19BT214 MICROBIAL TECHNOLOGY

Source: *http://fermentation-microbialtechnology.blogspot.com/2017/07/fermentation-and-microbial.html*

Hours Per Week :

L	T	P	C
3	0	0	3

Total Hours :

L	T	P
45	-	-

WA/RA	SSH/HSH	CS	SA	S	BS
10	50	-	8	2	2

PREREQUISITE COURSE: Microbiology.

COURSE DESCRIPTION AND OBJECTIVES:

The objective of the course is to understand the production of commercially and therapeutically important metabolites and bioproducts like enzymes, recombinant proteins. The course also provides a fundamental knowledge of methods used in manufacturing of bioproducts.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Understand and explain the streamlining of production pro cesses for obtaining metabolites.	1,2
2	Predict the effect of nutritional and other process variables on production of bioproducts.	1,2,3,5
3	Select the required unit operations for production of bioproducts.	1,2,3
4	Develop product manufacturing process.	1, 2, 3, 4, 11

SKILLS:

- ✓ *Formulation of suitable fermentation media for commercial production of bioproducts.*
- ✓ *Production and purify antibodies.*
- ✓ *Handling and maintanence of shake flask fermentation process.*
- ✓ *Apply unit operations in industrial fermentation process for production of microbial products.*

UNIT - I **L-9**

INTRODUCTION TO INDUSTRIAL BIOTECHNOLOGY: Scope of biotechnology and industrial microbiology; Process flow sheet for overview of industrial fermentation process; Industrial media and the nutrition of industrial organisms; Criteria for the choice of raw materials used in industrial media; A brief survey of organisms.

UNIT - II **L-9**

PRODUCTION OF PRIMARY METABOLITES: Outline of processes for the production of some commercially important organic acids such as citric acid, lactic acid and acetic acid; Amino acids such as glutamic acid, phenylalanine and aspartic acid; Production of wines and spirits; Production of butanol.

UNIT - III **L-9**

PRODUCTION OF SECONDARY METABOLITES: Antibiotics - beta-lactams (penicillin), aminoglycosides (Streptomycin), macrolides (Erythromycin); Production of vitamin B12 and steroids.

UNIT - IV **L-9**

PRODUCTION OF INDUSTRIAL ENZYMES AND OTHER BIOPRODUCTS: Production of industrial enzymes such as proteases, amylases, lipases and cellulases; Production of biopesticides; Production of biofertilisers; Production of biopreservatives (nisin); Production of biopolymers (xanthan gum, PHB); Single cell protein production and its uses.

UNIT - V **L-9**

PRODUCTION OF MODERN BIOTECHNOLOGY PRODUCTS: Production of recombinant proteins having therapeutic and diagnostic applications; Production of vaccines; Production of monoclonal antibodies; Products of plants and animals obtained by modern biotechnology approaches.

TEXT BOOKS:

1. A.N. Glazer and H. Nikaido, “Microbial Biotechnology” (eBook), W.H. Freeman and Company, NewYork, 1995.
2. S. Krupanidhi, A. Venkata Narayana, D.John Babu, “Hand book of Fermentation Technology - Instant Class Notes” (eBook), Pothi.com, ISBN: 9789352352616
3. Christoph Wittmann, James C.Liao, “Industrial Biotechnology: Products and Processes”, WILEY-VCH, USA, 2017.

REFERENCE BOOKS:

1. L.E. Casida Jr., “Industrial Microbiology”, 1st edition, New Age International (P.) Ltd, 2007.
2. S.C. Presscott and C.G. Dunn, “Industrial Microbiology”, 1st edition, Agrobios (India), CBS Publication, 2004.