principles of crop drying, milling, processing, preservation, packaging. **1 WK**

- **Week VIII:** Post-harvest technology – principles of crop drying, milling, processing, preservation, packaging.

➤ **Objectives**

The students at the end of the lecture for the week should be able to:

- i. Define the term post- harvest technology
- ii. State the importance of post-harvest processing of crop

iii. State the basic principles involve in crop drying, milling, processing, preservation, packaging

➤ **Description**

First hour:

Definition of terms related to post harvest technology

Importance of post -harvest processing of crops

Second hour

Basic principles of crop drying, processing, preservation and packaging

➤ **Study Question:**

Make extensive study on the importance of Post-harvest technology in modern day farming systems.

➤ **Reading List –**

- i. **Fundamentals of Engineering for Agriculture.** A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
- ii. **Agricultural processing and storage Engineering.** Igbela, J.C.
- iii. **Processing and storage of foods.** Dharmesh Kumar

Module 6

Principles of soil conservation. **1 WK**

Week IX: Principles of soil conservation.

➤ **Objectives**

The students at the end of the lectures for the week should be able to:

- i. Define soil conservation
- ii. State the principles involve in soil conservation
- iii. State the importance of soil conservation

➤ **Description**

First hour:

Introduction of the concepts

Definition of soil conservation

Terms related to soil conservation

Second hour

Principles involve in soil conservation

Importance of soil conservation

Feedback from the lecture

➤ **Study Question:**

Make extensive study on the activities that militate against soil conservation.

➤ **Reading List –**

Fundamentals of Engineering for Agriculture. A.P. Onwualu; C.O. Akubuo and I.E Ahaneku

Introduction to Agricultural Engineering. Y Mijinyawa, K. Ogedengbe, E. A. Ajav and A.K. Aremu

Module 7

Introduction to irrigation, drainage and farm electrification and second continuous assessment (CA) **2 WKS**

Week X: Introduction to irrigation, drainage and farm electrification.

➤ **Objectives**

The students at the end of the lectures for the week should be able to:

- i. Define irrigation and drainage
- ii. State the importance of irrigation and drainage
- iii. State the methods of irrigation and drainage
- iv. Define farm electrification
- v. Define terminologies in farm electrification (Basic electricity)
- vi. State the importance or uses of electric power on the farm

➤ **Description**

First hour:

Definition of irrigation and drainage
Importance of irrigation and drainage
Methods of irrigation and drainage

Second hour

Farm electrification defined
Terminologies in farm electrification
Importance of electric power on the farm

➤ **Study Question:**

- i. Make extensive study on problems of irrigation and drainage
- ii. Make extensive study on principle of wiring and lighting of farm structures.

➤ **Reading List –**

- i. **Fundamentals of Engineering for Agriculture.** A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
- ii. **Introduction to Agricultural Engineering.** Y Mijinyawa, K. Ogedengbe, E. A. Ajav and A.K. Aremu

Week XI: Mid semester Examination (CA II)

➤ **Objectives**

This is basically to test the students understanding of the course so far.

➤ **Description**

First hour:

Administration of the CA

Second hour

Collection of scripts and review of questions with the students

Module 8

Scope of agricultural mechanization. 1 WK

➤ **Week XII:** Scope of agricultural mechanization.

➤ **Objectives**

The students at the end of the lecture for the week should be able to:

- i. Define agricultural mechanization.
- ii. State the importance of agricultural mechanization
- iii. State the problems and prospects of agricultural mechanization

➤ **Description**

First hour:

Introduction of the topic

Definition of relevant terms

Importance of agricultural mechanization

Second hour

Problems and prospect of agricultural mechanization

➤ **Study Question:**

- i. Make extensive study on why agricultural mechanization have not been fully adopted in Nigeria
- ii. Differentiate between agricultural mechanization and tractorization

➤ **Reading List**

- i. **Fundamentals of Engineering for Agriculture.** A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
- ii. **Man, material and machine: The tricycle for Agricultural Mechanization.** T.M.A. OLÁYANJÚ. FUNAAB Inaugural Lecture Series No. 51

Module 9

Job prospects for agricultural engineers. 1 WK

➤ **Week XIII:** Job prospects for agricultural engineers.

➤ **Objectives**

The students at the end of the lectures for the week should be able to:

- i. Know job options available to an Agricultural Engineers
- ii. State the advantages that an Agricultural Engineers have over other fields in their search for job

➤ **Description**

First hour:

Introduction to available job opportunities for agricultural Engineers

Second hour

Description of what each job specification entails

➤ **Study Question:**

Make extensive study on how an agricultural engineer can create job for national development

➤ **Reading List**

- i. **Fundamentals of Engineering for Agriculture.** A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
- ii. **Introduction to Agricultural Engineering.** Y Mijinyawa, K. Ogedengbe, E. A. Ajav and A.K. Aremu

Module 10

Third Continuous assessment (CA III) and revision 2WKS

➤ **Week XIV: Third Continuous assessment (C A III)**

Objectives

➤ This is basically to test the students understanding of the course and how far they are knowledgeable about course content.

➤ **Description**

First hour:

Administration of CA questions

Second hour

Collection of scripts and review of questions with the students

➤ **Week XV: Revision and tutorials section**

Tutorial questions drawn from each module and conducted during lectures

- Week XV: Topic for the week
Revision and tutorials section
Tutorial questions drawn from each module and conducted during lectures

HOD's COMMENTS: Course content is adequate

Name: Dr. A.A. Okunola Signature A.A. Okunola Date: 25/8/2017

