LANDMARK UNIVERSITY, OMU-ARAN

COURSE COMPACT

COLLEGE: SCIENCE AND ENGINEERING
DEPARTMENT: AGRICULTURAL AND BIOSYSTEMS ENGINEERING
PROGRAMME:
COURSE COMPACT for: ABE 242

Course

Course code: ABE 242
Course title: Introduction to Farm Power and Machinery Engineering
Credit unit: 2 Credits
Course status: Compulsory (C)

Lecturer's Data

i. Name of the lecturers: Engr Alhassan, Elijah Aina
Qualifications obtained: B. Eng; M. Eng; COREN REGD.
Department: Agricultural and Biosystems Engineering
College: College of Science and Engineering
E-mail: alhassan.elijah *@lmu.edu.ng*
Office Location: A021 Engineering workshop

ii. Name of the lecturers: Dr. Moses, Olumuyiwa Isaac
Qualifications obtained: M. Eng; Ph.D
Department: Agricultural and Biosystems Engineering
College: College of Science and Engineering
E-mail: moses.olumuyiwa*@lmu.edu.ng*
Office Location: B 214 Second College building

Consultation Hours: Tuesday 10 - 12

INTRODUCTION TO THE COURSE

Course Description:

This course would enable the students to have foundational knowledge of farm power and machinery engineering.
It deals with prime movers or power sources used for all phases of agricultural production, processing and distribution. It therefore includes tractors, electric motors, stationary engines and engines of trucks. It also includes other energy systems such as wind, solar, biomass, and hydro-power.

Agricultural machinery deals with equipment for land clearing, tillage, planting, weeding, harvesting and transportation.

Course Justification:

Alignment with Goals and Vision of Landmark University: to impact the relevant

knowledge require 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 power sources required for their farming which can help for the advancement of the nation's technology.

The major role of power units in the farm is to operate farm equipment for land clearing and development, cultivation, harvesting, processing, handling, transporting, loading, unloading, pumping and any other farm operations. The uses of farm machinery in Nigerian agricultural is gaining popularity because of the increasing awareness to large scale farming. Example: Landmark University Commercial Farm

Course Objectives:

At the end of this course, the students would be able to appreciate the importance of farm power and machinery engineering through the in –depth analysis of the course contents.

To give brief knowledge of farm power and machinery engineering to the agricultural science students.

Course Content:

i. Description of major farm tools and machine parts.
ii. Farm Power sources,
iii. Tractors as the main source of power on the farm, classifications and purposes.
iv. Description of major farm equipment for primary and secondary tillage operations.
v. Field performance, evaluation and maintenance procedures of field machinery.
vi. Harvesting equipment and machinery.
vii. Planters.

Course Expectations:

S/N	GRADING	SCORE(%)
1.	Continuous Assessments • C.AI • C.AII (Mid-Semester Test) • C.AIII	 7% 15% 8%
2.	Assignment	
3.	Practical (Laboratory work)/ Case Studies	10%
4.	Final Examination	60%
5.	Total	100

Course Delivery Strategies:

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

Course Duration:

Two hours per week for 15 weeks (30 hours)

LECTURE CONTENT

Module 1

General overview of the course
Brief introduction to power and machinery engineering

The course requirements, description and expectations

CA I

- **Week 1:**
  - ✓ Course introduction

- **Objectives**

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

To give an overview of what the course is about.
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 farm power and machinery has aided for operation?

- **Reading List –**
  - **Fundamentals of Engineering for Agriculture**. A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
  - **Introduction to Agricultural power systems . Igbeka, J.C.**
  - **Agricultural processing and storage Engineering. Igbela, J.C.**
  - **Introduction to Agricultural Engineering**. Y Mijinyawa, K. Ogedengbe, E. A. Ajav and A.K. Aremu
  - **An introduction to Agricultural Engineering Technology**. A problem solving approach. Field, Harry L.; Solie, John B, Roth Lawrence O
  - **An Introduction to Engineering Disciplines (ABE 206).** Faculty of Engineering and technology, University of Ilorin, Nigeria
  - **Elements of Agricultural Engineering.** Jagdishwar Sahay.
  - Tractors and Automobiles - V. Rodichev, G. Rodicheva
  - **Engineers in Society**. James Oladele
- **Week 1I:**
  Introduction to farm power and machinery engineering
- **Objectives**

Students at the end of the week should be able to show an understanding of farm power and machinery, namely: Definition, importance and challenges of farm power and machinery usage in Nigeria.

