

Department of Food Sciences
University of the Punjab, Lahore
Course Outline



Programme	B.Sc. (Hons.) Food Science & Technology	Course Code	FST – 409	Credit Hours	3 (2-1)
Course Title	FOOD BIOTECHNOLOGY				
Course Introduction					
The course will provide:					
<ol style="list-style-type: none"> 1. Basic knowledge on principle of food fermentation 2. Basic knowledge of enzyme technology 3. Understanding of specific process related to food bio processing 4. Basic knowledge of value addition during food manufacturing 					
Learning Outcomes					
After completing this course students will be able to:					
<ol style="list-style-type: none"> 1. Understand fermentation process and how it enhances nutritional profile of product 2. Describe basic safety aspects of fermentation 3. Describe enzyme action and main classes 					
Course Content					Assignments/Readings
Week 1	Unit-I				
	1.1 Biotechnology				
	1.2 Introduction				
Week 2	1.3 History				
	Unit-II				
	2.1 Microbial metabolism				
Week 3	2.2 Development in metabolic				
	Unit-III				
3.1 Biochemical engineering					

	3.2 Metabolites	
Week 4	Unit- IV 4.1 range of fermentation processes	
	4.2 Components of fermentation process	
Week 5	Unit-V 5.1 Isolation of industrially important microorganisms	
	5.2 Preservation of industrially important microorganisms	
Week 6	Unit-VI 6.1 Industrial fermentation	
	6.2 Media preparation	
Week 7	Unit-VII 7.1 Design and type of fermenters	
	7.2 Process variables in fermenters	
Week 8	Unit-VIII 8.1 Recovery purification of fermentation products	
	8.2 Production of organic acids	
Week 9	Unit-IX 9.1 Production of enzymes	
	9.2 Production of amino acids	
Week 10	Unit-X 10.1 Production of single cell protein	

	10.2 Production of carotenoids	
Week 11	Unit-XI 11.1 Fermented food products	
	11.2 Microbial genetics	
Week 12	Unit-XII 12.1 Conjugation	
	12.2 Transduction	
Week 13	Unit-XIII 13.1 Transformation	
	13.2 GMO in food biotechnology	
Week 14	Unit-XIV 14.1 Legal aspects of food biotechnology	
	14.2 Social aspects of food biotechnology	
Week 15	Revision	
	Revision	
Week 16	Revision	
	Revision	
PRACTICAL		
Week 1	Isolation, purification and maintenance of yeast and bacterial cultures.	
Week 2	Isolation, purification and maintenance of yeast and bacterial cultures.	

Week 3	Isolation, purification and maintenance of yeast and bacterial cultures.	
Week 4	Isolation, purification and maintenance of yeast and bacterial cultures.	
Week 5	Isolation, purification and maintenance of yeast and bacterial cultures.	
Week 6	Isolation, purification and maintenance of yeast and bacterial cultures.	
Week 7	Isolation, purification and maintenance of yeast and bacterial cultures.	
Week 8	Isolation, purification and maintenance of yeast and bacterial cultures.	
Week 9	Fermentation aerobic and anaerobic fermentation and production of various fermented food products.	
Week 10	Fermentation aerobic and anaerobic fermentation and production of various fermented food products.	
Week 11	Fermentation aerobic and anaerobic fermentation and production of various fermented food products.	
Week 12	Fermentation aerobic and anaerobic fermentation and production of various fermented food products.	
Week 13	Fermentation	

	aerobic and anaerobic fermentation and production of various fermented food products.		
Week 14	Fermentation aerobic and anaerobic fermentation and production of various fermented food products.		
Week 15	Fermentation aerobic and anaerobic fermentation and production of various fermented food products.		
Week 16	Fermentation aerobic and anaerobic fermentation and production of various fermented food products.		
Textbooks and Reading Material			
<ol style="list-style-type: none"> 1. El-Mansi, F.M.T, Bryee, C.F.A, Demain, A.L. & Allman, A.R. (2019). Fermentation Microbiology and Biotechnology. (4th ed.). CRC Press, Taylor & Francis Group, Boca Raton, Florida, USA. 2. Shetty, K., Paliyath, G, Pometto, A. & Levin, RE. (2005). Food Biotechnology. Marcel Dekker Inc., New York, USA. 3. Borem, A., Santos, F.R. & Bowen, D.E. (2004). Understanding Biotechnology. Pearson Education Inc., New Jersey, USA. 			
Teaching Learning Strategies			
Teaching will be a combination of class lectures, class discussions, and group work. Short videos/films will be shown on occasion.			
Assignments: Types and Number with Calendar			
The sessional work will be a combination of written assignments, class quizzes, presentation, and class participation/attendance.			
Assessment			
Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.

2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.