

16AG201 CROP PROCESS ENGINEERING

Hours Per Week :

L	T	P	C
2	-	2	3

Total Hours :

L	T	P	W/RA	SSH/HS	CS	SA	S	BS
30	-	30	5	40	5	5	6	-



Course Description and Objectives:

This course deals with the various unit operations involved in processing of grains, fruits, vegetable and other main food products. The objective of this course is to enable the students to understand the processing technology of various agricultural products including cereals, pulses, oilseeds, fruits, vegetables and animal products.

Course Outcomes:

The student will be able to:

- gain basic knowledge about processing of various agricultural products including cereals, pulses, oilseeds, fruits, vegetables and animal products.
- acquire basic knowledge about material handling of various agricultural products.

SKILLS:

- ✓ *Able to produce jams, canned juice etc. using fruits and vegetables.*
- ✓ *Estimate efficiency and power requirements of belt conveyor, screw conveyor, bucket elevator etc.*
- ✓ *Estimate mixing index for various mixers.*

ACTIVITIES:

- o *Design of different types of mixers for homogeneous mixing of different food ingredients.*
- o *Design of prototype belt conveyor, screw conveyor and bucket elevator.*
- o *Performance evaluation of a screen pre cleaner*

UNIT - 1**L-06**

PROCESSING OF AGRICULTURAL PRODUCTS: Scope and importance of food processing, Post harvest losses, Principles and methods of food processing, Processing of farm crops, cereals, pulses, oil seeds, fruits and vegetables and their products for food and feed, Processing of animal products, Minimal processing.

UNIT - 2**L-06**

SIZE REDUCTION: Principle of size reduction, grain shape, size reduction machines, Crushers, grinders, cutting machines etc., Operation, Efficiency and power requirement, Rittinger's, Kick's and Bond's equation, Fineness modulus.

UNIT - 3**L-06**

MIXING: Theory of mixing, Types of mixtures for dry and paste materials, Rate of mixing and power requirement, Mixing index.

UNIT - 4**L-06**

SEPARATION: Theory of separation, Size and unsized separation, Types of separators, Size of screens, Sieve analysis, Capacity and effectiveness of screens, Pneumatic separation.

UNIT - 5**L-06**

MATERIAL HANDLING: Microwave and dielectric heating, Extrusion processing, Scope and importance of material handling devices, Study of different types of material handling systems-Belt, Chain and screw conveyor, Bucket elevator, Pneumatic conveying, Gravity conveyor; Design consideration, Capacity and power requirement.

LABORATORY EXPERIMENTS**LIST OF EXPERIMENTS****Total hours: 30**

1. Preparation of flow and layout charts of a food processing plant.
2. Determination of fineness modulus and uniformity index.
3. Study of cleaning equipments.
4. Study of grading equipments.
5. Performance evaluation of screen pre cleaner.
6. Study of conveying equipments.
7. Performance evaluation of a belt conveyor.
8. Performance evaluation of a bucket elevator.
9. Performance evaluation of a screw conveyor.

TEXT BOOKS:

1. A. Chakravarty, "Post Harvest Technology of Cereals, Pulses and Oil Seeds", 3rd edition, Oxford and IBH Pub. Co., Calcutta, 2008.
2. K. M. Sahay and K. K. Singh, "Unit Operation of Agricultural Processing", 2nd edition, Vikas Publishing, New Delhi, 2004.

REFERENCE BOOKS:

1. P. H. Pande, "Principles of Agricultural Processing-A Text Book", 2nd edition, Kalyani Publishers, Ludhiana, 2006.
2. T. K. Bose and S. K. Mitra, "Fruits, Tropical and Subtropical", 3rd edition, Naya Prakash, Calcutta, 2001.
3. R. L. Earle, "Unit Operations in Food Processing", 2nd edition, Pergamon Press, Oxford, UK, 1985.
4. P. J. Fellows, "Food Processing Technology, Principles and Practice", 3rd edition, Ellis Horwood, USA, 2009.

WEB LINK:

1. http://ecourses.iasri.res.in/e-Leaarningdownload3_new.aspx?Degree_Id=04