



GUJARAT TECHNOLOGICAL UNIVERSITY

BACHELOR OF ENGINEERING SYLLABUS

Subject Code: 3155103

Subject Name: Fruits and Vegetables Process Engineering

WEF Academic Year:	2023-24
Semester:	5
Category of the Course:	Professional Core

Prerequisite: Nil

Rationale: To acquaint and equip the students with processing of fruits and vegetables and the design features of the equipments used for their processing.

Course Scheme:

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Practical		
				ESE (E)	PA(M)	ESE (V)	PA (I)	
4	0	2	5	70	30	30	20	150

Course Content:

Sr. No.	Course Content	No. of Hours	% of Weightage
1	UNIT I Importance of post-harvest technology of fruits and vegetables, structure, cellular components, composition and nutritive value of fruits and vegetables, fruit ripening, spoilage of fruits and vegetables.	12	20
2	UNIT II Harvesting and washing, pre-cooling, preservation of fruits and vegetables, blanching, commercial canning of fruits and vegetables, minimal processing of fruits and vegetables.	10	20
3	UNIT III Cold storage of fruits and vegetables, controlled atmosphere packaging of fruits and vegetables, gas composition, quality of storage.	8	20
4	UNIT IV Dehydration of fruits and vegetables, methods, osmotic dehydration, foam mat drying, freeze drying, microwave heating, applications, radiation preservation of fruits and vegetables, irradiation sources.	8	20
5	UNIT V Intermediate moisture foods, ohmic heating principle, high pressure processing of fruits and vegetables, applications, sensory evaluation of fruit	12	20



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	and vegetable products, packaging technology for fruits and vegetables, general principles of quality standards and control, FPO, quality attributes.		
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Reference Book:

- 1) Cruess WV. 2000. Commercial Fruit and Vegetable Products. Agrobios.
- 2) Mircea Enachescu Danthy. 1997. Fruit and Vegetable Processing. International Book Publ.
- 3) Srivastava RP & Sanjeev Kumar. 1994. Fruit and Vegetable Preservation. Principles and Practices. International Book Distr.
- 4) Sumanbhatti & Uma Varma. 1995. Fruit and Vegetable Processing. CBS.
- 5) Thompson AK. 1996. Post Harvest Technology of Fruits and Vegetables. Blackwell.
- 6) Verma LR & Joshi VK. 2000. Post Harvest Technology of Fruits and Vegetables. Vols. I-II. Indus Publ.

Course Outcome :

After Completion of the Course, Student will able to :

No	Course Outcomes	RBT Level*
01	Identify the basic structure and importance of engineering properties of fruits and vegetables	RM
02	Understand different physical, thermal, frictional and aerodynamic properties of fruits and vegetables and its application in food processing operations.	UN
03	Apply the rheological physical properties of fruits and vegetables to design equipments.	AP
04	Discriminate between various fruits and vegetables based on its rheological state such Newtonian and non-Newtonian fluids.	AN
05	Develop food equipments based on thermal, electrical and magnetic properties of fruits and vegetables	EL

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

Suggested Course Practical List :

- 1) Determination of the size, shape, sphericity of fruits and vegetables.
- 2) Determination of roundness and roundness ratio of fruits and vegetables.
- 3) Determination of density, area-volume-mass relationship of fruits and vegetables.
- 4) Determination of bulk density, true density and porosity of fruits and vegetables.
- 5) Evaluation of washer, grader and packaging methods.
- 6) Experiments on drying of fruits and vegetables.
- 7) controlled atmosphere storage and quality evaluation.



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List of Laboratory/Learning Resources Required :

Equipment:

- 1) Digital Vernier Calipers
- 2) Weighing balance
- 3) Terminal velocity measurement set up with Anemometer
- 4) Brookfield viscometer
- 5) Hunter colorimter

List of Open Source Software/learning website:

- 1) <https://agrimoon.com/wp-content/uploads/Engineering-Properties-of-Biological-Materials-and-Food-Quality.pdf>
- 2) https://ecourses.icar.gov.in/e-Learningdownload3_new.aspx?Degree_Id=04