



FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

Programme: Bachelor of Technology (Food Processing Technology)

Semester: VI

Course Code: 202070606

Course Title: Food Fermentation Technology

Course Group: Professional Elective Course - II

Course Objectives: Food Fermentation Technology involves concepts pertaining to preparation of microorganisms for large scale fermentation, and preparation of biomass, enzymes, starter culture, metabolites, alcohols and spirits. It also helps in developing understanding to optimize the fermenter design and type.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
3	0	2	4	50/18	50/17	25/9	25/9	150/53

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Preparation of inoculum for large scale propagation: Types of Fermentations, Media- composition, Strain improvement.	08
2	Microbial biomass and metabolites: Microbial Production of enzymes, therapeutics, acids, starter culture, oriental foods. Genetic regulation of metabolites, concept of operon (Lac, Trp)	09
3	Design of a fermenter: Design of a Fermenter, Temperature controls, Sterilization, Aeration and agitation systems, Baffles, Valves and steam traps	10
4	Wine Production: Classification, Details of processes like Maceration, Primary Fermentation, Secondary fermentation, Aging/Maturation	10
5	Beer Production: Classification, raw materials, Details of processes like Malting, Mashing, Wort preparation, fermentation, bottling etc.	09
	Total	45



List of Practicals / Tutorials:

1	To determine amount of gas produced by yeast during fermentation
2	To determine the type of gas produced by yeast during fermentation
3	To prepare cabbage based traditionally fermented food: Sauerkraut
4	To study the effect of agitation on microbial growth in batch fermentation
5	To study the sugar utilization patterns by microorganisms
6	To evaluate exopolysaccharide production by microorganisms
7	To screen starch hydrolytic microorganisms from given sample
8	To determine β -galactosidase activity of microorganisms
9	To study given culture for its starter activity
10	To prepare fermented vegetable pickle
11	Open ended problem: purification of chymosin

Reference Books:

1	Principles of Fermentation Technology By P.F. Stanbury, A. Whitaker, and S.J. Hall
2	Industrial Microbiology by A.H. Patel.
3	Biochemical Engineering fundamentals by Jones E. bailey and David F. Ollis Mac Grawhill.
4	Microbial Technology- Fermentation Technology- Volume 2 by D. Perlman and Henry J Pepler, Elsevier Science.
5	“Biotechnology: Volume 1: Food Fermentation Microbiology, Biochemistry and Technology” by V K Joshi

Supplementary learning Material:

1	Wang, N.; Xiong, Y.; Wang, X.; Guo, L.; Lin, Y.; Ni, K.; Yang, F. Effects of <i>Lactobacillus plantarum</i> on Fermentation Quality and Anti-Nutritional Factors of Paper Mulberry Silage. <i>Fermentation</i> 2022, 8, 144. https://doi.org/10.3390/fermentation8040144
2	Fermentation Microbiology and Biotechnology, E.M.T. El-Mansi , F. Bruce Ward , Brian S. Hartley , Arun P. Chopra. ISBN: 9781439855799
3	https://cdn.copcap.com/hubfs/Downloads/Fact%20Sheets/Food_and_fermentation.pdf

Pedagogy:

- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment
- Interactive methods
- Industrial/ Field visits
- Course Projects

Internal Evaluation:

The internal evaluation comprised of written exam (40% weightage) along with combination of various components such as Certification courses, Assignments, Mini Project, Simulation, Model making, Case study, Group activity, Seminar, Poster Presentation, Unit test, Quiz, Class Participation, Attendance, Achievements etc. where individual component weightage should not exceed 20%.



Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
15%	40%	25%	15%	5%	0%	

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 Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Application and improvement of particular strains for production of metabolites during fermentation	15
CO-2	Understand the significance and processes involved in production of microbial biomass and metabolites (alcohols, therapeutics, enzymes) of industrial and therapeutic application	20
CO-3	Know the basic design considerations of industrial fermenter	20
CO-4	Understand process technology for manufacture of wine	25
CO-5	Understand process technology for manufacture of Beer	20

Curriculum Revision:

Version:	2
Drafted on (Month-Year):	June-2022
Last Reviewed on (Month-Year):	
Next Review on (Month-Year):	June-2025