



THE FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE

Department of Agricultural and Environmental Engineering

AGE 552 – Design of Agricultural Machinery.

Course Code: AGE 552

Course Title: Design of Agricultural Machinery

No. of Units: 3

Course Duration: Two hours of theory and three hours of practicals per week for 15 weeks.

Status: Compulsory

Course Email Address: age552@gmail.com

Course Webpage: <http://www.age.futa.edu.ng/courseschedule.php?coursecode=AGE%552>

Prerequisite: AGE 323

COURSE INSTRUCTORS

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COURSE DESCRIPTION

This course is a course meant to expose students in *Agricultural & Environmental Engineering to design of agricultural machinery*. As a practical course, the focus is to impart useful skills on the students in order to enhance their imaginative ability and to translate same into devices and systems that can be integrated into process lines where necessary. Topics to be covered include: Machine design processes and procedures, Materials of construction, selection, strength properties, stress analysis, costing, design of machine elements, machine fabrication and typical design of low cost agricultural machinery, problems and prospects of agricultural machinery development and commercial manufacturers in Nigeria

COURSE OBJECTIVES

The objectives of this course are to:

- 1) introduce students to design concepts and procedures and provide students with opportunities to develop basic drawing and design skills with respect to determination of components shapes and sizes using state of the art science, invention and technology.
- 2) introduce students to the design and theory of common machine elements and acquire experience in solving design problems ..
- 3) prepare professional quality solutions and presentations to effectively communicate the results of analysis and design.
- 4) translate ideas and imaginations into conceptual designs using the tools of conventional engineering drawings and computer aided designs.
- 5) show students by examples how some machines evolved from observations of natural or manual processes into mechanical devices and systems.

COURSE LEARNING OUTCOMES / COMPETENCIES

Upon successful completion of this course, the student will be able to:

(Knowledge based)

- design common machine elements and acquire experience in solving design problems ..
- prepare professional quality solutions and presentations to effectively communicate the results of analysis and design.
- translate ideas and imaginations into conceptual designs using the tools of conventional engineering drawings and computer aided designs.
- Transform observations of natural or manual processes into mechanical devices and systems.
- *Integrate machines for unit operations into continuous flow process lines*
- use the knowledge of the course to:

- solve real life problems related to agricultural production processes;
- develop machines;
-

GRADING SYSTEM FOR THE COURSE

This course will be graded as follows:

Class Project	30%
Test(s)	10%
<u>Final Examination</u>	<u>60%</u>
<u>TOTAL</u>	<u>100%</u>

GENERAL INSTRUCTIONS

Attendance: It is expected that every student will be in class for lectures and also participate in all practical exercises. Attendance records will be kept and used to determine each person's qualification to sit for the final examination. In case of illness or other unavoidable cause of absence, the student must communicate as soon as possible with any of the instructors, indicating the reason(s) for the absence.

Academic Integrity: Violations of academic integrity, including dishonesty in assignments, examinations, or other academic performances are prohibited. You are not allowed to make copies of another person's work and submit it as your own; that is plagiarism. All cases of academic dishonesty will be reported to the University Management for appropriate sanctions in accordance with the guidelines for handling students' misconduct as spelt out in the Students' Handbook.

Assignments and Group Work: Students are expected to submit assignments as scheduled. Failure to submit an assignment as at when due will earn you zero for that assignment. Only under extenuating circumstances, for which a student has notified any of the instructors in advance, will late submission of assignments be permitted.

Code of Conduct in Lecture Rooms and Laboratories: Students should turn off their cell phones during lectures. Students are prohibited from engaging in other activities (such as texting, watching videos, etc.) during lectures. Food and drinks are not permitted in the laboratories.

READING LIST

¹Rajput R. K. (2011). *An Integrated Course in Mechanical Engineering Birla Publications PVT, LTD, Shadara, Delhi*

¹Hall, A. S. Holowenko A. R. and Laughlin H. G. (1988). *Theory and Problems of Machine Design. Schaum's Series . McGraw Hill Book Company New York.*

– **Mechanical Engineering Design** by Joseph Shigley and Charles Mischke

- Design Website

Legend

- 1- Available in the University Library
- 2- Available in Departmental/School Libraries
- 3- Available on the Internet.
- 4- Available as Personal Collection
- 5- Available in local bookshops.

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COURSE OUTLINE

1	Introduction and Course Overview	During this first class, an outline of the course will be presented. The importance and /or potentials of the course in terms of job/wealth creation will be highlighted.
2 & 3	The design process	Process /procedure for design of a machine will be discussed
4 & 5	Design considerations	Factors considered in design and justification
6	Design of Machine Components	Exercises will involve design of machine components such as shafts , belts and pulleys
7 & 8	Conceptual designs and drawings of machines and their components	Examples of machine design concepts will be discussed
9	Course project allocation	Students will be provided with varieties of projects and will be guided to select a project of their choice
10	Orthographic and isometric presentation of machines (course project)	Progress made on course project will be assessed through presentation of orthographic and isometric drawings of machines and machine components
11&12	Fabrication and assembly testing of machine components	Practical classes to guide students on fabrication and assembly of prototypes
13	Performance Evaluation of course project	Performance evaluation of machine with a view to identifying areas of improvement
14	Revision	Revision and assessment of course impact