- **Description**

  First hour:

  Definition of farm power and Machinery

  Importance of farm power and machinery

  Second hour

  Challenges of farm power and machinery usage in Nigeria

- **Study Question:**

  Mention some farming operations and the machine(s) use for them.

Reading List –

- **Fundamentals of Engineering for Agriculture**. A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
- **Introduction to Agricultural power systems . Igbeka, J.C.**
- **Introduction to Agricultural Engineering**. Y Mijinyawa, K. Ogedengbe, E. A. Ajav and A.K. Aremu
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- **Week III:**

  Description of major farm tools and machine parts

  CA 1

- **Objectives**

Students at the end of the week should be able to:

i. Define tools, implements and machines
ii. Understand the concept of mounted, semi- mounted and trailed and self-propelled.
iii. Explain the concept of support and process unit

Description

First hour:

Definition of terms

Description of farm tools and machine parts

Second hour

Implement hitching to prime mover; support and process unit explanation

CA I

- **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 -

- **Fundamentals of Engineering for Agriculture**. A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
- **Introduction to Agricultural power systems . Igbeka, J.C.**
- **Introduction to Agricultural Engineering**. Y Mijinyawa, K. Ogedengbe, E. A. Ajav and A.K. Aremu
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- **Elements of Agricultural Engineering.** Jagdishwar Sahay.
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Module 2

Farm Power sources

- **Week IV**

  Farm Power sources I.

- **Objectives**

  Students at the end of the week should be able to

  - Define power unit in agricultural processes
  - Know the purpose of power unit.
  - Sources of farm power unit

Description

First hour:

Definition and purpose of farm power unit

Second hour

Sources of farm power

- **Study Question:**

  What do you think will be the key energy solutions to meeting the twenty- first century's global energy challenge?

- **Reading List**

  - **Fundamentals of Engineering for Agriculture**. A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
  - **Introduction to Agricultural power systems . Igbeka, J.C.**

- **Week V**

  Farm Power sources II

- **Objectives**

Students at the end of the week should be able to

- Identify the source of farm power
- Explain each source of farm power.
- State the merit and demerit of each source of farm power.

- **Description**

  First hour:

  Explanation of each source of farm power source

  Second hour

  Merit and demerit of each farm power source.

- **Study Question:**

State some farming operations that you feel human will handle better than machine.

- **Reading List -.**
  - **Fundamentals of Engineering for Agriculture**. A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
  - **Introduction to Agricultural power systems . Igbeka, J.C.**

Module 3

Tractors as the main source of power on the farm, classifications and purposes 2wks

- **Week VI**

Farm Tractor I

- **Objectives**

The students at the end of this week should be able to

i. Define farm tractor
ii. State the uses of farm tractor
iii. Enumerate the major components of a tractor
iv. Give brief historical development of tractor.

- **Description**

  First hour:

  Definition of farm tractor

  Uses of farm tractor

  Second hour

  Historical development of tractor

  Major components of a tractor

Study Question:

i. What may be the probable reasons and remedies if diesel tractor engine stops while working?
ii. Outline the differences between a petrol and a diesel engine.
iii. Outline the essential components of a tractor.

- **Reading List –**

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

  Introduction to Agricultural power systems. Igbeka, J.C.

  Elements of Agricultural Engineering. Jagdishwar Sahay.

  Tractors and Automobiles - V. Rodichev, G. Rodicheva

Week VII

Farm Tractor II - classifications and purposes

- **Objectives**

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

a) Know how to classify and select a tractor
b) State some functional part of tractor

- **Description**

First hour:

Classification and selection of tractors

Second hour

Some functional part of tractor explained.

