BISHOP COTTON WOMEN'S CHRISTIAN COLLEGE
C.S.I Karnataka Central Diocese
#19,3rd Cross, C.S.I Compound, Mission Road, Bengaluru – 560027
Affiliated to Bengaluru City University

Contact No: 080 – 22212933/22129880
Email: principal@bcwcc.edu.in Website: www.bcwcc.edu.in

DEPARTMENT OF BIO TECHNOLOGY

PROGRAM OUTCOMES

PO1 **Critical Thinking**: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decision (intellectual, organizational, and personal) from different perspectives

PO2 **Understanding science**: Nurturing and developing the scientific attitude, temper & curiosity in understanding the phenomenon of life.

PO3 **Science & benefits**: Ability to communicate science to common man, developing the respect for all forms of life and creating the awareness of interdependency of science technology & society

PO4 **Ethics**: Recognize different value systems including your own, understand the moral dimensions of your decisions and accept responsibility for them.

PO5 **Environment, Sustainability and Life-long Learning**: Understand the issues of environmental contexts and sustainable development by acquiring the ability to engage in independent and life-long learning in the broadest context socio-technological changes

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DEPARTMENT OF BIOTECHNOLOGY

COURSE OUTCOMES

I SEM: CELL BIOLOGY AND GENETICS

Course Outcomes (COs): At the end of the course the students will be able to:

1. Understand concepts in Biotechnology and demonstrate knowledge acquired in interdisciplinary skills in cell biology and genetics
2. Comprehend the structure of a cell with its organelles
3. Understand the chromatin structure and its location
4. Understand the basic principles of life, and how a cell divides
5. Explain the organization of genes and chromosomes, chromosome morphology and its aberrations

II SEM: MICROBILOGICAL METHODS

- Demonstrate skills as per National Occupational Standards (NOS) of "Lab Technician/Assistant" Qualification Pack issued by Life Sciences Sector Skill Development Council-LFS/Q0509, Level3.
- Skills enhancement as per National Occupational Standards (NOS) of "Lab Technician/Assistant" Qualification Pack issued by Life Sciences Sector Skill Development Council-LFS/Q0509, Level 3.
- Knowledge about major activities of biotech industry, regulations and compliance, environment, health and safety (EHS), good laboratory practices (GLP), standard operating procedures (SOP) and GMP as per the industry standards.
- Demonstrate soft skills, such as decision making, planning, organizing, problem solving, analytical thinking, critical thinking and documentation.

III SEM: BIOMOLECULES

At the end of the course the student should be able to:

1. Acquire knowledge about types of biomolecules, structure, and their functions
2. Willbeabletodemonstratetheskillstoperformbioanalyticaltechniques

3. Apply comprehensive innovations and skills of biomolecules to biotechnology field.

III SEM: Nutrition and Health

At the end of the course the student should be able to:

1. Study the concepts of food, nutrition, diet and health

2. To apply the best practices of food intake and dietary requirements

3. Acquire knowledge on various sources of nutrients and good cooking practices.

IV SEM: MOLECULAR BIOLOGY

At the end of the course the student should be able to:

1. Study the advancements in molecular biology with latest trends.

2. Will acquire the knowledge of structure, functional relationship of proteins and nucleic acids.

3. Aware about the basic cellular processes such as transcription, translation, DNA replication and repair mechanisms**.**

IV SEM: TITLE INTELLECTUAL PROPERTY RIGHTS

At the end of the course the student should be able to:

1. Knowledge about need and scope of Intellectual property rights

2.Acquire knowledge about filing patents, process, and infringement

3.Knowledge about trademarks, industrial designs, and copyright.

V SEM: GENETIC ENGINEERING

1. Demonstrate a thorough understanding of the fundamental principles and techniques of genetic engineering.

2. Apply the knowledge of genetic engineering to diverse applications in agriculture, medicine, biotechnology, and environmental science.

3. Perform laboratory procedures and develop practical skills in genetic engineering techniques.

4. Explain gene expression regulation mechanisms and apply genetic modification methods effectively.

5. Evaluate genetic engineering's ethical, social, and legal implications and propose responsible solutions.

6. Stay updated with recent advancements in genetic engineering, critically evaluate emerging trends, and assess their potential impact on various fields.

