



LANDMARK UNIVERSITY, OMU-ARAN

COURSE COMPACT

COLLEGE: SCIENCE AND ENGINEERING

DEPARTMENT: AGRICULTURAL AND BIOSYSTEMS ENGINEERING

PROGRAMME: AGRICULTURAL ENGINEERING

COURSE COMPACT for: ABE 322 - AGRICULTURAL POWER & MACHINERY II

Course

Course Code: **ABE 322**

Course Title: **AGRICULTURAL POWER & MACHINERY II**

Credit Unit: **3 Credits**

Course Status: **Compulsory (C)**

Course Duration: **Three hours - (2 hours lecture and 1 hour for practical) per week for 15 weeks (45 hours)**

Lecturer Data

Engr. T.A. Adekanye B.Eng., M.Eng.

Department of Agricultural and Biosystems Engineering

College of Science and Engineering

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Office Location: Room A216, New College Building.

Consultation Hours: Tuesdays: 1- 3 pm, Thursdays: 11 am – 1 pm.

Engr. S.O. Aniyi B.Eng., M.Eng.

Department of Agricultural and Biosystems Engineering

College of Science and Engineering

E-mail: aniyi.olanrewaju@lmu.edu.ng

Office Location: Room A213, New College Building.

Consultation Hours: Thursdays: 11 am- 12 noon, Fridays: 11 am – 12noon.

Course Content:

Review of farm power sources. Transmission of power in farm machinery. Tractor mechanics and power measurements. Tractor test and test codes. Ergonomics. Hitches and hitch systems. Maintenance of farm machinery. Selection and management of farm machinery. Criteria for replacement. Field evaluation and cost analysis of use of agricultural machines.

Course Description:

Agricultural Engineering is a unique discipline because it involves the application of almost all aspects of other engineering disciplines including Animal Science, Soil Science, Agricultural Economics, etc. One of the most important problems in developing countries is the level of awareness and importance given to agricultural development. The role of agricultural education is vital as it is directly linked to the effectiveness of the economy in providing the requirement of trained manpower for the development process. In modern agricultural production, power is very important for an appropriate level of mechanization to be achieved. It is therefore inevitable that any practicing agriculturist should know the relevant power sources available for agricultural work.

Course Justification:

The topics covered in this subject will enable the students to understand the basic principles, construction and working of farm machinery for different crops. This will also enable them to select appropriate machinery, use, and repair and maintain the same. This knowledge will be highly useful in running an Agro Service Centre for Farm Machinery.

Course objectives

1. To provide a sound knowledge in the study of agricultural power and machinery in order to facilitates students interest in agricultural engineering;
2. To provide suitable materials with adequate illustrations based on local problems and issues that affect tropical agriculture.
3. Discuss various power sources available for agricultural work
4. Be able to select, use, repair and maintain appropriate agricultural machinery
5. This knowledge will be highly useful in running an Agro Service Centre for farm machinery.

Course Requirements:

1. Students must have passed ABE 311; a prerequisite for ABE 322
2. Students must have a minimum 70% attendance and participate in all practical classes.
3. No student shall be allowed in for this lecture 20 minutes after the allocated time or entrance of the course teacher.

4. Assignment that was not submitted and delivered to the course teacher within the stipulated time frame shall not be graded.
5. Students shall be required to read beyond what is provided in class or compliment class jottings by making reference to text books for better grade standing.

Method of Grading-

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

Course Delivery Strategies:

Lecturing method complimented with field practical work will be adopted. There shall be Power point presentations especially in illustrative topics coupled with note dictations.

LECTURE CONTENT

Module 1 - Overview and Introduction

General overview of the course

Brief introduction to communication

The course description, justification, objectives, requirements, and expectations.

Week 1: Course Introduction

➤ **Objectives** - The students at the end of the lecture for the week should be able to:

- give an overview of what the course is about
- 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 knowledge of Agricultural power and machinery is relevant to your course of study?

