

## **Course Outcomes (COs): B. Sc. Biotechnology**

### **B. Sc. I Biotechnology**

- Theory** The students of this get acquaint with the importance of components of environments & its betterment, contribution of microbiology scientist, types of microbes, branches of microbiology & anatomy of microbes, basic statistical aspects, measures of central tendencies, measures of dispersion and probability. They are enabled to know the concepts of breeding, physiology, nutrition, herd-health & profitable animal production and also the basic principles, processes & functions of plant growth reproduction & photosynthesis for biotechnological approach. Students can understand the natural sciences dealing with the composition of substance & their properties. Students get information about cell & its importance in biology and understand the anthropogenic activities in environment, its sources, impact & controlling measures to attend sustainable development. Students take methodological review of cultivation of microbes, pure culture, staining, sterilization & disinfection, identify, classify & nomenclature the micro-organisms (bacteria, fungi, algae), animals and plants as well as they can understand the basic principles & process of plant and animal tissue culture, chemical process within & relating to living organisms. In addition, students get knowledge of basic principles & application of plant and animal physiology and get information about computer literacy & awareness of technology used in daily life. In addition, English language teaching provides the knowledge about basic English grammar, communication skills & use of language in creative writings.
- Practical** During the practical hours students know the cytological techniques, cultivation of microbes under the aseptic conditions. Students are enabled to analyze environmental factors like soil and water. They are also made aware of the collection, preservation & presentation of insects, their types, life cycle and the characteristics. They are also made to know the different types of plants, their life cycle, mode nutrition and pattern of development on the culture medium. In addition, students are subjected to carry out the qualitative & quantitative analysis of protein, carbohydrates and amino acid and are enabled to find out osmotic pressure on RBCs, Bleeding Time & Clotting Time of blood. It also helps to understand the cell physiology of human being, calculation of derivative, integration, central tendencies, dispersion, drawing some

diagram using computer excel sheet.

### **B. Sc. II Biotechnology**

Theory Students become able to study the genes (DNA) and their inheritance at molecular level as well as get the knowledge of molecular biology. They also get information about analytical instruments in life sciences and research activities. Students are made aware with the cells and organs structure, immunity, antigen, and antibody, the interaction between them, Major Histocompatibility Complex & cytokines. They are made aware about humeral and cell mediated immunity, monoclonal antibodies, hyper sensitivity, auto immunity, Vaccines & hematology. The study of genetics helps the students to know the structure of chromosome and functions which can be helpful for future projects. Students can understand the principle, process & applications of plant tissue culture.

Practical Student can understand and articulate the nature of science, and its development through the scientific method as well as to identify the characteristics and basic needs of living organisms and ecosystems. It also helps to develop biomedical techniques, devices and systems that require substantive expertise in biology. It gives information about important techniques of animal tissue culture such as sterilization, media preparation, cell viability etc. Furthermore it helps to learn different life cycles of plants, their mode & pattern of development. The practical course enables the students to determine clotting time, hemoglobin, RBC, WBC, DLC, Latex, Coombs, Widal, VDRL etc. tests & immune-electrophoresis.

### **B. Sc. III Biotechnology**

Theory Students are subjected to know about the screening of antibiotic producer, vitamin, antibiotic assay, citric acid, amylase, sauerkraut, Bio-insecticide, wine production, determination of milk's-SPC, MBRT, Phosphates, sugar, Calcium, Magnesium, isolation of lipolytic & lactic acid producer and MIC. In addition, they get knowledge about the benefits of micro-organisms & spoilage of food and dairy products by the microorganisms. Students get acquaint with the applications of genetic engineering in xenobiotic degradation, utilization of sugar, polymer synthesis, vaccine production, characteristics modification in plants, animals & industrial microbes and enzyme immobilization, enzyme & metabolic engineering, environmental remedies,

toxicology & bioethics. English language teaching creates passion about grammatical skills, communication skills & to develop interest in various creative writing.

**Practical** Students are enabled to know the reproductive biology practically with respect to sperms, eggs, Cleavage, Blastula, Gastrula and development of frog-chick. Students are made aware practically of different types of cancers, oxygen consumption in animals, embryonic and morphologic aspects of plant life. Practical of genetic engineering helps to understand the modern biotechnology in terms of isolation & quantification of genomic, plasmid DNA from microorganism, ligation, use of restriction enzyme, molecular weight of nucleic acid, PCR. In addition, students develop an ability of screening antibiotic producer, vitamin antibiotic assay, citric acid, amylase, sauerkraut, bio-insecticide, wine production, determination of milk's-SPC, MBRT, Phosphates, sugar, Calcium, Magnesium, isolation of lipolytic & lactic acid producer and MIC.