Gyanmanjari Innovative University

Course Syllabus
Gyanmanjari Diploma Engineering College
Semester 4 (Diploma)

Subject: Sugar and Food Industry- DETCH14211

Type of course: Minor

Prerequisite: Basic knowledge of Food Industry.

Rationale: Food processing in India is growing as a large production industry covering a very wide range of ready/semi ready to eat foods. The modern food processing and preservation industry was born in 1800s. This course covers the fundamentals of manufacturing sugar and some key food items like dairy products, bakery products and beverages. 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 on parameters of standards to deliver the consumers high quality, safe and healthy foods. Diploma engineers may utilize their skills to interpret each steps of manufacturing process flow diagrams and to supervise operation of various equipment/processes involved.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P	C	Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
3	0	2	4	60	30	10	20	30	150

Legends: CI - Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Course Content:

Sr. No.	Course content	Hrs	Weightage
1	**Introduction** Physical and chemical properties of Sucrose/sugar, Byproducts - molasses, bagasse and filter mud, Types of Food Industry, Food processing techniques, Food processing and storage.	10	40%

2	**Sugar Production Processes** Raw sugar from sugarcane, Milling Operation, Clarification/Purification, Carbonation process, Sulphitation process, Filtration, Concentration/ Saturation, Crystallization, Centrifuging, Drying and Bagging, Refining of sugar, Beet sugar manufacturing.	15	20%
3	**Dairy Products** Milk and its composition, Methods of preparation of pasteurized milk, Preparation of milk powder4.4 Cream and butter, composition and preparation of cheese	10	20%
4.	**Bakery products and Beverages** Baking Industry, raw materials used in baking industries, Equipment used in baking industries, Manufacturing of bread, Non–alcoholic Beverages, carbonated beverages, Beverage syrup manufacturing, Bottling of Carbonated Beverages, Manufacturing of wine and beer	10	20%

Continuous Assessment:

Sr. No.	Active Learning Activities	Marks
1.	**Environmental Impact:** Each student will be given a particular Chemical industry. Student needs to find the environmental impact of that industry. Students have to upload a report on GMIU web portal.	10
2.	**Daily Life Application:** Students need to write a short note on Beverages and its consumption in day to day life. Students have to upload it on the GMIU web portal.	10
3.	**Scientific analysis:** Faculty will give a particular topic to each student. Students need to prepare an analysis report and submit on GMIU web portal.	10
Total		30

Suggested Specification table with Marks (Theory): 60

Distribution of Theory Marks (**Revised Bloom's Taxonomy**)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20%	15%	20%	15%	20%	10%

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.

Course Outcome:

After learning the course the students should be able to:	
CO1	Characterize sugar and food industries.
CO2	Recognize raw and refine sugar manufacturing plant.
CO3	Understand production process of dairy products.
CO4	Explain manufacturing processes of bakery products and beverages.

LIST OF PRACTICALS:

Sr. No.	Practical	Unit	Hours
1	Determine moisture content in sugar crystals	1	2
2	Determine ash content in sugar crystals	1	2
3	Measure the pH of sugar solution	2	2
4	Determine POL by polarimeter	2	2
5	Organic separation of glucose	2	4
6	Determination of sugar content using fehling's test	2	4
7	Prepare chart showing unit operations and major equipments used in sugar industries	2	4
8	Prepare the chart showing unit operations and major equipments used in various food industries	4	4
9	Methods of preparation of pasteurized milk	3	2
10	Prepare cheese from milk	3	4
Total			30

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

[1] Dryden's Outlines of Chemical Technology, M.Gopal Rao, Marshall Sitting, Affilated East-West Press Pvt. Ltd. - New Delhi, 3rd Edition.
[2] A Textbook of Chemical Technology Vol-1 and Vol-2, G.N. Pandey and Shukla, Vani Books Company –Hyderabad, 2nd Edition.
[3] Shreves' Chemical Process Industries, George T. Austin, McGraw-Hill Education India Pvt. Ltd - New Delhi, 5th Edition.
[4] Handbook of Cane Sugar Technology, R.B.L. Mathur, Oxford and IBH publishing, - New Delhi, 2nd Edition.
[5] Hand book of Cane Sugar Engineering, E. Hugot, Elsevier science, 3rd Edition.