

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

Course Curriculum

POST HARVEST TECHNOLOGY
(Code: 3346303)

Diploma Programme in which this course is offered	Semester in which offered
Agricultural Engineering	4 th

1. RATIONALE.

Post harvest technology is an important aspect for agricultural produce. Cleaning, grading, sorting, drying, storage, milling, etc process to be done for improved grain quality and availability, Drying of grain using different type of dryer viz. Solar drying, Deep bed dryers, flat bed dryers, continuous flow dryers etc., Losses during storage and their control and Packaging of fruits and vegetables. Students have to study these various parameters related to post harvest technology and will have to apply this knowledge on farm and industry.

2. COMPETENCY (Programme Outcomes (POs) According to NBA terminology)

The course content should be taught and implemented with the aim to develop required theoretical knowledge & associated practical significance so that they acquire following competencies activities.

1. Comprehend Engineering Properties / various post harvest process on agriculture produce and its applications
2. Determine various properties & parameters of Agriculture Produce.
3. Evaluate Engineering Properties / Management of storage structures and losses during Storage agricultural Produce.
4. Define dryers and different types of dryers.

2. TEACHING AND EXAMINATION SCHEME.

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA	ESE	PA	150
3	0	2	5	70	30	20	30	

Legends: L-Lecture; T – Tutorial/Teacher Guided Theory Practice; P -Practical;
C – Credit, ESE -End Semester Examination; PA - Progressive Assessment

3. COURSE DETAILS.

Unit	Outcomes (in cognitive domain)	Major Learning Topics and Sub-topics
Unit – I Introduction of post harvest technology	1.1 Discuss post harvest technology 1.2 Enlist Post harvest technology need	1.1 Introduction to post harvest technology of agricultural produce; Status of Production, Losses, Need, Scope and Importance 1.2 Introduction to various post harvest operations such as Primary Processing Operation Vs. Secondary Operation, Operations like Harvesting, Handling cleaning, grading, sorting, drying, storage, milling, size reduction, expelling, extraction, blending, heat treatment, separation, material handling (transportation, conveying, elevating), washing; their functions and use in the post harvest processing.
Unit– II Drying of Cereals and Pulses	2a. Introduction of drying and types of drying method. 2b. Discuss Principles of dryers and types of dryers	2.1 Introduction, importance of drying, principles of drying and factors affecting drying, types of drying methods i.e. sun drying & artificial drying by mechanical means – Psychometric Chart, Moisture content representation, equilibrium moisture content, determination of moisture content by direct and indirect methods. 2.2 Drying Characteristics, Introduction to various grain drying systems - solar drying system, batch drying system, continuous flow drying system. Precautions during drying. 2.3. Principles and operation of different types of Dryers viz. Deep Bed Dryers, Flat Bed Dryers, Continuous Flow Dryers, L.S.V. Dryers, Spray Dryer, Fluidized Bed Dryers, Rotary Dryer, Spouted Beds, Freeze Dryer, Tray And Tunnel Dryers
Unit–III Storage of Cereals and Pulses	3a. Enlist General principles of storage and affected physical properties on grain 3b. Explain Fungi, insect and organism affected on stored grain 3c. Discuss various types of storage structures	3.1 Introduction, need and importance, general principles of storage. Temperature and moisture changes during storage i.e. influence of moisture content, relative humidity, temperature, fungi etc. on stored product. 3.2 Fungi, insect and other organism / Infections associated with stored grains. 3.3 Familiarization with the various types of storage structures. Deep and shallow bins. Traditional and modern storage structures. Management of storage structures. Losses during storage and their control, space requirement of bag storage structure. 3.4 Types of material conveying Systems. Belt Conveyor, Bucket Elevator, Screw Conveyor,

Unit	Outcomes (in cognitive domain)	Major Learning Topics and Sub-topics
		Pneumatic Conveyor
Unit-IV Post Harvest Technology of Fruits and Vegetables	4a. Introduction to packaging and its types 4b. Explain Post harvest treatment to increase shelf life 4c. Explain storage of fruits and vegetables	4.1. Methods of Harvesting and Post harvest losses in fruits and vegetables, Handling of Fruits and Vegetables. Introduction to the storage of fruits and vegetables. Need and importance of storage. Principle of storage of fruits and vegetables. Recommended storage operation conditions for some important fruits and vegetables and their storage life. 4.2 Post harvest treatment to increase shelf life i.e. freezing, chilling, dehydration, canning, thermal processing. 4.3 Introduction to Packaging of fruits and vegetables and types of packaging. Concept of modified atmosphere packaging.

4. SUGGESTED SPECIFICATION TABLE WITH HOURS AND MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	Introduction of post harvest technology	08	04	04	02	10
2	Drying of Cereals and Pulses	16	12	08	08	28
3	Storage of Cereals and Pulses	14	08	04	04	16
4	Post Harvest Technology of Fruits and Vegetables	10	08	04	04	16
	Total	42	17	22	31	70

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy).

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

General Notes:

1. If mid sem test is part of continuous evaluation, unit numbers I and II are to be considered.
2. Ask the questions from each topic as per marks weightage. Numerical questions are to be asked only if it is specified. Optional questions must be asked from the same topic.
3. In examination, example of same chapter is to be asked in place of example.

5. SUGGESTED LIST OF EXERCISES/PRACTICALS.

The exercises/practical/experiments should be properly designed and implemented with an attempt to develop different types of skills leading to the achievement of the competency. Following is the list of exercises/practical/experiments for guidance.

Sr. No.	Unit No.	Practical Exercises (outcomes in Psychomotor Domain)	Teaching Hours
1	1	Determination of physical properties of agricultural materials e.g. size, shape, density and angle of repose of Cereals, Pulses and Oil Seeds Change in Specific Gravity, TSS, Acid of Fruits and Vegetables	06
2	2	Determination of moisture content of grains.	02
3	2	Study of different types of dryers.	04
4	3	Study of domestic grain storage structures.	04
5	3	Visit to warehouses, Packhouses and cold-storage.	04
6	4	Study of different packaging materials.	04
7	4	Study of material conveying equipments.	04
		Total	28

7. LIST OF STUDENT ACTIVITIES:

1. Physical properties of agricultural materials: size, shape, density and angle of repose.
2. Determine moisture content of grain.
3. Determination of Change in Specific Gravity, TSS, Fruit Firmness and Acid of Fruits and Vegetables during Storage.

8 SUGGESTED LEARNING RESOURCES

A. List of Books

Sr No.	Title Of Book	Author	Publication
1	Post Harvest Technology of Cereal, Pulses, Oil seeds	A.Chakraverty	Oxford & IBH Publication Co.
2	Unit operation of Agro Processing Engineering	Dr.K.M. Sahay& K.K Singh	Vikas Publications.
3	Post Harvest Technology of fruits & Vegetables	Thompson	CBS Publishers and Distributors
4	Post Harvest (Introduction Physiology Handling fruits & Vegetables)	Wills R.B.H.	Oxford & IBH Publication Co.

B. List of Major Equipment/ Instrument

- Hot air oven
- Weighing balance(100kg)
- Set of Refractometers
- Fruit Firmness Tester

C. List of Software/Learning Websites

- <http://www.agricoop.nic.in/dacdivision/mmsoil280311.pdf>
- <http://ecoursesonline.iasri.res.in/>