DEPARTMENT OF BIOTECHNOLGY

B.Sc. Biotechnology

Program Objective (PO)

PO1: Students learns the concepts in various allied subjects

PO2: Students will enrich with knowledge in basic and applied aspects of life sciences.

PO3: Students build interdisciplinary approach in teaching/ learning & in research.

PO4: To inculcate the sense of scientific responsibilities and social awareness

PO5: Students develop a progressive and successful career in academia and industry.

Program Specific Objective (PSO)

PSO1: In Biotechnology course, students are trained to apply this knowledge particularly in day-to-day applications of biotechnology and to get a glimpse of research.

PSO2: Biotechnology trained students provides academic and professional excellence for immediate productivity in academics, government organization, biomedical sectors, health and nutrition settings for ultimate benefit of society and sustainable development.

COURSE OUTCOMES

FY B.Sc. Biotechnology (CBCS 2019 pattern)

BBt-101 Fundamentals of Chemistry-I

CO1: Students aware about basic concept of chemistry, atomic structure and thermodynamics.

CO2: Student understand that may biological phenomenon are based on concept found in chemistry

BBt-102 Fundamentals of Physics

CO1: Students learn basic concept of physics and learn to correlate this phenomenon to biological process and mechanism.

BBt-103 Biochemistry I

CO1: Various organic bio molecules, their properties and their role in cellular Organization are explained here.

BBt-104 Biophysics

CO1: Basic physical terms related to life science, like radioactivity, Electrical model of cell membrane is explained in this course

BBt-105 Animal Sciences I

CO1: Students learn about Kingdom Animalia and a variety of animal tissue, also aware about Invertebrate and vertebrate model system

BBt-106 Plant Sciences I

CO1: This is to study about plant world & classification.

CO2: This is to study of external and internal structure of plant

BBt-107 Microbiology I

CO1: Students were introducing to microbial world, discoveries made by various scientist, structure of microorganism and classification of it.

BBt-108 Biomathematics and Biostatistics-I

CO1: Learn the concepts in mathematics and statistics which is used to analysis the biological data

BBt-109 Practical In Chemistry and Biochemistry

CO1: Students learn chemical and biochemical technique like titration, enthalpy and entropy, pH-meter, Working of Colorimeter, Qualitative analysis of sugar and lipid, practically

BBt-110 Practical in Plant and animal Science

CO1: Learn the morphology and classification of Algae, fungi, bryophytes, pteridophytes, gymnosperms

CO2: Learn the anatomy of root, stem & leaf of dicot and monocot plant

CO3: Study of Paramecium, hydra, drosophila life cycle.

BBt-111 Practical in Microbiology & Biostatistics

CO1: Students learn to handle common microbiological instruments and equipment Incubator, Hot Air Oven, Autoclave, Colorimeter, pH Meter,

CO2: Distillation Unit, Chemical Balance, Laminar air flow hood, Clinical Centrifuge.

CO3: Students learn aseptic handling of microorganism, staining technique.

CO4: Uses of MS excel spreadsheets for data organization. Learn t-test, Chi square test, analysis of variance

BBt-112 Practical in Physics and Biophysics

CO1: Learn physical terms and their application in biology.

CO2: Learn travelling microscope, surface tension, osmosis and working of GM counter

BBt-201 Fundamentals of Chemistry II

CO1: Learn theory behind preparation of buffer.

CO2: Concept of mole, molarity and Methods of expressing concentrations of solutions.

BBt-202 Biochemistry II

CO1: Students learn ultra-structure and function of bio molecules like proteins, vitamins, enzymes and nucleic acid

BBt-203 Bioinstrumentation

CO1: Learn the various analytical techniques, like spectroscopy, chromatographic technique, pH meter, centrifuge and microscope their working, principal and construction.

BBt-204 Animal Sciences II

CO1: Learns animal physiology, parasitology and application of zoology in Vermiculture, Aquaculture, Sericulture, Apiculture

BBt-205 Plant Sciences II

CO1: Students learn plant economics of Cereals, Pulses, Oil seeds, Fiber plants, Medicinal Plants, Timber yielding along with plant metabolism

BBt-206 Microbiology II

CO1: Learns how to grow the organism, how to control growth of organism and interaction of microorganism with other life

BBt-207 Biomathematics and Biostatics-II

CO1: Learns concept in Mathematics like calculus, linear equation, and probability and hypothesis testing

BBt-208 Computer in biology

CO1: Students learns application and concept of computers, data processing, computer viruses, various operating system.

BBt-209 Practical In Chemistry & Biochemistry II

CO1: Student learns to check viscosity, to calculate molarity and normality by titration method.

