

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: VII
FOOD PROCESSING TECHNOLOGY

Subject Name: **Controlled and Modified Atmosphere Storage Engineering**
 Subject Code: **171407**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
3	0	2	5	70	30	30	20

Sr. No	Course Content	Total Hrs.
1.	Storage Environment and Shelf-life of durable and perishable food products – effect of temperature, humidity, season, moisture, respiration, maturity, delay.	05
2.	Introduction: CA and MA Storage history and practices.	02
3.	Effects and Interactions of CA Storage: Carbon Dioxide and Oxygen Damage, High Oxygen Storage, Carbon Dioxide Shock Treatment, Total Nitrogen and High Nitrogen Storage, Ethylene, Carbon Monoxide, Temperature, Humidity, Delayed CA Storage, Interrupted CA Storage, Residual Effects of CA Storage.	10
4.	Controlled Atmosphere Technology: Temperature & Humidity Control, Gas Control Equipment, Oxygen Control, Carbon Dioxide Control, Generating Equipment and measurement, Static & Dynamic CA, Fruit Ripening, Hypobaric and Hyperbaric Storage.	09
5.	Flavours, Quality & Physiology of Stored Products: Flavour, off-flavours, Quality Measurement, Acidity, Nutrition, Respiration Rate, Physiological Disorders.	04
6.	Modified Atmosphere Packaging: Film & Coating types, Permeability, Gas Flushing, Perforation, Adjustable Diffusion Leak, Absorbents, Humidity, Temperature, Chilling Injury, Shrink-wrapping, Vacuum Packing, Modified Interactive Packaging, Minimal Processing, Equilibrium Modified Atmosphere Packaging, Effect of scavengers, Some MA Packaging Recommendations.	10

7.	Transport Systems: CA Transport Technology, CA Containers, Hypobaric Containers, MA Packaging and Transport.	04
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Reference Books:

1. Controlled Atmosphere Storage of Fruits & Vegetables, A. Keith Thompson, 2nd edition, 1998.
2. Modified and Controlled Atmosphere for Storage, Transportation and Packaging of Horticultural Products, by Ethadi M Yahia, CRC Press.
3. Non-thermal Preservation of Foods, Enrique Palou, CRC Press; 1 edition, 1997.
4. Modified Atmosphere Packaging – Present and future uses of gas absorbents and generators, Smith JP, Abe Y, Hoshino J (1995).
5. Handling, Transportation, and Storage of Fruits and Vegetables: Fruits and tree nuts, Albert Lloyd Ryall, Werner J. Lipton, Wilbur Tibbils Pentzer.
6. Post-Harvest Diseases & Disorders of Fruits & Vegetables Volume I, By Anna L. Snowdon.