



# GUJARAT TECHNOLOGICAL UNIVERSITY

**Program Name: Bachelor of Vocation**

**Level: Under Graduate**

**Branch: Food Processing and Quality Control**

**Course / Subject Code: BV05009011**

**Course / Subject Name: Processing of Cereals Pulses and Oilseeds**

w. e. f. Academic Year:	2026-2027
Semester:	05
Category of the Course:	Core Courses

<b>Prerequisite:</b>	Provide basic knowledge for processing of cereals, pulses and oilseeds using different operations and machineries
<b>Rationale:</b>	This course provides fundamental knowledge of post-harvest processing of grains, cereals, pulses and oilseeds. It covers principles and equipment used in cleaning, grading and separation, size reduction and material handling operations. The syllabus includes rice milling technology, milling of wheat, pulses and corn, and oilseed processing methods such as mechanical expression, solvent extraction and refining. Overall, the course develops essential technical understanding of grain processing and milling operations for applications in food and agro-processing industries.

## Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes
01	Understand and explain the principles of cleaning, grading and separation of grains, including aspiration, scalping, size separation, screens and sieve analysis.
02	Identify and differentiate between various grain separation equipment.
03	Apply the principles and laws of size reduction (Kick's law, Rittinger's law and Bond's law) to analyze crushing, impact, cutting and shearing operations.
04	Describe the construction, working and applications of size reduction and material handling equipment, including jaw crusher, hammer mill, plate mill, ball mill, conveyors, bucket elevators and pneumatic conveying systems.
05	Explain the technology of rice milling, including conditioning, parboiling methods, advantages and disadvantages, traditional and modern rice milling operations and equipment.
06	Understand and compare the milling and processing techniques of wheat, pulses, corn and oilseeds, including pre-conditioning, dry and wet milling, mechanical expression, solvent extraction, oil refining and rice bran stabilization.



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## Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
3	0	0	3	50	0	0	0	50

## Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	<b>Cleaning and Separation of Grains</b> Cleaning and grading, aspiration, scalping; size separators, screens, and sieve analysis. Various types of separators: specific gravity, magnetic, disc, spiral, pneumatic and colour sorters	08	15
2.	<b>Size Reduction and Material Handling Equipment</b> Size reduction: principle, Bond's law, Kick's law, Rittinger's law, procedure (crushing, impact, cutting and shearing), Size reduction machinery: Jaw crusher, Hammer mill, Plate mill, Ball mill. Material handling equipment. Types of conveyors: Belt, roller and chain. Bucket elevator and Pneumatic conveying.	12	25
3.	<b>Rice Milling Technology</b> Milling of rice: Conditioning and parboiling, advantages and disadvantages, traditional methods, parboiling method, Types of rice mills, Modern rice milling, different unit operations and equipment	08	20
4.	<b>Milling of Wheat, Pulses and Corn</b> Milling of wheat, unit operations and equipment. Milling of pulses: traditional milling methods, commercial methods, pre-conditioning, dry milling and wet milling of corn.	09	20
5.	<b>Milling and Processing of Oilseeds</b> Milling of oilseeds: mechanical expression, screw press, hydraulic press, solvent extraction methods, preconditioning of oilseeds, refining of oil, stabilization of rice bran.	08	20
<b>Total</b>		<b>45</b>	<b>100</b>



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## Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
25	15	10	0	0	0

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

## References/Suggested Learning Resources:

### (a) Books:

1. Chakraverty, A. Post Harvest Technology of cereals, pulses and oilseeds. Oxford & IBH publishing Co. Ltd., New Delhi.67
2. Dash, S.K., Bebartta, J.P. and Kar, A. Rice Processing and Allied Operations. Kalyani Publishers, New Delhi.
3. Sahay, K.M. and Singh, K.K. 1994. Unit operations of Agricultural Processing. Vikas Publishing house Pvt. Ltd. New Delhi.
4. Geankoplis C. J. Transport processes and unit operations, Prentice Hall of India Pvt Ltd, New Delhi
5. Earle, R.L. 2003. Unit Operations in Food Processing. Pergamon Press. Oxford. U.K.
6. Henderson, S.M., and Perry, R. L. Agricultural Process Engineering, Chapman and hall, London
7. McCabe, W.L., Smith J.C. and Harriott, P. Unit operations of Chemical Engineering. McGraw Hill.
8. Singh, R. Paul. and Heldman, R.Dennis. 2004. Introduction to Food Engineering. 3rd Edition. Academic Press, London.
9. Brooker, D.B., Bakker-Arkema, F.W., Hall, C.W. 1992. Drying and storage of grains and oilseeds, AVI publication

### (b) Open-source software and website:

1. <https://nptel.ac.in/courses/126/103/126103017/>
2. [https://www.youtube.com/watch?v=ZwBoZVrZxbk&list=PL2E9\\_TIQKsGRQy05HBihSowy1WP9HBtdy](https://www.youtube.com/watch?v=ZwBoZVrZxbk&list=PL2E9_TIQKsGRQy05HBihSowy1WP9HBtdy)
3. <https://www.digimat.in/nptel/courses/video/126105011/L12.html>
4. <https://nptel.ac.in/courses/126105015/>

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