CO2: Learn to check the concentration of protein, and cholesterol. Learn to separate amino acid from mixture and to find out enzyme activity.

BBt-210 Practical in Plant and Animal science II

CO1: Learn the process of osmosis, to determine rate of respiration, to estimate chlorophyll content and Effect of plant growth regulators on germination of seed

CO2: Learn to dissect observe honey bee and study Plasmodium. Learn to count RBCs using haemocytometer

BBt-211 Practical in Microbiology & Bioinstrumentation

CO1: Learn to prepare bacterial and fungal growth media, cultivation of microorganism, counting of organism by various techniques.

CO2: Learn working and component and principle of various bio instruments like, centrifuge, microscope, pH meter, colorimeter, spectrophotometer

BBt-212 Practical In Computer & Biostatistics

CO1: Learn to use word, excel, power point and their uses in biology. Learn to use Wizards & Templates. Learn to use computer for statistical analysis.

S.Y. B.Sc. Biotechnology (CBCS 2019 pattern)

BBt-301 Cell Biology

CO1: Students learn ultra-structure of eukaryotic cells.

CO2: Learn organisation of cells, cell organelle and their function

BBt-302 Molecular Biology I

CO1: Students learn molecular basis of nucleic acid, RNA and DNA, their molecular structure and function.

CO2: Learns structure, function of heredity material of prokaryotic cells, viruses and cell organelle.

CO3: Learns concept of genetic code

BBt-303 Genetics

CO1: Learns genetic basis of inheritance pattern. Learns genes are responsible phenotypic characteristics.

CO2: Learns chromosomal aberrations and Mutations and various types genetic disorders develop due to that. Learns mechanism of Sex Determination

BBt-304Metabolism

CO1: Learns energy production cycle and energy utilization mechanism.

CO2: Learns production and utilization pathway of lipid, carbohydrate, amino acid and nucleotide

BBt-305 Environmental Biotechnology

CO1: Learns the biological aspect of environment.

CO2: Relationship between biotic content environmental components.

CO3: Learns component of environment, component of ecosystem.

CO4: Threat to ecosystem, current global environmental issues.

CO5: Learns biotechnological solution for environmental problems.

BBt-306 Bio analytical Techniques

CO1: Learns various tools and technique to analyse the biological analyte.

CO2: Learns principle, construction, working and function the various instruments like centrifuge, spectrophotometer, chromatography, electrophoresis.

BBt-309 Practical in Cell Biology and Genetics

CO1: Students gets hands on training and learn technique to isolate and observe the various cell organelle likes mitochondria, chloroplast, nuclei and lysosomes.

CO2: They also ware about the eukaryotic and prokaryotic cell by direct observation of specimen.

CO3: Students learn to measure the size of various cells using micrometry.

CO4: Students also solve problem regarding various inheritance pattern to learn theory behind it

BBt-310 Practical in Bio Analytical Technique and Metabolism

CO1: Learn to separate small molecule using chromatography technique.

CO2: Learn separation of protein and DNA using electrophoresis technique.

CO3: Students learn technique to quantitative estimation of various molecules like carbohydrate, cholesterol, enzymes, creatinine and cholesterol.

BBt-311 Practical in Molecular Biology and Environmental Biotechnology

CO1: Student learns isolation of nucleic acid, DNA and RNA from various source, detection and quantitation of these molecules.

CO2: Learns various properties of nucleic acid practically.

CO3: Students get training to find level of pollution using biological indicators.

CO4: Learns to examine various properties of polluted soil.

CO5: Students able to check genetic effect of polluted water.

BBt-401 Cell Biology II

CO1: Learn mechanism of animal and plant cell division/ growth and their control to produce healthy new cells.

CO2: Learns various signalling mechanism required to coordinate the physiological and metabolic functions; to communicate environment, other cells and organelle.

CO3: Students learn various way of death of cell follows in different condition.

BBt-402 Molecular Biology II

CO1: Learns, how cells synthesis DNA copy, proteins? Mechanism to avoid mistake during DNA synthesis and if mistake/ damage take place; how to repair it.

CO2: Learns mechanism of regulation of gene functioning

BBt-403 Immunology

CO1: Learns mechanism of defence of human body against pathogens.

CO2: Various component of body involve in killing or deactivating the pathogens.

CO3: Learns the component and their mechanism of action which already presents in body and produce after invasion of pathogens.

CO4: Learns theory of vaccine, mechanism of action and production of vaccine.

BBt-404 Animal Development:

CO1: Students learn theory behind development of embryo to organism.

