



JAI HIND COLLEGE

Basantsing Institute of Science & J. T. Lalvani College of Commerce.
and Sheila Gopal Raheja College of Management.

Autonomous

Program Name: Bachelor of Science (B.Sc in Biotechnology)

PROGRAM OBJECTIVES:

PO1: To develop knowledgeable and skilled Biotechnologists who have an in-depth understanding of the latest developments in the field.

PO2: To equip the student with the ability to apply skills learnt into practice.

PO3: To instill and nurture research aptitude, ability to read and understand Scientific literature amongst young graduates.

PO4: To inculcate entrepreneurial interests, innovative thinking and problem-solving aptitude such that more employment opportunities are generated in the field of Biotechnology and allied fields.

PO5: To empower students with soft skills like written and academic write up

PO6: To empower students with verbal communication.

PO7: To help students towards being ethically responsible citizens.

PO8: To sensitize students on Environmental issues like types of pollution, Conservation of natural resources, Bioremediation, Sustainable Development, Respect for Biotic as well as Abiotic factors.

PO9: To inculcate entrepreneurial interests, innovative thinking and problem-solving aptitude such that more employment opportunities are generated in the field of Biotechnology and allied fields.

PO10: To enable students to live a healthy lifestyle by making informed decisions regarding choices towards health and implement lifelong learning.

COURSE OUTCOMES:

CO1: Develop conceptual knowledge and problem solving regarding different products and provide a detailed insight about the recent research so that knowledge can be used to write research paper.

CO2: Implement concepts of Homozygosity, heterozygous, Allele, and Learn the concept of karyotype analysis and identification of genetic abnormalities.

CO3: Explain the concept of genetic, species and ecosystem biodiversity and identify the experimental models based on prokaryotic and eukaryotic systems.

CO4: Explain the methodology of pure culture techniques and the principle, working and application of bright-field microscopy, dark-field microscopy and phase contrast microscopy.

CO5: Identify and classify elements based on the periodic table and atomic details and refer to examples of biological samples and their bonds.

CO6: Explain the concept of entropy and apply it for different types of chemical processes and articulate it diagrammatically, representation of cis, trans, erythro, meso-isomers

CO7: Make students apply theories of fermentation as well as chemical oxidation-reduction reactions to practical/real life scenarios and calculate and predict genotypes and phenotypes of various Mendelian Genetics crosses.

CO8: Differentiate eukaryotic as well as prokaryotic cells using different objectives, viz., low power, high power and oil immersion objectives and use an enrichment medium to cultivate algae in the laboratory using pond water.

CO9: Calculate the strength of weak acid using incomplete titration methods and analyse and differentiate different types of organic salts.

CO10: Illustrate the detailed structure and function of the various cell organelles of the microorganisms and provide the significance and application of the cell organelle.

CO11: Describe the role of various enzymes and proteins in the process of DNA replication, and calculate allelic frequencies for populations that are in Hardy-Weinberg equilibrium.

CO12: Elucidate the mechanism of enzyme activity and associate the vitamin deficiency disorders with their solubility and biochemical functions

CO13: Describe the importance of plant and animal cell culture and be able to connect with green

biotechnology and Solve problems related to measures of central tendency and dispersion.

CO14: Analyze structures and classification of standard amino acids, carbohydrates and gain knowledge about diversity in lipids, their structure and biological function.

CO15: Determine the oxidation number of various compounds and differentiate between oxidation number and valency, and determine the order of the reaction using: integration method, graphical method, Ostwald's isolation method and half-time method and discuss different techniques used for separation of precipitates.

CO16: Explain students stepwise, pour plate technique and calculate number of cell present, understand the principles of staining techniques

CO17: Detect the activity of Amylase using Starch agar and *Bacillus* cultures and Represent data using biostatistics the appropriate method viz. frequency polygon, histogram, bar diagram.

CO18: Understand the need of standardization of commercial products and Separate and characterize different amino acids using paper chromatography.

CO19: Classify and identify the different biomolecules that constitute the cell membrane and State role of Macrophages in phagocytosis

CO20: Elucidate the concept of the central dogma and its significance in molecular biology.