- **Study Question:**

With the aid of a sketch, describe the sequence of operations in a four-stroke cycle engine.

- **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. **Elements of Agricultural Engineering.** Jagdishwar Sahay.
  iv. **Tractors and Automobiles** - V. Rodichev, G. Rodicheva

Module 3

CA 2

- **Week VIII**

CA 2- Mid semester Examination

Module 4

Farm equipment for primary and secondary tillage operations

Week IX

Farm equipment for primary and secondary tillage operation

Objectives

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

i. Define tillage and its importance
ii. Define primary and secondary tillage
iii. State equipment use for primary and secondary tillage operations.

v. **Description**

First hour:

Tillage and its importance explain

Second hour

Equipment for primary and secodary tillage operations

vi. **Study Question:**

i. State the advantage of disc plough over mould board plough.

ii. What do you understand with term conservation and conventional tillage?

iii. What are the factors that affect draught and power requirement of a plough?

iv. Is it necessary to have machinery on the farm? Discuss

v. State the objectives of secondary tillage operation

vii. 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. **Elements of Agricultural Engineering.** Jagdishwar Sahay.

Module 5

i. Planters
ii. Harvesting equipment and machinery

- Week X

Planters

Objectives:

Students at the end of this week should be able to:

i. Define planter
ii. State the functions of planter
iii. State seed planting methods
iv. State the parts of planters
v. State types of planter

- Description

First hour:

Definition of planter, function and planting methods

Second hour

Parts of planter

Types of planter

- Study Question:

i. Make a sketch of the essential parts of a seed planter

- Reading List –

i. **Fundamentals of Engineering for Agriculture**. A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
ii. **Elements of Agricultural Engineering.** Jagdishwar Sahay.

Week XI

Harvesting equipment and machinery

- Objectives

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

i. Define Harvesting
ii. Classify harvesting action
iii. Explain corn picker, rice combine and root crop harvester
iv. Explain the concept of threshing.

- **Description**

First hour:

i) Definition of harvesting and tillage
ii) Classification of harvesting action

Second hour

i. Principle of threshing
ii. Corn picker, rice combine and root crop harvester.

Study Question:

i. Make an extensive study on combine harvester
ii. Explain terminology connected with power thresher

Reading List –

i. **Fundamentals of Engineering for Agriculture**. A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
ii. **Elements of Agricultural Engineering.** Jagdishwar Sahay.

Week XII: Topic for the week

Combined harvester

- **Objectives**

At the end of this week lecture, the students' knowledge should be vast in the operation and working principles of combined harvester.

- **Description**

First hour:

Combined harvester

Second hour

Combined harvester.

- **Study Question:**

Make a well labelled drawing of a combined harvester.

- **Reading List**

i. **Fundamentals of Engineering for Agriculture**. A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
ii. **Elements of Agricultural Engineering.** Jagdishwar Sahay.

Module 6

Field performance, evaluation and maintenance procedures of field machinery.

CA III and revision

- **Week XIII**

Field performance, evaluation and maintenance procedures of field machinery.

- **Objectives**

The students at the end this week should be able to:

i. Know the field performance and evaluation of field machinery
ii. Explain the maintenance procedure of field machinery.

- **Description**

<u>First hour:</u>

Field performance and evaluation of field machinery

<u>Second hour</u>

Maintenance procedure of field machinery

- **Study Question:**

Differentiate between a machine and a tool

How will you classify farm machinery?

Starting from field clearing to post- harvesting, list the various equipment available for use on the farm

- **Reading List –**

i. **Fundamentals of Engineering for Agriculture**. A.P. Onwualu; C.O. Akubuo and I.E Ahaneku
ii. **Elements of Agricultural Engineering.** Jagdishwar Sahay.

Week XIV

Third Continuous assessment (C A III) and revision

Objectives

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

- **Description**

<u>First hour:</u>

Administration of CA questions

<u>Second hour</u>

Revision

- **Week XV**

Examination

HOD's COMMENTS: _____

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Name: _____ Signature _____ Date: _____