CO2: Mechanism of tissue organisation and pattern of arrangement various organ in specific manner.

CO3: Theory of development of embryo to adult and aging

BBt-405 Plant Development

CO1: Students learn difference between plant and animal development.

CO2: Learns various phases of plant development.

CO3: Formation and pattern of different plant part.

CO4: Understand, how various plant parts acts as stem cells and may develop in to new plant.

CO5: Learns different type of reproduction like pathogenesis

BBt-406 Microbial Biotechnology

CO1: Learns the theory behind technique to use of microorganism for the production of various microbial food and dairy products at industrial scale, also products like Microbial Sweeteners Microbial toxins Microbial Polysaccharide Bio fertilizers and Bio pesticides and Microbial plant growth Promoters.

CO2: Learns role and mechanism of microorganism in causing human diseases.

CO3: Students also learns role of microorganism in water pollution and treatment of waste water using the same microorganism.

BBt-409 Practical's in Molecular Biology and Microbial Biotechnology

CO1: Students gets hands on training to isolated DNA from prokaryotic and eukaryotic cells. They also train to quantitate DNA, RNA and protein.

CO2: Students able to isolate microorganism responsible for food spoilage.

CO3: Learns to examine the quality of milk and potability of water.

BBt-410 Practical's in Animal & Plant development

CO1: Learns various stages of frog and chick embryo development by observing slide.

CO2: Observe stages of chick embryo and effect of toxicant on deformation of embryo by growing the chick embryo in laboratory.

CO3: Learns methodology to study plant development, apices and meristem.

CO4: Learns the technique to observe the male and female gametophyte and developmental stages during plant embryogenesis in dicots and monocots

BBt-411 Practical in Cell Biology and Immunology

CO1: Learns the technique to observe the various stages of cell division; effect of toxicant on division of cells.

CO2: Student learns the technique to find the human blood group, number of different cells present in blood.

CO3: Learns the various type of antigen antibody reaction and application of it in diagnosis of diseases.

T.Y. B. Sc. Biotechnology (CBCS 2019 pattern)

BBt-501 Industrial Microbiology

CO1: Students learns industrial processes of large scale production microbial products.

CO2: Students learn strategy to find organism that has commercial value from various source.

CO3:Learns the various type of fermenter that can use for production of microbial products

BBt-502 Recombinant DNA Technology

CO1: Students learn basic theory of modification of DNA and significance of modification.

CO2: Students learns the use of tools used for recombination of DNA, Students learns application of Recombination DND technology and able to find more application of Recombination by various combination of DNA

BBt-503 Plant Tissue culture

CO1: Learns, how to grow the plants in laboratory? Learns the basic chemical requirements, tools and technique required for growing plant.

CO2: Methods to grow various plants parts in laboratory. Significance/ commercial application of plant tissue culture

BBt-504 Animal Tissue Culture

CO1: Learns maintain and growing animal cells.

CO2: Student knows different types of animal cells require different types of technique to propagate in vitro.

CO3: Students learns to set basic ATC laboratory. Students learns, how to preserve the cells? The use of animal tissue culture

BBt-505 Applied biotechnology I

CO1: Students learns various application of biotechnological phenomena for human use.

CO2: Students learns technology that can use for composting in agriculture.

CO3: Technology use in diagnosis of medical complications

CO4: Students learns the principle of Nano biotechnology and its applications

BBt-506 Biodiversity and systematics

CO1: Learns the various biological components present on earth, their relation, mechanism of relation.

CO2:Variety of biological components and possible applications due to variation. Different types of laws to handle and use of wildlife resources.

BBt-509 Practical Course in Industrial Microbiology

CO1: Students able to isolate antibiotic producing organism from soil.

CO2: Students learns technique to produce citric acid, antibiotic, ethanol, wine at laboratory scale and also able to analyse quality and quantity of these microbial products

BBt-510 Practical Course plant tissue culture and Animal Tissue culture

CO1: Students able to grow the animal cells and plant tissue in laboratory.

CO2: Become familiar with difference to grow various type plants parts and animal cells.

CO3: Students can design a layout and set a new ATC laboratory.

CO4: Students knows importance of maintenance of aseptic condition in tissue culture laboratory.

BBt-511 Practical Course in R-DNA Technology &Biodiversity

CO1: Students learns isolation of plasmid DNA.

CO2: Learns the cutting and joining of DNA which required for making combination of DNA for new products.

CO3: Knows, how to use instruments? like PCR and gel electrophoresis.

CO4: Students learns the methodology to work with biodiversity.

CO4: Learns to take sample of organism and to find diversity of each group.