V SEM: PLANT AND ANIMAL BIOTECHNOLOGY

After completing this course, the student is expected to learn the following:

1. Demonstrate a comprehensive understanding of plant biology, physiology, genetics, and molecular biology.

2. Apply biotechnological tools and techniques used in plant research and agriculture, such as plant tissue culture, genetic engineering and transgenics.

3. Execute plant tissue culture techniques for callus induction, somatic embryogenesis, and micropropagation, and apply them in plant breeding and propagation.

4. Perform plant transformation methods and demonstrate the ability to introduce foreign genes into plants using different techniques.

5. Apply knowledge about ethical considerations and regulatory frameworks associated with plant biotechnology and genetically modified crops.

6. Understand the biology and characterization of cultured cells, including their adhesion, proliferation, differentiation, morphology, and identification.

7. Gain practical skills in basic mammalian cell culture techniques, measuring growth parameters, assessing cell viability, and understanding cytotoxicity.

8. Learn about germplasm conservation techniques and the establishment of gene banks, along with large-scale culture methods for cell lines.

9. Explore organ and histotypic culture techniques, biotransformation, 3D cultures, whole embryo culture, somatic cell cloning, and the ethical considerations surrounding stem cells and their applications.

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V SEM: BIOTECHNOLOGY SKILLS AND ANALYTICAL TECHNIQUES

At the end of the course the student should be able to:

1. Demonstrate skills as per National Occupational Standards (NOS) of the "Lab Technician/Assistant" Qualification Pack issued by the Life Sciences Sector Skill Development Council-LFS/Q0509.

2. Develop knowledge of laboratory safety procedures and protocols and acquire skills in handling and maintaining laboratory equipment and instruments.

3. Operate analytical equipment and instruments as per standard operating procedures (SOP)

4. Knowledge about major activities of the biotech industry, regulations and compliance, environment, health and safety (EHS), good laboratory practices (GLP), and Good Manufacturing Practices (GMP) as per the industry standards.

5. Demonstrate soft skills, such as decision-making, planning, organizing, problem solving, analytical thinking, critical thinking, and documentation.

VI SEM: IMMUNOLOGY

At the end of the course, the student should be able to:

1. Demonstrate comprehension of the underlying structure and function of the immune system and related disorders.

2. Demonstrate an understanding of the role of cells and molecules in immune reactions and responses

3. Demonstrate technical skills in immunological tools and techniques

4. Apply the domain-specific knowledge and skills acquired in immunology for innovative therapies and Immuno technologies

5. Understand the fundamental concepts of immunity, and the contributions of the organs and cells in immune responses.

6. Realize how the MHC molecule's function and host encounters an immune insult.

7. Understand the antibodies and complement system

8. Understand the mechanisms involved in the initiation of specific immune responses

9. Differentiate the humoral and cell-mediated immune mechanisms

10. Comprehend the overreaction by our immune system leading to hypersensitive conditions and its consequences

11. Understand unique properties of cancer cells, immune recognition of tumors, immune evasion of cancers

VI SEM: BIOPROCESS AND ENVIRONMENTAL BIOTECHNOLOGY

1. Exploitation of microorganisms for industrial use and their improvement, and formulation of media for efficient growth and production of microbial or cell-based products.

2. The design, operation, and specific applications of various bioreactors.

3. Demonstrate a comprehensive understanding of the fundamental concepts and principles of environmental biotechnology.

4. Apply knowledge of biotechnological techniques to address environmental challenges, such as pollution control and waste management.

5. Analyze and evaluate environmental biotechnology case studies, research findings, and real-world applications.

6. Design and implement biotechnological approaches for environmental remediation, utilizing microbial processes and biodegradation principles.

7. Evaluate the ethical and sustainable aspects of environmental biotechnology practices and make informed decisions regarding their application in environmental conservation.

8. Communicate scientific concepts and research findings related to environmental biotechnology effectively, both in written and oral forms, to diverse audiences.