



# GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Chemical Engineering

Subject Code: DI04005091

Subject Name: Sugar and Food Technology

<b>w. e. f. Academic Year:</b>	2025-26
<b>Semester:</b>	4 <sup>th</sup>
<b>Category of the Course:</b>	Professional Elective - II

<b>Prerequisite:</b>	This course covers the fundamentals of manufacturing sugar and some key food items like dairy products, bakery products and beverages.
<b>Rationale:</b>	Food manufacturing in India is arising as a large manufacturing sector covering a very wide range of prepared foods. The modern food processing and preservation industry was born in 1800s. This technology course enables the student to apply principles of engineering and science to operate food processing facilities for producing foods in large quantities and with narrow tolerances to deliver the consumers high quality, safe and healthy foods. Diploma engineers may utilize their skills to read and recognize each steps of manufacturing process flow diagrams and to operate various equipments involved

### Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Use concepts in manufacturing sugar and food	R, U
02	Operate raw and refined sugar manufacturing plant.	A
03	Prepare dairy products	U, A
04	Prepare bakery products and beverages	U, A

\*Revised Bloom's Taxonomy (RBT)

### 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(M)	PA(I)	ESE (V)	
3	0	2	4	70	30	20	30	150



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## Course Content:

Unit No.	Content	No. of Hours	% of Weightage
<b>Unit – I</b> <b>Introduction to Sugar and Food Industries</b>	1.1 History of Sugar and Food Industries 1.2 Physical and chemical properties of Sucrose/sugar 1.3 Brief idea of byproducts - molasses, bagasse and filter mud 1.4 Sugar factories in India 1.5 Importance of Food Industry 1.6 Types of Food Industry 1.7 Food processing techniques 1.8 Food processing equipments 1.9 Food storage	7	16
<b>Unit – II</b> <b>Sugar Production</b>	2.1 Raw Sugar manufacturing from sugarcane 2.1.1 Processes involved in sugar manufacturing 2.1.2 Milling operation 2.1.3 Clarification/ Purification 2.1.3.1 Need 2.1.3.2 Carbonation process 2.1.3.3 Supination process 2.1.4 Filtration 2.1.5 Concentration/Saturation 2.1.6 Crystallization 2.1.7 Centrifuging 2.1.8 Drying 2.1.9 Bagging 2.1.10 Refining of sugar 2.1.11 Beet sugar manufacturing	12	30
<b>Unit – III</b> <b>Equipments For Sugar Production</b>	3.1 Major Equipment for Sugar Production 3.1.1 Crushers 3.1.2 Pressure mills 3.1.3 Shredders 3.1.4 Filter Press 3.1.5 Evaporators 3.1.6 Crystallizers 3.1.7 Centrifuge 3.1.8 Vacuum pump	8	17



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<b>Unit-IV</b>  <b>Dairy Products</b>	4.1 Milk and its composition 4.2 Methods of preparation of pasteurized milk 4.3 Preparation of milk powder 4.4 Brief study of cream and butter 4.5 Classification and composition of cheese 4.6 Preparation of cheese	7	<b>14</b>
<b>Unit – V</b>  <b>Bakery products And Beverages</b>	5.1 Baking Industry 5.1.1 Raw materials used in baking industries 5.1.2 Various equipment used in baking Industries 5.1.3 Manufacturing of bread 5.2 Beverages 5.2.1 Preparation of non-alcoholic carbonated beverages 5.2.2 Beverage syrup manufacturing 5.2.3 Bottling of Carbonated Beverages 5.3 Manufacturing of wine 5.4 Manufacturing of Beer	11	<b>23</b>
<b>Total</b>		<b>45</b>	<b>100</b>

### Suggested Course Practical List:

Sr. No.	Practical/Exercise (Course Outcomes in Psychomotor Domain according to NBA Terminology)	Approx. Hrs Required
1.	To determine moisture content of sugar	2
2.	To determine ash content of sugar	2
3.	To measure the pH of sugar solution	2
4.	Determination of POL by polarimeter	2
5.	To find solid content in juice by brix hydrometer	2
6.	To Analyse baggase	2
7.	Prepare a chart showing unit operations and major equipments used in sugar industries	2
8.	Prepare a chart showing unit operations and major equipments used in various food industries	2
9.	To find out specific gravity and fat content of milk sample	2
10.	To prepare cheese from milk	2
11.	To prepare butter milk and butter	2
12.	To prepare loaf bread	2
13.	Study of equipments used in sugar factory- Crusher, Shredder, Mills	2



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14.	Study of equipments used in sugar factory- Evaporators, Crystallizer	2
15.	Preparation of non – alcoholic carbonated beverages	2
		<b>30</b>

## Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
32%	36%	32%	-	-	-

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:

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
1	Dryden's outline of Chemical Technology, 3 <sup>rd</sup> edition	M. Gopala Rao, Marshall Sittig	Affiliated East West Press (Pvt) Ltd-New Delhi
2	A Textbook of Chemical technology Vol-1 and Vol-2, 2 <sup>nd</sup> edition	G.N. Pandey and Shukla	Vani Books Company -Hyderabad
3	Shreve's Chemical Process Industries, 5 <sup>th</sup> edition	George T. Austin	McGraw Hill publication –New Delhi
4	Handbook of Cane sugar technology, 2 <sup>nd</sup> edition	R.B.L. Mathur	Oxford and IBH publishing
5	Hand book of cane sugar engineering , 3 <sup>rd</sup> edition,	E. Hugot	Elsevier science



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## Suggested Activities for Students:

Following is the list of proposed student activities. These could be individual and group based.

1. Course/topic based presentation
2. Internet based assignment
3. Teacher guided self-learning activity
4. MCQ/Quiz

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