Week 2: Transmission of power in farm machinery.**Objectives**

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

1. understand the terms which are used to describe power and be able to explain them
2. Describe the methods of power transmission in agricultural machinery,

Description**First hour:**

Definition of terms which are used to describe power

Methods of power transmission in agricultural machinery

Second hour

Advantages and disadvantages of V- belt

Study Questions:

1. Identify the four major components of a power train and list the function of each
2. List the five types of clutches used in agricultural equipment and identify one feature of each.

Reading List:

1. Principles of Farm Machinery by Kepner R. A., Bainer R., and Barger E. L. 1997. 2nd Ed. AVI Publishers Connecticut. USA.
2. Elements of Agricultural Engineering by Jagdishwar, S.2010. Standard Publishers Distributors, Delhi
3. Farm Power Machinery Volume-I by ISAE; Jain brothers

Week 3: Transmission of power in farm machinery continue**Week 4: Tractor Mechanics and Power measurements.**

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

1. Understand mechanics of tractor chassis.

Description**First hour:**

Definition of terms
Tractor Mechanics

Second hour

Power measurements

Study Questions:

1. What is traction?
2. Why the diesel tractor engine gets heated up and what are the remedies?

Reading List:

1. Engineering Principles of Agricultural Machines by Ajit, K. Srivastava, Carrol, E. Goering, Roger, P. Rohrbach and Dennis, R. Buckmaster. ASABE.
2. Elements of Agricultural Engineering by Jagdishwar, S. 2010. Standard Publishers Distributors, Delhi.
3. Fundamentals of Engineering for Agriculture by A.P. Onwualu, C.O. Akubuo and I.E. Ahaneku. 2006. Immaculate publications Limited, Enugu - Nigeria

Week 5: Tractor Mechanics and Power measurements - Continue**Week 6: Tractor Tests and Test codes**

Objectives - The students at the end of the lectures for the week should;

1. Understand main tractor tests

Description**First hour:**

Definition of terms
Tractor test codes

Second hour

Tractor test

Study Questions:

1. What are the important test conditions of a tractor?
2. How belt performance test differs from drawbar performance test?

Reading List:

1. Elements Of Agricultural Engineering Part 1 & 2 by Dr. O.P. Singhal and Naresh Chandra Aggarwal; Mumfordganj, Allahabad
2. Principle of Agricultural Engineering Volume-I by A.M. Michael & T.P.Ojha; Jain brothers.

Week 6: Tractor Tests and Test codes - Continue

Week 8: Hitches and hitch systems

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

1. Describe different types of hitch systems

Description

First hour:

Definition of terms

Hitches and hitch systems

Second hour

Advantages of each type of hitch system

Study Question

Describe the three – point linkage system on a tractor

Reading List:

1. Elements Of Agricultural Engineering Part 1 & 2 by Dr. O.P. Singhal and Naresh Chandra Aggarwal ; Mumfordganj, Allahabad
2. Tillage System in the Tropics by FAO; Oxford and IBH Publication Co.
3. Farm Power Machinery Volume-I by ISAE ; Jain brothers
4. Element of Farm Machinery by A. C.Srivastava and Raju Primlari; Oxford &IBH Publishing Co. Pvt Ltd, New Delhi

Week 9: Mid – semester examination

Week 10: Hitches and hitch systems (Continue)

Week 11: Maintenance of farm machinery

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

1. Understand the importance of maintenance of farm machinery
2. Understand various types of maintenance
3. Maintain agricultural machinery

Description

First hour:

Definition of terms

Types of maintenance

Second hour

Importance of maintenance of farm machinery

Study Questions:

1. Identify and discuss factors responsible for the premature failure of agricultural machinery in Nigeria.
2. What factors would you consider in selecting agricultural machinery?

