Name of the Programme: M.Sc. Biotechnology

Course Code: GBT-602

Title of the Course: BIOPROCESS TECHNOLOGY

Number of Credits: 3

Effective from AY: 2022-23

Pre-requisites		
Course:	None	
Course	1) To educate students about fundamental concepts of Biop	rocess
Objectives:	technology	
	2) To study and understand related applications.	-
Content:		No. of
	MODULE I	hours
	Basic Principles of Biochemical Engineering and	
	Fermentation Processes:	
	• Isolation, screening, and preservation of industrially	
	important microbes	
	Bioreactor designs	
	Types of fermentors	
	Concepts of basic modes of fermentation: batch, fed-	15
	batch and continuous	15
	Scale up termentation processes	
	Media formulation	
	Air and media sterilization.	
	Aeration; agitation in bioprocess.	
	Measurement and control of bioprocess	
	parameters.	
	MODULE II	
	Industrial production of chemicals:	
	Strain improvement for increased field & amp; other	
	desirable characteristics	
	alcohol (beer)	15
	organic acids (citric acid)	15
	antibiotics (Penicillin)	
	amino acids (lysine)	
	<ul> <li>Application of microbes in food processing:</li> </ul>	

	manufacture of cheese and monosodium glutamate
	manufacture of cheese and monosodium glutamate         MODULE III         Downstream Processing:         Introduction, removal of microbial cells & amp; solids, bio-separation, filtration, centrifugation, sedimentation, flocculation, cell disruption, liquid-liquid extraction.         Purification by chromatographic techniques         Drying and crystallization.         Storage and Packaging.         Effluent treatment & amp; disposal.         Immobilization of microbial cells, immobilized reactors & amp; their applications
	Bioprocess for the production of biomass: yeast and     mushrooms
Pedagogy:	Lectures, tutorials, assignments.
References/	1. A. Kuila, V. Sharma (Eds.). Principles and Applications of
Readings:	<ul> <li>Fermentation Technology. John Wiley &amp; Sons, 2018.</li> <li>A. Wiseman (Ed). Topics in enzyme Fermentation technology. Topics in enzyme and fermentation biotechnology. ACS Publications, 1984.</li> <li>Fomina M., &amp; Gadd G. M. Biosorption: current perspectives on concept, definition and application. Bioresource technology, 160, 3-14, 2014.</li> <li>F. Stanbury, A. Whitaker, J.H. Stephan. Principles of fermentation technology. Butterworth Heinemann Books – Elsevier, 2003.</li> <li>G. Najafpour, Biochemical engineering and biotechnology. Elsevier, 2015.</li> <li>J.M. Coulson &amp; J.F. Richardson. Chemical engineering. Elsevier, 2017.</li> <li>J. S. Dordick (Ed.). Biocatalysts for industry. Science &amp; Business Media, 2013.</li> <li>M.C. Flickinger, Drew, S.W Encyclopedia of Bioprocess technology. Vol 1-5, 1999.</li> <li>M. M. Young (Ed) Comprehensive Biotechnology. Pergamon Press, 2019.</li> <li>P. Prave, V. Fanst, W. Sitting &amp; D.A. Sukatesh, Fundamentals of Distribute and the second sec</li></ul>
	11. K. K. Prasad & N. K. Prasad, Downstream process technology: a new horizon in Biotechnology. PHI Learning Pvt. Ltd, 2010.

	12. Trevan, M.D. Immobilized enzymes: An introduction & application	
	in biotechnology, 1980.	
Course	1. Students will gain knowledge regarding various concepts related to	
Outcomes:	Biotechnological industrial aspects.	
	2. Students shall learn about the industrial production of	
	Biotechnologically important products.	
	3. Students shall be aware of how an industry functions from a	
	biotechnological perspective.	
	4. Students shall be prepared to meet the challenges of new and	
	emerging areas of biotechnology industry.	