

OBJECTIVES: To enable the students to -

- Understand the role of biotechnology in industries.
- Know the use of microbes in the preparations of food and dairy product.
- Understand the role of biotechnology in the environment such bioremediation.

COURSE:

UNIT – I: INDUSTRIAL BIOTECHNOLOGY – I

- a. Introduction to industrial biotechnology.
- b. Primary and secondary metabolic products of micro organisms.
- c. Screening, isolation and preservation of industrial microorganisms.
- d. Fermentation technology – principle, design and process. Definition of Bioreactor, Types of bioreactors – Batch, Fed- batch, Continuous.

UNIT – II: INDUSTRIAL BIOTECHNOLOGY – II

- a. Ethanol production by fermentation using Molasses, Starchy substances. Production of alcoholic beverages- Beer & Wine.
- b. Production of Citric acid by submerged & solid state fermentation.
- c. Fermentative production of microbial enzymes – Amylase & Protease and antibiotics - Penicillin.
- d. Fermentative production of foods.
- e. Fermentative production of dairy products.

UNIT – III: MEDICAL BIOTECHNOLOGY

- a. Production of health care products through r-DNA technology (insulin, hepatitis B vaccines)
- b. Production of targeted proteins – human growth hormones, – production of alpha and beta interferon's, monoclonal antibodies
- c. Good manufacturing practice, biosafety issues, bioethics
- d. IPR and patenting issues

UNIT – IV: ENVIRONMENTAL BIOTECHNOLOGY

- a. Introduction to environmental biotechnology.
- b. Energy resources – Renewable and Non-Renewable
- c. Treatment of municipal and industrial effluent
- d. Degradation of pesticides and toxic chemicals

UNIT – V: AGRICULTURAL BIOTECHNOLOGY

- a. Biopesticides and Biofertilizers (nitrogen fixing, phosphate solubilizing microorganisms)
- b. Microbial leaching
- c. Bioremediation - Biodegradation of recalcitrant compounds and the role of genetically engineered microbes.
- d. SCP – SCP organisms and production

REFERENCES:

1. Food microbiology by M.R. Adams and M.O. Moss.
2. Industrial microbiology by L.E. Casida
3. Biotechnology and IPR'S and Biodiversity by M.B. Rao and Manjula
4. Bioprocess Engineering by Shuler (Pearson education)
5. Biotechnology – U. Satyanarayana.

OBJECTIVE: To enable the student to apply the different principles of Biotechnology in the preparation of different industrial products

COURSE:

1. Production of wine using yeast
2. Production of hydrogen and biogas using cow dung
3. Production of alcohol by fermentation & estimation of alcohol by Colorimetry
4. Production of Biofertilizers (*Azolla*)
5. To determine the dissolved oxygen (DO)
6. To find out the salinity in water
7. Isolation of *Rhizobium*

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