

Programme: M.Sc. (Biochemistry)

Course Code: BCO 113

Title of the Course: INDUSTRIAL BIOCHEMISTRY [T]

Number of Credits: 3

Effective from Academic Year: 2018-19

Prerequisites	Basic understanding of biomolecules and cell biology.	
Objective:	Develop the concepts and principles for handling, processing and managing biomolecules at commercial scale.	
Content:		
1.	Industrial bioreactor designs	(12)
1.1	Fermenters: design of fermenters, types of fermenters.	
1.2	Fermentation process, maintenance of aseptic conditions, aeration and agitation	
1.3	Fermentation: batch, fed-batch and continuous. Scale up and scale down. Solid state fermentation.	
1.4	Control of various parameters – online and offline monitoring, rheological properties of fermenter, computerization offermenter operation.	
1.5	Downstream processing, recovery and purification of fermentation products.	
2.	Food technology	(12)
2.1	Characteristics of industrial microorganisms; strain improvement; use of auxotrophic mutants; Cultivation of microorganisms.	
2.2	Processed foods – cheese, cold meats	
2.3	Fermentations – wine, beer, vinegar.	
2.4	Oriental fermented foods: Soy sauce, tofu, tempeh	
2.5	Indian fermented foods: Idli, dosa, dikhla.	
2.6	Probiotics – yoghurt/ curd	
3.	Industrial production of biochemically important products	(12)
3.1	Production of protein/ carbohydrate/ lipids	
A.	Proteins from milk and SCP; Industrially important enzymes	
B.	Production of dextrans, glucose.	
C.	Preparation of fatty acids, lecithins	
3.2	Production of pharmaceuticals/neutraceuticals/ biochemicals	
A.	Antibiotics: penicillins	
B.	Vitamins: B12.	
C.	Amino acids: lysine.	
D.	Alcohol: ethanol	
E.	Organic acid: citric acid	

Pedagogy:	Lectures/tutorials/assignments/self-study/Moodle/Video	
References/ Readings	Patel,A.H., Industrial Microbiology –McMillan India Ltd, 1st Edition	
	Frazier &Westhoff., Food Microbiology –Tata McGraw Hill Publishers, New Delhi	
	Jay,J. M., Food Microbiology	
	Apsinon,J., Total synthesis of natural products, Vol I	
	Hilditch,J.P. Industry chemistry of Fats and Waxes	
	Guenther,E., Essential Oils, Vol I	
	Furnas,C.C. (ed.) Roger's Industrial Chemistry Vol I & II	
	Agarwal& Sharma. Chemistry of Natural Products	
	Shreeve, N.&Brink,J. Chemical Process Industries	
Learning Outcomes	<ol style="list-style-type: none"> 1. Apply the principles of tools and techniques of biochemistry in various setting of industrial processes. 2. Able to develop strategies for production of various types of biomolecules. 	