Gujarat University

Syllabus M.Sc. part-II (Microbiology, 1994-1999)

There shall be 3 theory papers, each of 100 marks and 3 hours duration. The practical examination will be of 150 marks out of which 20 marks will be assigned on the basis of oral examination.

Paper-IV : Advances in Microbial Technology

1. Modification and induction
   Substrates
   Bioreactors
   Products
2. Aspects of up and down stream processing
   Sterilization
   Aeration and agitation
   Antifoam and steering agents
   Product recovery
   Concept of scale up
3. Enzymes and Tissue culture
   Immobilization of enzyme and cells
   Tissue culture
   Monoclonal antibody
4. Microbial biomass
   SCP, SCO, Vaccines
   Bio-fertilizers, Bio-insecticides
   Food, feed and bakers yeast, Mushroom
5. Micro organisms as catalyst
   Steroid transformation
   MEOR
   Bio-leaching of metals
   Starters

Papers-V : Economic Microbiology

Survey of microbiological products, detailing of the microbes involved, fermentative production and recovery of the products specified for each of the following topics:

1. Antibiotics: Penicillin, Tetracycline
2. Enzymes: Amylases, proteases, lipases
3. Alcohol and organic acids : Acetone butanol, 2-3 butylene glycol, citric acid, acetic acid, lactic acid
4. Vitamins, amino acids and beverages: Vit. B2, Vit. B12, glutamic acid, lysine, wines, beer, cidar, sake, keffir
5. Biofuels and biopolysaccharides : Biogas, gasohol, dextran, xanthan

Paper-VI : Environmental Microbiology

1. Microorganisms as geochemical agents
   Fitness of m.o. as geochemical agents
   Influence of environmental factors on distribution of m.o. in environment and influences of man thereupon
   Cycles of matter and mineralisation
   Population interactions
2. Drinking and waste water management
   Care and monitoring of drinking and recreational waters
   Disposal of domestic wastewater
   Principles of disposal of industrial wastewater
3. Biodegradation
   Survey of recalcitrant and nonrecreational compounds entering ecosystem
   Biodegradation of lignin, pesticides, hydrocarbon, dyes, soaps and detergents
4. Pollution microbiology
   Propollution activities of microorganism
   Antipollution activities of microorganism
5. Biodeterioration
   Principles and microbial mechanisms
   Testing methodologies
   Biodeterioration of materials

Practicals : 15 titles for each paper will be announced with their reference at the beginning of the term every year.

Seminars : A student will be required to deliver at least one seminar per year.

References : For each topic the most current references available will be announced prior to introduction in university class.