# COURSE CODE: MIC 410 NO. OF CREDITS: 04

# COURSE OUTCOMES (COs)

- **CO1** in-depth knowledge of the development of microbially derived products such as antibiotics, organic acids, therapeutic agents, enzymes, and vitamins.
- CO2 Role of microbes at the industrial scale for developing beverages food istaught to the students with special emphasis on entrepreneurship.
- **CO3** In-age knowledge pertaining to the use of microbes in developing chemicalalternatives of glues, gums, and plastics is imparted.

## Unit 1: Microbial fermentative products

- Organic Acid: Citric Acid, Acetic acid
- Organic Solvent: Acetone-butanol
- ➢ Beverage: Beer
- Enzyme: Protease
- Polysaccharide: Xanthan gum
- ➢ Biosurfactants
- Biopolymer: Polyhydroxyalkanoates (PHA)

## Unit 2: Production of Therapeutic agents

- Antibiotic: Streptomycin
- Amino acid: Glutamic acid
- Vitamin: Riboflavin (B2)
- > Anticancer agents
- ➢ Vaccines
- Monoclonal antibodies: Hybridoma technology

# Unit 3: Dairy Microbiology

- Fermented foods and their microbiology
- Starter cultures, significance, and production
- Steps in Cheese Production
- Evaluation and Role of Probiotics
- > Nutraceuticals

## Unit 4: Biomass production and applications

- ▶ Fungal biomass- baker's yeast and single-cell oil
- Mushroom cultivation
- ➢ Use of Algal biomass.
- Microbial production for food and feed
- Carotenoid pigments- B carotene, lycopene

# REFERENCE

EREN	ICE	lyoyal
No.	Name	Author
1.	Principles of Fermentation Technology	P F Stanbury, A Whitaker, S J Hall
2.	Topics in Enzyme & Fermentation Biotechnology	Volumes by Wisemen
3.	Preservation and Sterilisation Methods in Microbiology	Norris & Ribbons
4.	Biology of Industrial Microorganisms	A.L. Duncun
5.	Bioprocess Engineering	P.K. Ghosh
6.	Handbook of Dairy Microbiology	Getachew Osei
7.	Food and Dairy Microbiology	Getachew Osei

# WEBLINKS

e-PGPathshala:

https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=NuAs6SreCGryddEfs4kkBA==

Paper-06 Module-20 Production of fatty acids and amino acids

Paper-06 Module-21 Production of Vitamin B12, Riboflavin and Xanthan gum

Paper-06 Module-22 Technologies for production of alcoholic beverages Paper-

06 Module-23, 24 & 25 Fermentation of food and Milk

Paper-06 Module-36 Microbial biomass

Paper-06 Module-37 Production of Single cell protein

Paper-06 Module-38 Production of yeast and fungal biomassPaper-11 Module-01 & 02 Nutraceuticals