Week 12: Machinery Selection and Management

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

1. Understand causes of agricultural machinery breakdown
2. Selection of appropriate agricultural machinery
3. Maintain agricultural machinery
4. Do cost analysis of agricultural machinery and
5. Replace agricultural machinery.

Description

First hour:

Definition of terms

Machinery Selection

Second hour

Causes of agricultural machinery breakdown

Replace agricultural machinery

Study Questions:

1. Identify and discuss factors responsible for the premature failure of agricultural machinery in Nigeria.
2. What factors would you consider in selecting agricultural machinery?

Reading List:

1. Fundamentals of Engineering for Agriculture by A.P. Onwualu, C.O. Akubuo and I.E. Ahaneku. 2006. Immaculate publications Limited, Enugu - Nigeria
2. Elements of Agricultural Engineering by Jagdishwar, S.2010.. Standard Publishers Distributors, Delhi.

Week 13: Machinery Selection and Management - Continue

Week 14: Field evaluation and cost analysis of use of agricultural machines

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

1. Carry out performance evaluation of agricultural machinery breakdown
2. Do cost analysis of agricultural machinery and
3. Replace agricultural machinery.

Description

First hour:

Field evaluation of agricultural machinery

Cost analysis of agricultural machinery

Second hour

Replacement of agricultural machinery

Study Questions:

1. Identify and discuss factors responsible for the premature failure of agricultural machinery in Nigeria.
2. What factors would you consider in selecting agricultural machinery?

Reading List:

1. Fundamentals of Engineering for Agriculture by A.P. Onwualu, C.O. Akubuo and I.E. Ahaneku. 2006. Immaculate publications Limited, Enugu - Nigeria
2. Elements of Agricultural Engineering by Jagdishwar, S.2010. Standard Publishers Distributors, Delhi.

Week 15: Examination

Objectives: To examine the students on all that has been taught during the semester.

Reading List:

1. Principles of Farm Machinery by Kepner R. A., Bainer R., and Barger E. L. 1997. 2nd Ed. AVI Publishers Connecticut. USA.
2. Tractors and Their Power Units by Liljedahl J. B., Carlton W. M., Turnquist P. K., and Smith D.W. 1997. 3rd Ed. John Wiley. New York
3. Agricultural Engineers Yearbook by Richey L. B., Jacobson R., Hall C. W. Mc.Graw Hill Co. USA
4. Machines for Power Farming by Stone A. A. and Culvin H. E. 3rd Ed. John Wiley. New York.

5. Engineering Principles of Agricultural Machines by Ajit, K. Srivastava, Carrol, E. Goering, Roger, P. Rohrbach and Dennis, R. Buckmaster. ASABE.
6. Elements of Agricultural Engineering by Jagdishwar, S.2010.. Standard Publishers Distributors, Delhi.
7. Fundamentals of Engineering for Agriculture by A.P. Onwualu, C.O. Akubuo and I.E. Ahaneku. 2006. Immaculate publications Limited, Enugu - Nigeria
8. Element of Farm Machinery by A.C.Srivastava and Raju Primplari; Oxford & IBH Publishing Co. Pvt Ltd, New Delhi
9. Elements Of Agricultural Engineering Part 1 & 2 by Dr. O.P. Singhal and Naresh Chandra Aggarwal; Mumford Ganj, Allahabad
10. Principle of Agricultural Engineering Volume-I by A.M. Michael & T.P.Ojha; Jain brothers.
11. Principle of Agricultural Engineering Volume-II by A.M. Michael & T.P.Ojha ; Jain brothers.
12. Farm Power Machinery Volume-I by ISAE; Jain brothers
13. Farm Power Machinery & Surveying by Irshad Ali; Kitab Mahal, Nai Sarak, Delhi
14. Farm Machinery by Smith
15. Tillage System in the Tropics by FAO; Oxford and IBH Publication Co.

HOD's COMMENTS:

Name: _____ **Signature** _____ **Date:** _____