COURSE OBJECTIVES AND COURSE OUTCOMES

T. Y. B. Sc. SEMESTER - V

MICROBIOLOGY PAPER - IV

SUBJECT: BIOPROCESS TECHNOLOGY - I (USMB504)

Sr. No.	Course Objectives	Course Outcomes
1)	**After completing this course student expected:** To differentiate between the types of fermentation processes their merits and demerits and their modifications & types of products	**After completing this course students will be able to :-** Describe different types of fermentation processes, Modes, various components of fermentation process, Categories of fermented products
2)	To learn various techniques and methods to modify the organisms to increase the bioprocess eared bye classical or recombinant DNA technology methods also reserve the cultures and have their quality control in place	Sequentially summarize strain improvement procedures types of strains, types of metabolites produced(Primary, secondary) and then can evaluate the suitability of a strain for commercial production
3)	To learn various screening methods such as primary secondary and high throughput screening to isolate various organisms from the environments & isolate mutated strains after strain improvement programme	Describe screening methods and compare between primary and secondary screening, various methods of preservation of industrially important cultures & their quality control, steps involved in inoculum development, scale up & scale down
4)	To categories the raw materials either crude or synthetic as well as determine their usage in the formulation of fermentation media by considering the following characteristics such as cost availability pre-treatment quantity required etc	Classify & describe various raw materials, their components used as ingredients in fermentation media design and hence suitably formulate an ideal fermentation medium with the help of various statistical tools
5)	To evaluate the fermentation vessels for their advantages disadvantages and hence its application in the bioprocess industry, also to enlist the parameters which are useful in monitoring and controlling the fermentation processes such as temperature pressure pH aeration agitation sterilization scale up and shutdown	Describe & evaluate the importance of various types of fermenters, their construction, applications, parameters controlling fermentation process, sterilization procedures required for fermenters, fermentation media, air, feed etc
6)	To learn various stages / steps & characteristics of traditional fermentation processes : Beer , Wine , Bakers yeast , Vinegar , Fuel alcohol Koji process for amylase production , antibiotics organic acids etc	Describe and compare traditional industrial fermentation with following aspects such as microbe used , fermentation duration, control measures used, Fermenter vessel , & special features of each of the fermentation process

COURSE OBJECTIVES AND COURSE OUTCOMES

T. Y. B. Sc. SEMESTER - VI

MICROBIOLOGY PAPER - IV

SUBJECT: BIOPROCESS TECHNOLOGY - II (USMB604)

Sr. No.	Course Objectives	Course Outcomes
1)	**After completing this course student expected:** To know various product recovery processes such as filtration centrifugation etc. & understand the merits and demerits of these methods	**After completing this course students will be able to :-** Enlist and describe various methods of product recovery in bioprocess their advantages and disadvantages , process , categories of fermented products
2)	To how to treat the industrial effluent by various biological methods such as aerobic, anaerobic as well as their modifications & various tests to determine the quality of effluent after treatment which is to be disposed in the natural environments	Describe and compare aerobic and anaerobic biological effluent treatment methods their modifications their efficacies as well as calculations of B OD Co D values
3)	To learn components of plant tissue culture and animal tissue culture media , types of plant tissue culture as well as animal tissue cultures and their various applications	Describe and compare types of plant tissue cultures & animal tissue cultures media used in both, fermenters used in both and applications of plant tissue culture as well as animal tissue culture
4)	To learn different methods of immobilization their merits and demerits applications and various immobilised enzyme reactors for production of bioprocess derived products	Describe and compare immobilization of cells and enzymes, Methods used in immobilization, their advantages and disadvantages and also various applications of immobilised cells and enzymes
5)	To learn the principle working and detection methods of various instruments which could be useful in deciding the progress of bioprocess and to establish relationship between various bioprocess products	Describe and use the sophisticated instruments in analysing products of bioprocesses and their intermediates as well as to evaluate the progress of the bioprocess.
6)	To understand the principle of bioassays different methods and their accuracy to establish the progress of a bioprocess	Describe and calculate the yield of biological products as well as predict the progress of the fermentation process by performing suitable biological assays
7)	To carry out various protocols to evaluate the product produced by bioprocess for its quality, sterility and safety	Describe & implement the quality assurance and quality control as well as sterility assurance and sterility control protocols to evaluate the quality of the bioprocess product