

AEN 3106 AGRICULTURAL PROCESSING ENGINEERING

Credit Units : 3 Credit Units

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

Course Duration : 15 weeks (45 hours) i.e. 30 LH, 30 PH

Course Type : CORE (BSC Agric Engineering III)

Lecturer : Mr. John B. Kawongolo

BSc. Mech Eng (MUK), MEng(Agricultural Engineering), Full time Lecturer, Dept of Agric Engineering.

Mrs. Kigozi

BSc. Agric Eng (MUK), MEng(Agricultural Engineering), (University of Pretoria)
Full time Lecturer, Dept of Agric Engineering.

Mrs Florence Kiyimba BSC Agric Engineering MUK, MSC Agric Engineering (Nairobi University)

Parttime Lecturer, Dept of Agric Engineering.

1. Course Description

Scope, importance and key concepts in agricultural processing engineering. Importance properties of Agricultural materials in processing. Determination and measurement of properties of solid agricultural materials (physical, electrical, mechanical, biochemical properties). Determination and measurement of properties of fluid agricultural materials (types of fluids, viscosity, rheological properties fluid statics, fluid flow).

2. Course Objectives

The **main objective** of the course is to equip students with an understanding of the scope and key concepts in the processing of agricultural produce to enable them to understand the operations in the agro-processing industry.

The **Specific Objectives** include;

- (1) To introduce students to the scope, importance and key concepts of the agro processing industry
- (2) To equip students with Knowledge on the importance, use and determination of properties of solid agricultural materials in processing
- (3) To equip students with Knowledge on the importance, use and determination of properties of fluid agricultural materials in processing.

3. Recommended Texts

Food Processing Technology. Principles and practice. P.J fellows. Ellis Horward limited, 1988.

[Unit Operations Of Agricultural Processing](#) Sahay, K.M. New Dehli: Vikas, 1994.

Unit Operations in Processing. R.L. Earle. Pergamon Press. 1992

Introduction to food Engineering..P.G.Smith. Food science Text series. Kluwer Academic/Plenum Publishers.

Physical properties of Foods and Food processing systems. M.J Lewis. Wood head Publishing Limited.

Physical Properties of Plant and Animal materials. Nuri.N.Mohsenin. Gordon and Breach Science Publishers

4. COURSE CONTENT, METHODS OF INSTRUCTION, TOOLS AND EQUIPMENT REQUIRED

TOPIC	CONTENT	METHOD OF INSTRUCTION / Time allocated	TOOLS / EQUIPMENT NEEDED
LECTURE 1. INTRODUCTION	<ul style="list-style-type: none"> • Scope, importance and key concepts in agricultural processing engineering 	Interactive lectures (5 hrs)	Chalk / BB LCD and computer
LECTURE 2	<ul style="list-style-type: none"> • Importance properties of Agricultural materials in processing. • Visit to processing Industry 	Interactive lectures (2 hrs) Field trip (3hrs)	Chalk / BB LCD and computer transport
LECTURE 3	<ul style="list-style-type: none"> • Importance, determination and measurement of physical properties. ▪ Determination of size, shape, surface area, volume, porosity, bulk density, specific gravity 	Interactive lectures (6 hr) Practical (6 hrs)	Chalk / BB LCD and computer Selected crop, Well equipped food processing lab
LECTURE 4.	<ul style="list-style-type: none"> • Importance (electrical sensing elements) determination and measurement of electrical properties ▪ Determination of electrical conductance, resistivity 	Interactive lectures (2hrs) Practical (3hrs)	Chalk / BB LCD and computer Selected crop, Well electrical lab
LECTURE 5	<ul style="list-style-type: none"> • Determination and measurement of mechanical (texture and solid rheological) properties. ▪ Determination of hardness, bending strength, bending stress, crispness 	Interactive lectures (7 hr) Practical (3hrs)	Chalk / BB LCD and computer Selected crop, Well equipped food lab
LECTURE 6	<ul style="list-style-type: none"> • Determination and measurement of biochemical properties. ▪ Proximate Analysis 	Interactive lectures (2hrs) Practical (3hrs)	Chalk / BB LCD and computer Selected food, Well equipped food processing lab

LECTURE 7.	<ul style="list-style-type: none"> ▪ Test 	3 hrs	Chalk/BB
LECTURE 9.	<ul style="list-style-type: none"> ▪ Types of fluids, viscosity importance, determination and measurement of static properties of fluids, rheology of fluids ▪ Determination of viscosity and rheological properties of fluids 	Interactive lectures (3hrs) Practical (3hrs)	Chalk / BB LCD and computer Selected food, Well equipped food processing lab
LECTURE 10	<ul style="list-style-type: none"> • Fluid flow, flow measurement and pump selection. 	Interactive lectures (3hrs) Tutorials (3hrs)	Chalk / BB LCD and computer
LECTURE 11	<ul style="list-style-type: none"> • Test 2 	Tests (3 hrs)	
	<ul style="list-style-type: none"> • Final Exams 		

5. SUMMARY OF TIME NEEDED

Interactive lectures	30 hrs
Tutorials practicals, field trip	24 hrs
Evaluation (tests)	06 hrs

6. OVERALL COURSE EVALUATION

Continuous Assessment Test		20%
Class practicals, Assignments	20%	
Final examination		60%