CO21: Differentiate between traditional and modern Biotechnology and Discuss advantages and ethical issues surrounding genetically modified foods.

CO22: Describe not only the techniques involved in purification of water but also assessment methods to check quality of potable water and Explain Bioremediation and also distinguish between phytoremediation and microbial remediation.

CO23: Describe transport and activation of fatty acids in the human body and describe and justify effect of pH, temperature, enzyme concentration and substrate concentration on enzyme activity

CO24: Describe basic principle of spectroscopy and types of spectrometers, centrifugation and and they will be able to differentiate sample for instruments and understand various factors affecting migration of charged particle under electrophoretic field

CO25: Select the experimental model for an experiment. and summarize the scientific methods and processes by using software.

CO26: Explain the principle and significance of pasteurization of milk, types of process

CO27: Summarize Composition of gel matrix, Sample Buffer, Tank Buffer, and composition of staining and Destaining solution for PAGE

CO28: Analyze wastewater treatment by evaluating the organic and inorganic parameters

CO29: Compare and contrast the structure and organization of the microtubules, microfilaments and intermediate filaments.

CO30: Explain the role of plasmids as cloning vectors and discuss the fate of partially diploid E. Coli cell with LacOc mutation in the presence and absence of glucose using a diagram

CO31: Classify diseases on the basis of mode of transmission, state of host, severity of the disease, frequency of occurrence, describe pathogenicity or progression of diseases caused by the mentioned pathogens in different tracts or parts or organs of the human body.

CO32: Demonstrate the concept of meiosis and will be able to illustrate the stages of cell division using diagrammatic representation and distinguish between parametric and non-parametric tests and Solve problems related to hypothesis testing

CO33: Differentiate general reactions of amino acids such as transamination, deamination and decarboxylation and understand different analytical techniques and also be able to interpret the result obtained after the experiment using these techniques.

CO34: Summarize the concept of radioactivity and isotopes and differentiate the naturally derived and chemically synthesized polymers and Justify significance and limitations of green chemistry

CO35: Signify the motivational factors and barriers in the journey of an entrepreneur and describe the steps of Business planning procedure (Preliminary investigation, Marketing Plan, Operational /Production Plan, Organizational Plan and Financial Plan).

CO36: Demonstrate antibacterial activity of lysozyme from suitable body fluid sample

CO37: Study the technique of cloning a fragment of DNA following insertion into a suitable vector.

CO38: Synthesize nanoparticles and characterize their properties using spectroscopic methods

CO39: Discuss Structure of Chemokine and its role in cellular communication and Illustrate Monocyte/ Neutrophil Extravasation using a suitable diagram

CO40: Interpret the significance of developmental biology, mammalian physiology and endocrine system.

CO41: Explain Complete Biochemical pathway for Conversion of Galactose to Glucose using Biochemical reactions with structures.

CO42: Make Outline of general steps involved in gene cloning and interpret the cell:volume ratio and be able to analyze the concept of cryopreservation.

CO43: Identify and categorize BMI values according to reference charts and describe different methods of body composition evaluation.

CO44: Calculate and report Total RBC count of the sample and interpret

CO45: Determine whether the patient is suffering from any glucose homeostasis related abnormalities at home using suitable method

CO46: Determine sugar content in table sugar, sugar syrups, etc. by performing biochemical assays

CO47: Calculate BMR for a given coordinates (weight and height)

CO48: Justify Immune activation is required for CMI and Explain stepwise CTL mediated killing of target cells and explain the terms: Tolerance, Autoimmunity, central and Peripheral Tolerance, Ag Sequestration.

CO49: Explain the terms commonly encountered in Pharmacology such as, drug, pharmacodynamics and summarize the hormones related to GI tract and their function.

CO50: Elucidate the four stages in the formation of cholesterol from acetyl coA and summarize the usefulness of the ENCODE project.

CO51: Describe the various types of PCR commonly used in research and medical diagnosis

CO52: Determine Blood group of the sample provided using Reverse typing method and Determination of TDP for enteric bacteria. Set up an extensive experiment to determine sterility of any given injectable along with use of appropriate negative and positive controls and write a research proposal in an area of active interest and also plan in detail the experiments. Write an abstract and refer to published papers for literature survey and discussion of their own work done.