Gyanmanjari Innovative University

Syllabus
Gyanmanjari Science College
Semester-7 (B.Sc.)

Subject: Food Processing Technology - BSCFT17402

Type of course: Major

Prerequisite: Students should have basic knowledge of food science, elementary biology, and an introductory understanding of food commodities and processing principles.

Rationale: This course provides an understanding of food processing operations, preservation techniques, safety standards, and modern technologies used in the food industry for producing safe and value-added food products.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				SEE		CCE			
CI	T	P	C	Theory	Practical	MSE	LWA/V	ALA	
3	0	2	4	75	25	30	20	50	200

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.

3 Credits * 25 Marks = 75 Marks (each credit carries 25 Marks) Theory
1 Credits * 25 Marks = 25 Marks (each credit carries 25 Marks) Practical
SEE 100 Marks will be converted in to 50 Marks
CCE 100 Marks will be converted in to 50 Marks
It is compulsory to pass in each individual component.

GYANMANJARI INNOVATIVE UNIVERSITY BHAVNAGAR

Course Content:

Unit No.	Course content	Hrs	% Weightage
1	**Food Processing Equipment & Engineering Aspects** • Properties of foods relevant to processing (thermal, physical, rheological) • Equipment used in food industries: 1. Heat exchangers, dryers, evaporators, extruders 2. Mechanical & plant aspects • Basic food engineering operations: Size reduction, mixing, filtration, fermentation and enzyme technology • Energy efficiency and sustainability in food processing	10	25
2	**Processing of Plant-Based Foods** • Cereals and pulses processing: • Milling, polishing, parboiling • Fruits and vegetables processing: Canning, dehydration, pickling, jam and jelly • Oil extraction and refining • Sugar and starch processing • By-product utilization (Rice husk, Bagasse, Oil cake)	10	25
3	**Processing of Animal-Based Foods** • Dairy processing: Pasteurization, homogenization, fermented products • Meat, poultry, and fish processing: Chilling, freezing, curing, smoking • Egg processing and preservation (Whole egg preservation, Thermostabilization, Liquid/Dried Eggs) • Quality evaluation (Organoleptic evaluation) and Post-processing operations	10	25
4	**Advanced Processing & Food Safety Systems** • Emerging Processing technologies: 1. High Pressure Processing (HPP) 2. Irradiation 3. Modified Atmosphere Packaging (MAP) • Food additives and functional ingredients • Food safety and quality systems: Hazard Analysis and Critical Control Points (HACCP) • Indian regulatory framework: Food Safety and Standards Authority of India	15	25

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	**HACCP Hazard Identification Exercise** Students identify possible hazards (biological, chemical, physical) in a selected food product line and prepare a basic Hazard Analysis and Critical Control Point plan and upload it to GMIU web portal.	10
2	**Presentation** Each Student presents on a modern food processing technology such as High Pressure Processing, Modified Atmosphere Packaging, or Irradiation and discusses its industrial applications and upload it to GMIU web portal.	10
3	**Process Flow Chart & Report Preparation Activity** Students prepare a process flow chart for any one food product (e.g., jam, pickles, milk, or biscuits) showing all unit operations involved. Along with the chart, they submit a brief report explaining each step, processing conditions, and upload it to GMIU web portal.	10
4	**Case Study Analysis (Food Industry Problem)** Students analyze a real-life case of food spoilage or processing failure (e.g., milk contamination or canned food spoilage) and suggest corrective processing and safety measures and upload it to GMIU web portal.	10
5	**Attendance**	10
Total		**50**

Suggested Specification table with Marks (Theory):75

Distribution of Theory Marks **(Revised Bloom's Taxonomy)**						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20%	40%	30%	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	Understand the properties of foods relevant to processing and explain basic food engineering operations such as size reduction, mixing, filtration, and evaporation.
CO2	Analyze the role of processing methods in improving quality, shelf-life, and utilization of by-products in plant-based food systems.
CO3	Describe quality control methods and analyze spoilage processes in animal-derived foods.
CO4	Explain food safety systems including HACCP and regulatory standards of FSSAI with emphasis on packaging innovations and shelf-life improvement.

List of Practical:

Sr. No.	Descriptions	Unit No.	Hrs.
1.	To determine microbial contamination on food contact surfaces.	1	4
2.	To study fungal growth and spoilage in bread.	1	2
3.	To study the effect of pasteurization on microbial load in milk.	2	4
4.	To estimate the vitamin C (ascorbic acid) content in fruit juice by dye titration method using 2,6-dichlorophenol indophenol (DCPIP).	3	2
5.	To prepare jam and study preservation by sugar concentration.	3	4
6.	To study the antimicrobial effect of salt and sugar on the growth of food spoilage microorganisms.	3	2
7.	To prepare tomato ketchup/sauce and study the preservation process involved in its production.	3	4
8.	To determine the microbial quality of fruit juice samples by estimating the total viable microbial count using the standard plate count method.	3	2
9.	To study the effect of different preservatives (such as salt, sugar, and vinegar) on the growth of microorganisms in food samples.	4	2
10.	Isolation of Lactic Acid Bacteria from Curd/Yogurt	4	4
Total		30	

Instructional Method:

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

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

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

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 the laboratory.

Reference Books:

1. Fellows, P. J. (2009). *Food processing technology: Principles and practice* (3rd ed.). Woodhead Publishing.
2. Singh, R. P., & Heldman, D. R. (2014). *Introduction to food engineering* (5th ed.). Academic Press.
3. Damodaran, S., Parkin, K. L., & Fennema, O. R. (Eds.). (2007). *Fennema's food chemistry* (4th ed.). CRC Press.
4. Ranganna, S. (2001). *Handbook of analysis and quality control for fruit and vegetable products* (2nd ed.). Tata McGraw-Hill.
5. Potter, N. N., & Hotchkiss, J. H. (1998). *Food science* (5th ed.). Springer.
6. Jay, J. M., Loessner, M. J., & Golden, D. A. (2005). *Modern food microbiology* (7th ed.). Springer.
7. Alli, I. (2003). *Food quality assurance: Principles and practices*. CRC Press.
8. Saravacos, G. D., & Kostaropoulos, A. E. (2002). *Handbook of food processing equipment*. Springer.
9. Coles, R., McDowell, D., & Kirwan, M. J. (Eds.). (2003). *Food packaging technology*. Blackwell Publishing.
10. Heldman, D. R., & Singh, R. P. (2013). *Food process engineering and technology* (2nd ed.). Academic Press.